PDHPE

SECOND EDITION

HSC Course

application and inquiry



STAN BROWNE ★ DEB CLARKE
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★ with assistance from the Australian Institute of Sport

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Contents

Introduction 1

Core 1: Health priorities in Australia 2

Chapter 1 How are priority issues for Australia's health identified? 4
Chapter 2 What are the priority issues for improving Australia's health? 20
Chapter 3 What roles do health care facilities and services play in achieving better health for all Australians? 52
Chapter 4 What actions are needed to address Australia's health priorities? 72

Core 2: Factors affecting performance 80

Chapter 5 How does training affect performance? 82
Chapter 6 How can psychology affect performance? 114
Chapter 7 How can nutrition and recovery strategies affect performance? 130
Chapter 8 How does the acquisition of skill affect performance? 148

Option 1: The health of young people 170

Chapter 9 What is good health for young people? 172
Chapter 10 To what extent do Australia's young people enjoy good health? 196
Chapter 11 What skills and actions enable young people to attain better health? ... 226

Option 2: Sport and physical activity in Australian society 240

Chapter 12 How have meanings about sport and physical activity changed over time? 242
Chapter 13 What is the relationship between sport and national and cultural identity? 256
Chapter 14 How does the mass media contribute to people's understanding, values and beliefs about sport? 268
Chapter 15 What are the relationships between sport and physical activity and gender? 274

Option 3: Sports medicine 284

Chapter 16 How are sports injuries classified and managed? 286
Chapter 17 How does sports medicine address the demands of specific athletes? .. 300
Chapter 18 What role do preventative actions play in enhancing the well-being of the athlete? 312
Chapter 19 How is injury rehabilitation managed? 334













Option 4: Improving performance 346

Chapter 20 How do athletes train for improved performance? 348
Chapter 21 What are the planning considerations for improving performance? 374
Chapter 22 What ethical issues are related to improving performance?..... 390



Option 5: Equity and health 402

Chapter 23 Why do inequities exist in the health of Australians? 404
Chapter 24 What inequities are experienced by population groups in Australia? 412
Chapter 25 How might the gap in health status of populations be bridged? 436

Syllabus Checkpoints 450

Appendix 460

Glossary 462

Acknowledgements 469

Index 470

Introduction

What's new?

PDHPE Application and Inquiry: HSC Course was written by a team of experts and educators and this *Second Edition* has been rewritten and updated for the requirements of the revised NSW Stage 6 PDHPE syllabus. The text closely addresses the revised 'learn about' and 'learn to' syllabus dot points. A variety of updated statistics and articles, trends and practices in the health priority issues, physical activity and nutrition will enable students to complete the course successfully.

Exam focused and authoritative

With an emphasis on exam success, the inclusion of end-of-chapter summaries, revision activities and exam-style questions will gear students for assessment success. Marking criteria and guidelines for each exam-style question are available for teachers online. Every student book has an **ebook** on CD-ROM with enhanced search functionality.

Application, Inquiry and Skills-based activities

The NSW Stage 6 PDHPE syllabus requires students to apply their knowledge practically and to develop critical inquiry and research skills. To assist students in developing these skills, three exercise types have been utilised in the book as with the previous edition: *Research and Review*; *Practical Application*; and *Critical Inquiry* investigations. In addition, NSW Board of Studies key terms are used throughout activities.

Online support

Go to oup.com.au/pdhpe12 for:



- marking criteria and guidelines for every exam-style question*
- sample answers and suggested responses
- AIHW (Australian Institute of Health and Welfare) report updates
- weblinks for further research. Corresponding links from the student text indicate where relevant links are available. Look for the 'web' icon.

Oxford University Press and the Australian Institute of Sport

The publisher and authors would like to thank the Australian Institute of Sport for their expert advice and assistance with revising and updating Chapter 7 on Nutrition and Recovery Strategies.

*Elements of the web support are password protected for teachers only. To enquire about your password, contact your local Oxford representative or send us an email at salesec.au@oup.com



outcomes

A student:

- H1 describes the nature and justifies the choice of Australia's health priorities
- H2 analyses and explains the health status of Australians in terms of current trends and groups most at risk
- H3 analyses the determinants of health and health inequities
- H4 argues the case for health promotion based on the Ottawa Charter
- H5 explains the different roles and responsibilities of individuals, communities and governments in addressing Australia's health priorities
- H14 argues the benefits of health-promoting actions and choices that promote social justice
- H15 critically analyses key issues affecting the health of Australians and proposes ways of working towards better health for all
- H16 devises methods of gathering, interpreting and communicating information about health and physical activity concepts



core 1

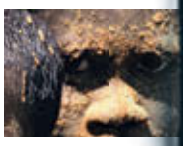
Health priorities in Australia

coming up Core 1 explores the major health issues identified as current priorities in Australia and investigates the reasons they are considered priorities. It also highlights the considerable inequalities in health status that exist and the groups most affected by these inequalities. Students will examine changes in health promotion over the past century culminating in the emergence of the 'new public health' approach. Australia's health care system is investigated in terms of its role in improving health status. The Core includes a study of the health priority issues using the Ottawa Charter as a framework for analysis.

FOCUS QUESTIONS

- How are priority issues for Australia's health identified? .....[page 4]
- What are the priority issues for improving Australia's health? .....[page 20]
- What roles do health care facilities and services play in achieving better health for all Australians? .....[page 52]
- What actions are needed to address Australia's health priorities? .....[page 72]









chapter 1

how are priority issues for AUSTRALIA'S HEALTH IDENTIFIED?

In this chapter you will learn how health status is measured and examine the role of epidemiology. You will critique the use of epidemiology to describe health status and analyse current trends in life expectancy and major causes of morbidity and mortality for Australians. You will also argue why decisions are made about health priorities for all Australians.

Measuring health status

To develop a health profile of a community or population, specific information is gathered from various sources. A large proportion of this information is collated annually by government organisations, such as the Australian Bureau of Statistics (ABS), the Australian Institute of Health and Welfare and non-government agencies (such as the Cancer Council and the Heart Foundation).

Role of epidemiology

Information on the health of a nation is gathered in many areas, including life expectancy, infant mortality rates, morbidity rates and use of health care services (for example, hospital admissions and Medicare claims). The study of this information is known as epidemiology. Epidemiology provides information on the distribution (or patterns) of disease, illness and injury and on the likely causes (or determinants) within groups or populations.





What can epidemiology tell us?

Epidemiology serves many purposes. These include:

- monitoring the major causes of sickness and death to identify any emerging issues and inequalities between groups
- identifying areas of need so that specific prevention and treatment interventions can be specifically targeted
- determining priority areas for the allocation of government funding
- monitoring the use of health care services and facilities
- evaluating the effectiveness of any prevention and treatment programs.

Who uses epidemiology?

Epidemiological information is used to inform the decision-making of many groups within the community. These include:

- policy developers at all levels of government
- the manufacturers of health products
- the providers of health services
- individual consumers.

An example of how epidemiology has been applied is in the area of heart disease. Epidemiology indicates that deaths from heart disease are decreasing, especially in males aged over 45 years. This is an indication that previously implemented management strategies have been effective.

WEB

Internet support concerning epidemiology measures can be accessed via www.oup.com.au/pdhpe12

Although epidemiology can provide statistical information on the incidence, trends and population groups most at risk of illness and disease, it fails to explain the socio-cultural factors that contribute to negative health behaviours. More recently, epidemiology has been challenged regarding this shortcoming, and has also been challenged as focusing primarily on physical health issues.

Health promotion campaigns that are designed in response to the statistics obtained through epidemiology alone, but which ignore social influences, can be ineffective. For example, epidemiology identifies 17–25-year-old males as being at high risk of injury from motor vehicle accidents, and it also identifies the risk factors that contribute to these accidents; for example, speed and alcohol. But epidemiology does not say why young males are more likely to engage in this risk behaviour and what the influencing factors are.



Figure 1.1 Epidemiology provides information on the distribution of disease, illness, injury and causes

Critical inquiry

1 a **Discuss** how epidemiology is able to tell us everything about health status.

b If epidemiology has shortcomings, **explain** how this additional information could be gathered.

Measures of epidemiology

The major measures used to determine the health of a population are:

- *Mortality rate*—This is also called death rate, and is a measure of the number of deaths from a specific cause in a given period of time (usually a year).
- *Infant mortality rate*—This is a measure of the annual number of deaths of children under 1 year of age per 1000 live births.
- *Life expectancy*—This is the average number of years a person of a given age and gender can expect to live.
- *Morbidity rate*—This rate provides information about the level of disease in specific populations. The main indicators used are prevalence and incidence.

In terms of the morbidity rate, prevalence is the number of current cases of a specific illness or disease (for example, 20 000 people in Australia infected with HIV) and incidence is the number of new cases of a disease or illness in a set time period (for example, approximately 800 new diagnoses of HIV per year).

Critical inquiry

Epidemiological findings are often presented in the form of statistical data. **Discuss** whether statistics always present the full story.

practical application

Create a health profile

1 Your class has been assigned the responsibility of creating a profile of the health status of the school population. The major tool you will use to establish this profile is a survey. The five areas on which you are required to gather information are:

- demographics (such as age and gender)
- physical activity patterns
- nutritional intake
- drug use
- interpersonal relationships.

a As a class, for each area develop a list of survey questions that will allow you to gather relevant information to create your school's health profile. Present your findings in graphs using Excel or another suitable program.

b Use your findings as the basis for a report on the health status of the school that could be included in the next school newsletter.

Research and Review

1 **Define** 'epidemiology'.

2 **Describe** what epidemiology can tell us.

3 **Identify** which people and organisations would use these measures.

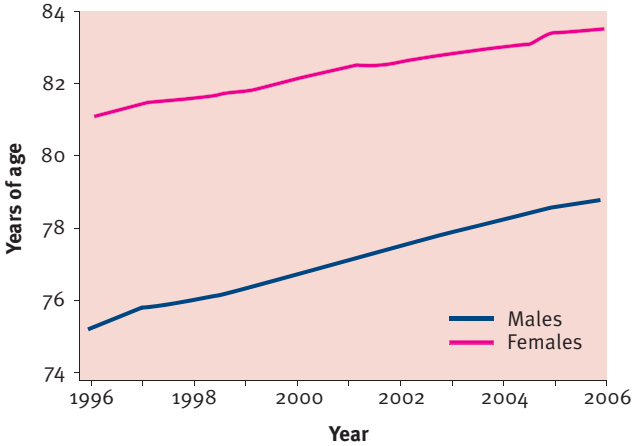
4 Research the latest epidemiological information on Australia's health status to produce a short article for the school newsletter. It should include the life expectancy and infant mortality rates for males and females in Australia.

Current trends in life expectancy

Australia is a very healthy country, and the health status of the Australian population continues to improve. An international comparison shows that Australia has one of the highest life expectancies in the world. In 2006, in Australia the average life expectancy of a newborn male was 78.7 years, and that of a newborn female was 83.5 years. This improvement has been gradual over time (see Figure 1.2).

One of the major contributing factors to increased life expectancy in the last hundred years has been a reduction in the infant mortality rate. Overall, there are fewer deaths of young children, especially in the first year of life. Early in the twentieth century, approximately 100 in 1000 infants died in the first year of life. This has now improved to be fewer than 10 in 1000 (see Table 1.1).

Infant mortality is the number of deaths of children under the age of 1 year in one calendar year



Source: ABS, Social Trends, 2008

Figure 1.2 Life expectancy at birth, 1996–2006

Table 1.1 Infant mortality rate (deaths per 1000 live births), 1997–2007

Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Rate	5.3	5.0	5.7	5.2	5.3	5.0	4.8	4.7	5.0	4.7	4.2

ABS, Social Trends, 2008

Life expectancy improvements in the first half of the twentieth century

In the first half of the twentieth century the major causes of sickness and death included influenza, diarrhoea and pneumonia. In addition to decreasing infant mortality, improvements in life expectancy can be attributed to two major factors:

- improved public health measures—such as water and food quality, sewerage systems and better education
- medical advances—such as the discovery of penicillin and use of large-scale immunisation programs.

Life expectancy improvements in the second half of the twentieth century

In the second half of the twentieth century the pattern of illness shifted from infectious diseases to lifestyle-related diseases, such as **cardiovascular disease** and cancer. Although decreasing infant mortality continued to lengthen life expectancy, increases in life expectancy also resulted from other factors. These included:

- national public health strategies
- continued medical advances
- education
- cooperation among health care agencies.

National public health strategies

National public health strategies have been effectively implemented in areas such as nutrition, physical activity, smoking, alcohol use, illicit drug use, sexual behaviour, sun exposure, driving of motor vehicles and immunisation.

Continued medical advances

Medical research and improved medical techniques have lengthened life through various procedures. These include coronary artery bypass surgery to address heart disease, and radiation and chemotherapy to manage cancer.

Education

Education has played a role in reducing mortality and morbidity from lifestyle diseases. The more active role of schools, government and media in education and health promotion has resulted in a more-informed population regarding the risk factors associated with the major lifestyle diseases. People are also more aware of the early signs of disease and the preventative steps that can be taken; for example, self-detection of skin cancer and breast cancer.

Cooperation among health care agencies

Coordination and cooperation among the many groups involved in health care has improved. This has established an environment that is more supportive of individual and community health.

practical application

Infant mortality

Table 1.1 presents infant mortality rates (per 1000 live births) from 1997 to 2007. Using these data, **construct** a line graph to illustrate the trend in infant mortality rates over the 10 years shown.

Critical inquiry

1 Australian life expectancy in 1796 was 25 years, in 1896 it rose to 48, and in 1996 it was 80 years. At this rate, in 2096 most Australians will reach over 110 years of age.

a **Discuss** whether this is likely.

b **Identify** the reasons this continued increase in life expectancy might or might not be possible.

Current trends in the major causes of morbidity and mortality

In Australia the top 20 specific causes of death were responsible for 74 per cent of all deaths in 2005. The main causes of these deaths are shown in Table 1.2.

Table 1.2 Main causes of mortality in 2005

Males	Females
Coronary heart disease	Coronary heart disease
Lung cancer	Cerebrovascular disease
Cerebrovascular disease	Other heart diseases
Other heart diseases	Dementia and other related disorders
Prostate cancer	Breast cancer

Table 1.3 Leading underlying causes of death, by age group, 2005

	Males		Females	
Age group	**Cause of death**	**Per cent of deaths***	**Cause of death**	**Per cent of deaths***
Infants (less than 1 year)	Conditions emerging from the **perinatal** period	52.1	Conditions emerging from the perinatal period	50.2
	Congenital anomalies	22.5	Congenital anomalies	24.8
	Ill defined	11.1	Ill defined	11.1
	Injury and poisoning	2.4	Injury and poisoning	2.4
1–14	Injury and poisoning	35.9	Injury and poisoning	35.4
	Cancer	16.7	Cancer	18.4
	Nervous system diseases	9.8	Nervous system diseases	7.2
	Cardiovascular disease	7.8	Ill defined	6.3
			Endocrine	6.3
15–24	Injury and poisoning	75.0	Injury and poisoning	57.1
	Cancer	6.3	Cancer	16.0
	Nervous system diseases	5.1	Nervous system diseases	5.4
	Cardiovascular disease	4.2	Cardiovascular disease	4.3
25–44	Cancer	51.9	Cancer	35.5
	Cardiovascular disease	14.1	Injury and poisoning	27.0
	Injury and poisoning	13.9	Cardiovascular disease	13.5
	Digestive disorders	4.3	Digestive disorders	4.4
45–64	Cancer	42.5	Cancer	57.3
	Cardiovascular disease	26.4	Cardiovascular disease	15.1
	Injury and poisoning	10.5	Injury and poisoning	6.3
	Digestive disorders	5.6	Respiratory system diseases	5.3
65–84	Cancer	38.1	Cardiovascular disease	34.3
	Cardiovascular disease	33.5	Cancer	33.8
	Respiratory system diseases	9.6	Respiratory system diseases	8.6
	Endocrine	4.0	Endocrine	4.7
85+	Cardiovascular disease	44.2	Cardiovascular disease	51.2
	Cancer	20.5	Cancer	12.6
	Respiratory system diseases	12.0	Respiratory system diseases	8.8
	Genitourinary diseases	3.5	Mental disorders	5.2

*Per cent of deaths within each age and sex group.

AIHW, Australia's Health, 2008

The cause of death varies according to age group. Injury and poisoning is the most common cause of death in the age groups 1–14 years and 15–24 years. For those aged 25–44 years, injury and poisoning is the leading cause of death in males, but cancer is the leading cause of death among females. In both sexes, cancer is the most common cause of death among those aged 45–64 years, followed by cardiovascular disease, which includes both coronary heart disease and stroke. Cancer and cardiovascular disease are the two most common causes among those aged 65–84 years, but cardiovascular disease dominates the 85 and over age group. Respiratory diseases are significant contributors to death among the elderly. The leading underlying causes of death for each age group are shown in Table 1.3.



Death rates for motor vehicle accidents fell when wearing seatbelts was made compulsory during the early 1970s.

Trends in mortality

Overall, death rates in Australia have fallen by around two-thirds over the past century. The decrease in deaths due to infectious disease is one of the major reasons for this reduction. Other reasons include improvements in sanitation and living conditions, increased understanding of infectious diseases, and the development and use of antibiotics and vaccines.

Table 1.4 Contributing causes of death, 2005

Rank	Contributing cause of death	Number of mentions	Percentage	Percentage underlying
Males				
1	Coronary heart disease	20 111	29.9	61.8
2	Other heart diseases	18 055	26.9	18.0
3	Cerebrovascular disease	9 041	13.4	51.6
4	Pneumonia and influenza	8 548	12.7	15.6
5	Chronic obstructive pulmonary disease	7 489	11.1	37.8
6	Renal failure	7 265	10.8	12.2
7	Diabetes	6 325	9.4	28.1
8	Essential (primary) hypertension	6 116	9.1	2.0
9	Dementia and related disorders	5 656	8.4	26.4
10	Lung cancer	5 016	7.5	93.6
11	Unknown primary site cancers	4 965	7.4	36.0
12	Other diseases of the respiratory system	4 770	7.1	5.6
13	Prostate cancer	4 240	6.3	69.5
14	Diseases of the arteries, arterioles and capillaries	3 914	5.8	31.1
15	Septicaemia	3 815	5.7	13.2
All male deaths		**67 241**		
Females				
1	Other heart diseases	19 417	30.6	22.5
2	Coronary heart disease	17 115	27.0	65.1
3	Cerebrovascular disease	11 590	18.3	59.1
4	Dementia and related disorders	10 048	15.8	32.6
5	Pneumonia and influenza	8 841	13.9	19.3
6	Essential (primary) hypertension	8 467	13.3	3.4
7	Renal failure	6 436	10.1	15.6
8	Diabetes	5 539	8.7	31.7
9	Chronic obstructive pulmonary disease	4 615	7.3	44.5
10	Other diseases of the respiratory system	4 260	6.7	6.7
11	Unknown primary site cancers	4092	6.4	38.9
12	Diseases of the arteries, arterioles and capillaries	3 861	6.1	30.3
13	Musculoskeletal and connective tissue disorders	3 704	5.8	19.7
14	Septicaemia	3 658	5.8	15.0
15	Breast cancer	3 432	5.4	79.2
All female deaths		**63 473**		

AIHW, Australia's Health, 2008

Trends in cardiovascular disease

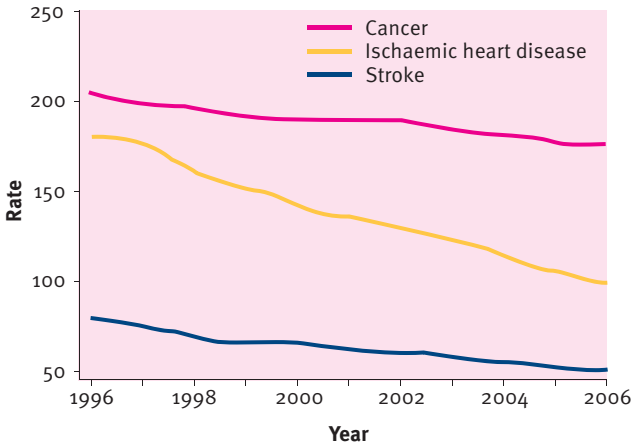
The major cardiovascular diseases that contribute to these death rate numbers are coronary heart disease, cerebrovascular disease (stroke) and peripheral vascular disease (leg pain cause by an inadequate blood supply to the legs). There has been a downward trend of cardiovascular disease since the 1960s due to improvements in risk factors and advances in treatment. This decrease is most prominent in males aged over 45 years.

Trends in cancer

The most common cancers leading to death are lung cancer in males and breast cancer in females. Cancer has increased in incidence over the past 20 years. Despite the incidence increasing, actual cancer mortality rates have fallen for both males and females. Death rates for colorectal cancer have been fairly steady until the late 1980s and have since fallen by around 40 per cent. By contrast, the death rate for **cervical cancer** began to fall in the mid-1960s and has dropped by around 75 per cent since then. Prevention and treatment strategies have been successful in the drop in cervical cancer death rates after the Pap smear became available to Australian females in the 1960s.

Trends in other causes of death

Death rates for motor vehicle accidents fell when wearing seatbelts was made compulsory during the early 1970s. Tracking trends in death rates and identifying changes in the future can help to set new priorities for policy, practice and research to improve the health of Australians.



Source: ABS, Social Trends, 2008

Figure 1.3 Trends in the incidence of the three main causes of death

WEB The ABS and AIHW websites can be accessed via www.oup.com.au/pdhpe12

Critical inquiry

If a cure for cancer were discovered tomorrow, what effect would this have on the incidence and prevalence of the other leading causes of sickness and death in Australia?

Research and Review

Complete the following tasks using Figure 1.3 and Tables 1.2–1.4 (pages 7–9) and any other relevant sources, such as the Australian Bureau of Statistics and the Australian Institute of Health and Welfare (AIHW).

1. **Identify** the major causes of sickness and death in Australia.
2. **Identify** the differences in the major causes of death for specific age groups.
3. **Describe** the trends in incidence and mortality of cancer, respiratory diseases and accidents.
4. The leading causes of injury from accidents are transport-related.
   - a **Discuss** possible reasons for the significant reduction of injury from transport-related accidents.
   - b **Identify** strategies that could be implemented to continue the decline.
5. a Apart from the major causes identified, what other diseases are major contributors to mortality in Australia?
   - b **Discuss** whether you perceive any of these increasing in the future. Provide reasons for your answer.

Differences in health status by gender

Current life expectancy tables show that females born between 2003–05 have a life expectancy that is six years longer than for males born in the same years. In fact, a female has a one-in-four chance of reaching 90 years of age, whereas a male has only one chance in 10. This gender difference in life expectancy is common to all countries, to varying degrees.

The difference in health status of females and males can be attributed to both biological and behavioural factors. Females seem to have a genetic advantage in terms of longevity. Varying behaviour patterns also affect morbidity and mortality; some of these behaviour patterns are related to genetics, and some to notions of masculinity and femininity. The types of work in which males and females are engaged also affect morbidity and mortality.

Males aged over 65 years are more likely to die from coronary heart disease, lung cancer, suicide and motor vehicle accidents.

Females aged over 65 are more likely to die from coronary heart disease, cerebrovascular disease, other heart diseases, dementia and related disorders, and lung cancer.

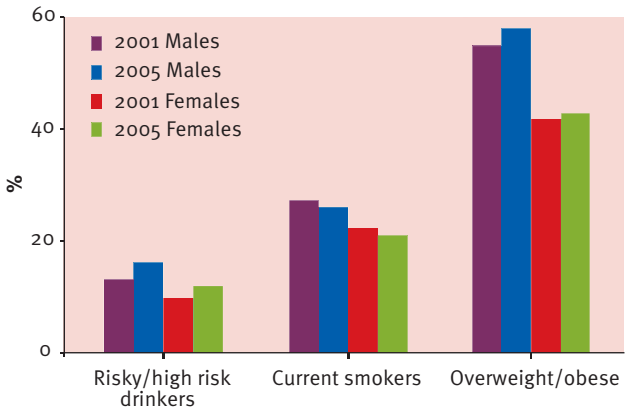
Australian youth, aged 15–24 years, also display significant gender differences in health status. Male death rates have been consistently higher than those for females. Females and males aged 15–24 years are more likely to die from:

- motor vehicle accidents
- suicide
- cancer
- drug dependence.

Gender differences also exist in risk behaviour. More males smoke, and they therefore have higher levels of lung cancer, heart disease and other smoking-related conditions. Certain occupations expose males to more hazards. Mining, construction work and farming have high proportions of males employed, and are high-risk occupations. Young males are more likely to participate in contact sports and high-risk motor vehicle activities.

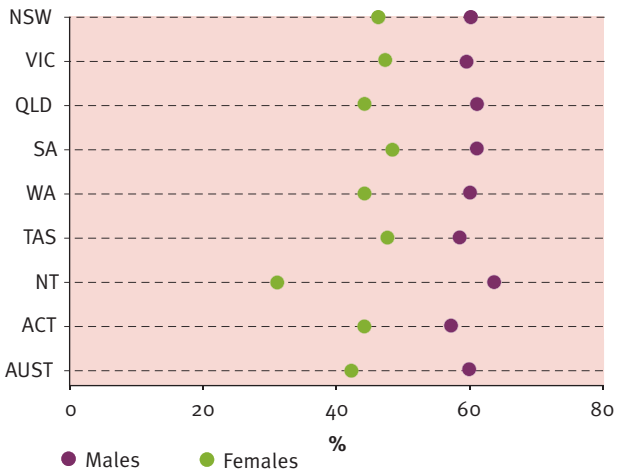
Hospitalisation rates were higher for females than for males. The most common reasons for hospitalisation among young females were:

- pregnancy and childbirth
- gestational diabetes
- mental and behavioural disorders (depressive episodes and eating disorders)
- intentional self-harm.



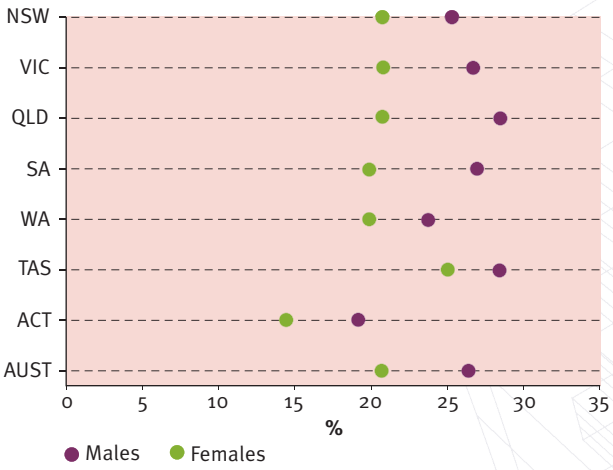
Source: ABS, Social Trends, 2008

Figure 1.4 Risk behaviours



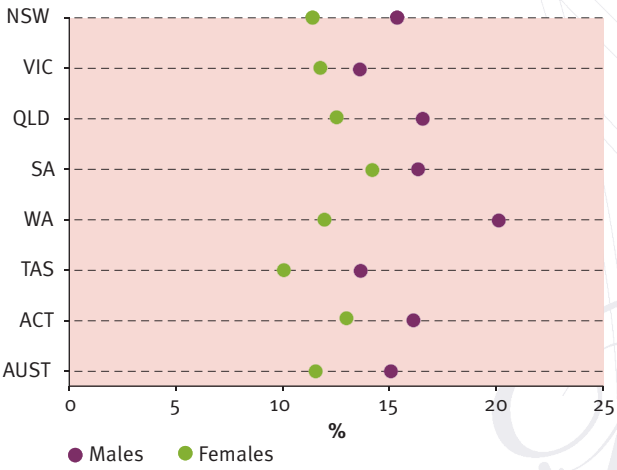
Source: ABS, Social Trends, 2008

Figure 1.5 Overweight/obese adults aged 15 years and over, 2004–05



Source: ABS, Social Trends, 2008

Figure 1.6 Current smokers aged 18 years and over, 2004–05



Source: ABS, Social Trends, 2008

Figure 1.7 Alcohol consumption: risky/high-risk levels, 2004–05

practical application

Differences in health status by gender

Conduct a newspaper review over several days, cutting out any article that relates to illness or injury. Complete a gender analysis of the articles, **identifying** the predominant gender affected. In groups, work cooperatively to present a report on the findings.

Research and Review

1. **Discuss** the major differences in health status between males and females.
2. **Propose** reasons for the differences in health status between males and females.

Critical inquiry

Analyse Figures 1.5 to 1.7 (page 11) to complete the following tasks:

1. **Identify** any examples in which females have poorer health status than males.
2. **Describe** any trends in the health behaviour of either gender that might have significant health effects in the future.

Identifying priority health issues

Although Australia's health status has improved over the years, many people still experience health conditions that are, to some degree, preventable. This is particularly so for groups such as Aboriginal and Torres Strait Islander peoples and the socio-economically disadvantaged. With a view to making significant progress in improving the health status of all Australians, the vision for national health information in the years ahead is to improve the health of populations.

The Commonwealth Government and all state and territory governments work together to provide some common direction in national health and reduce any existing inequities. At the National Health Summit held in 1993 the health ministers agreed that national goals and targets should be stated and form the basis of a national health policy. From this summit there is continued acknowledgement of the need to re-orientate policies and programs towards health prevention and improvement, rather than simply curative measures and health care services. The priority areas are therefore:

- cardiovascular health
- cancer control
- injury prevention and control
- mental health
- diabetes mellitus
- asthma
- arthritis and musculosketetal conditions.

The priority areas chosen provide a framework within which more specific goals and targets have been established. There are other significant health issues in Australia that could have been singled out for additional emphasis. This selection of priority areas was based on five specific criteria:

- principles of social justice
- priority population groups
- prevalence of condition
- potential for prevention and early intervention
- costs to individuals and the community.

Social justice principles

Social justice is about making sure that every Australian has choices about how they live and the ability to make those choices. For example, social justice refers to everyone being able to access an adequate water supply, cooking facilities and sanitation; nourish their children and send them to school where their education not only equips them for employment but also reinforces their knowledge and understanding of their cultural inheritance; and have an opportunity to secure employment and good health. That is, social justice is a life of choices and opportunity, free from discrimination.



Figure 1.8 Supportive environments encompass where people live, their local community, their home and where they work and play

Everyone has the right to equal health opportunities. Social justice recognises the importance to support the **marginalised**, disadvantaged or under-represented groups of people in society. Social justice principles provide a framework or process to guide the equal division and distribution of policies and practices so all groups have equal opportunity to benefit depending on their needs.

Social justice principles recognise the following:

- There are situations where identical rules, laws or policies applied to all groups may produce unequal results.
- Past and present disadvantage exists.
- Barriers exist in our systems that create discrimination.

The principles of social justice are equity, diversity and supportive environments. This is applied by reducing inequality; encouraging participation; removing barriers; building stronger communities; providing education; and valuing and promoting the social, economic and cultural benefits of diversity.

Equity involves making sure resources and funding are distributed fairly and without discrimination. Health equity means that all people have access to the health services and support they need at the time that they need it, and in a place that is easily accessible.

WEB Internet support concerning the national health priority areas can be accessed via www.oup.com.au/pdhpe12

Diversity involves all community groups in planning and making decisions about health issues, as well as:

- recognising the cultural and social diversity of society and examining and evaluating diverse values, beliefs and attitudes
- recognising the contribution of social, cultural, economic and biological factors to individual values, attitudes and behaviours
- exploring different views about issues such as gender roles, physical activity, peer-group relationships, sexuality, cultural beliefs and what constitutes a healthy environment
- exploring conflicting values, morals and ethics for well-being when making decisions.

The principle of supportive environments refers to both the physical and social aspects of our surroundings. It encompasses where people live, their local community, their home, and where they work and play. It also refers to access to resources for living and opportunities for empowerment. Therefore, action to create supportive environments has many dimensions: physical, social, spiritual, economic and political.

Action to create supportive environments has many dimensions: physical, social, spiritual, economic and political.

Critical inquiry

1. You overhear the following statement being made by someone who looks at health inequities from a selfish point of view:

   As long as I am healthy and those whom I care about are healthy, then all is fine. The fact that significant health inequities exist is not of concern to me, as long as it doesn't affect me.

   Explain whether this is a valid statement.

2. In your opinion, **discuss** whether social justice and health are viewed by Australians as being important.

3. As an individual, **describe** what you can do to address social justice issues that affect health.

4. a. If taxation increases were adopted in order to address social justice issues, **identify** the groups in the community that would support such initiatives.

   b. **Discuss** whether some groups would be opposed to such taxation initiatives.

Research and Review

1. a. **Identify** Australia's seven health priority issues and why they were chosen.

   b. **Explain** why it is important to prioritise health issues.

2. a. **Define** 'social justice'. What role is played by the principles of social justice?

   b. **Explain** why social justice is a fundamental component of health programs.

3. One of the principles of social justice is that 'all Australians should have access to a comprehensive range of health care services regardless of financial status' (Department of Human Services and Health, *Better Health Outcomes for Australians*, Commonwealth Government, Canberra).

   a. **Identify** the government policies that have been implemented to meet this principle.

   b. **Describe** how effective these strategies have been.

4. **Discuss** what is meant by the term 'cooperative strategies' in relation to the reduction of health inequities. Support your answer with examples.

Priority population groups

One of the criteria for selection as a priority issue was the potential to reduce inequities in health status. To achieve social justice for each issue, specific priority population groups were identified. These priority population groups are those that are shown by research to experience an unnecessarily high incidence of the condition. Some of the priority groups identified include socio-economically disadvantaged people, Aboriginal and Torres Strait Islander peoples, people living in rural and remote areas, the elderly, people with disabilities and people who were born overseas.

Prevalence of condition

Another criterion for the selection of a priority issue was the current number of cases of the illness or condition. Epidemiology shows that cardiovascular disease, cancer, injury, mental health, diabetes and asthma contribute substantially to mortality and morbidity in Australia. The seven priority issues account for the large majority of deaths recorded every year in Australia, and also for a significant number of the recorded hospital episodes.

Cardiovascular disease, although experiencing a decline, is still the leading cause of death in Australia. The number of people with cardiovascular disease may increase as the population ages.

Cancer is the second leading cause of death in Australia. The incidence of certain types of cancer is increasing. Advances in cancer diagnosis and treatment, and an ageing population, have led to increasing numbers of people surviving for longer periods after a diagnosis of cancer.

Diabetes is increasing significantly, and is known to affect over half a million Australians. The real figure is likely to be higher because many people with type-2 diabetes (adult-onset diabetes) remain undiagnosed. Apart from deaths directly due to diabetes, a much larger number of deaths also occur as a result of diseases that are complications of diabetes. Diabetes is thus the cause of a very large number of deaths, either directly or indirectly.



Diabetes is known to affect over half a million Australians.

Respiratory diseases, such as *asthma*, are a major cause of morbidity in Australia, with levels among the highest in the world. Asthma especially affects young children, and is one of the most common reasons for the hospitalisation of school-age children. Improved asthma management, asthma

diagnosis at an earlier age and an increased awareness of treatment have resulted in a significant decrease in deaths related to asthma.

Although *injury* mortality is declining, it is still responsible for substantial hospital admissions. Injury is the greatest cause of death in the first half of life and leaves many people with serious disability or long-term conditions.

The prevalence of *mental health problems* in Australia has only recently been clearly understood. Someone might experience a mental illness only once, and then fully recover. For others, mental illness can recur throughout their lives. It is currently estimated that one in five individuals will be affected by a mental health problem at some point in their lives.

Research and Review

1. **Identify** priority population groups that are common across the majority of health priority issues.
2. **Describe** the criteria for identifying priority population groups.
3. **Discuss** the purpose of singling out priority population groups. Are there any groups that have been overlooked?
4. 'Prevalence of condition' was one of the criteria for selection of priority issues. **Discuss** the reasons for the prevalence of mental health problems in Australia being only recently established.
5. **Discuss** the reasons for the importance of prioritising. Does this mean other health issues might be neglected? What if the prevalence of another health condition increases?

practical application

National health priority issues

Research the current prevalence of the national health priority issues through the Australian Bureau of Statistics website to **identify** any changes.

Potential for prevention and early prevention

The identification of priority issues is based on the potential for **prevention** and **early prevention**. The incidence of lifestyle-related conditions (such as cardiovascular disease, some forms of cancer and type-2 diabetes) can be reduced through behavioural change and environmental modifications. For health problems that are not lifestyle-related the potential for change is extremely limited and progress is more reliant on research and medical advances.

For lifestyle-related conditions, in addition to research and medical advancements, education and awareness of risk factors can lead to behaviour change and a reduction in incidence. Such risk factors include smoking, sun exposure and drink driving. Environmental modifications can also contribute to a reduction in incidence; for example, shaded areas to reduce skin cancer, dual-lane highways to reduce road injury, and lean beef and low-fat milk to reduce heart disease.

Prevention and early prevention in relation to these major conditions is more complicated than simply identifying the behaviour that contributes to their incidence. Health problems are social issues that are directly related to the society in which people live. Prevention for many people is limited and, in some cases, non-existent. To blame individuals for their behaviour ignores the social, economic, cultural and political forces at work in society.

Research and Review

1. **Explain** why the 'potential for prevention and early prevention' was a criterion in the identification of priority issues.
2. Several environmental factors affect the health status of the population. Select two of the national health priority issues and **discuss** how the following can affect the prevalence of the two areas that you have chosen:
   - a. physical environment
   - b. economic environment
   - c. cultural environment
   - d. political environment.

Costs of ill-health to the individual and community

Cost of ill-health to the individual

Another criterion for selection as a priority issue was the impact that the condition has on individual health and well-being. The impact on the physical, social and emotional health of people experiencing a condition will vary from individual to individual. Costs can be categorised as either direct or indirect. Direct costs are those that can be measured, usually through financial means; for example, cost of treatment, cost of replacement labour or lost working hours. Indirect costs are more difficult to measure. They include factors such as emotional trauma and relationship breakdown. There are millions of Australians whose quality of life is decreased as a result of experiencing cardiovascular disease, cancer, diabetes, respiratory disease, injury or mental health problems and illnesses.

The impact of these conditions on the individual's physical health can vary from minor pain and discomfort to permanent disability or death. Dealing with minor physical health problems can be overcome in a short time with appropriate treatment and medication. More serious physical effects can remain for a long time, however, and, in some cases, are permanent. Examples of permanent physical effects are spinal cord injury from an accident, limb amputation caused by peripheral vascular disease, and mastectomy (breast removal) to remove a cancerous tumour. Permanent physical health problems that result from an illness or accident will, for many people, have effects that reach far beyond the physical.

As noted above, it is more difficult to measure how illness or injury indirectly impacts on the social health of an individual. Serious illness or injury can result in:

- *Social isolation*—This isolation can be caused by an inability to continue employment or to participate in hobby or sporting groups.
- *Long-term hospitalisation and lack of mobility*—This might also isolate the individual and increase financial pressures, resulting in further limitations to social opportunities.
- *Pressure on relationships and family structures*—This can result from the short-term trauma of a serious health scare. If ongoing care and rehabilitation are required this might need to occur in the home, and thus place additional pressure on immediate family and close relatives and friends.

The emotional well-being of an individual can also be affected by serious illness or injury. A person diagnosed with a serious (possibly terminal) illness will experience a range of emotions that might extend into periods of extreme depression. A loss of self-esteem and purpose in life, a sense of hopelessness, personal reflections on questions such as 'why me?', and despair at possibly not being there for loved ones in the future—these are the types of thoughts that can contribute to an erratic state of mental health. The emotional trauma of injury from an accident can also be difficult to overcome as the victim might be young and, in most cases, the trauma unexpected.

Critical inquiry

1. Some people have stated that experiencing a life-threatening illness or a disability has been a positive, life-changing experience. **Explain** how a serious illness or injury has the potential to improve the affected individual's well-being.
2. Review the data you collected about your school's health status in the Practical Application task on page 6.
   a. **Describe** how you would identify priority health issues for your school.
   b. **Discuss** the role that the principles of social justice play in improving health.
   c. **Explain** why it is important to prioritise when addressing health issues.



Figure 1.9 The emotional well-being of an individual can also be affected by serious illness or injury

Cost of ill-health to the community

The cost of ill-health to the Australian community is enormous. As such, it was a criterion for the selection of priority issues. The annual economic cost alone related to the diagnosis, treatment and care of the sick is over $30 billion. This includes the costs of hospitalisation, medical treatments, pharmaceuticals, health insurance and illness prevention.

The indirect costs of ill-health to the community are not included in the dollar figures. Indirect costs are difficult to measure and would obviously increase the financial impact even further. Indirect costs include loss of income and workplace productivity as a result of illness or premature death, travel costs of patients, and the costs of caring for an ill person at home.

Australia's expenditure on health

Over the past 20 years, Australia's expenditure on health has been fairly constant. Measured in terms of Australia's total wealth—known as gross domestic product (GDP)—expenditure on health has been about 8 per cent each year for the last 20 years. It is feared that expenditure on health might have to increase significantly in future years, however, and recent statistics have detected a slight increase already. There are several factors indicating that Australia's health system might come under financial pressure in the future. These include:

- an ageing population
- a more informed population
- increased use of Medicare
- advances in medical technology.

An ageing population

Life expectancy at birth for the Australian population has increased by over 20 years since the beginning of the twentieth century. Whether this will cause a big increase in health costs is uncertain. The people who live longer might be healthier, and they might require less health care than older people do today. However, there is still concern that having an older population might place an extra burden on Australia's health costs.

A more informed population

Health promotion and illness-prevention messages have resulted in a population more informed about ill-health. This might result, in turn, in an increase in the use of health services, especially in relation to prevention. In the longer term, spending money on prevention and early detection of illness might decrease overall health costs. In the short term, however, having a more informed and health conscious population does tend to cause people to use more medical services than previously, and this puts immediate pressure on the health care budget.

Increased use of Medicare

The ease and simplicity that Medicare has brought to health care has resulted in a steady increase in the use of doctors' services, especially in urban areas where there are many doctors. As noted above, this might result in longer-term benefits if conditions are detected earlier and prevented from developing into more serious (and expensive) problems. It places a burden on the health budget now, however, and in the immediate future. Even if there might be longer-term benefits, these are difficult to measure, and the immediate concern is that health costs are going up because of the increased number of consultations.

There is also concern that the ease and simplicity of Medicare might lead to some people seeing doctors for trivial matters. In addition, some doctors are guilty of 'over-servicing'; that is, deliberately seeing people more often than required, and providing medical services that are unnecessary and costly.

The effect of Medicare on health costs is thus a complex matter. Overall, Medicare helps to keep down costs because the government does have some control over the fees charged for services. But overuse of doctors by some patients, and over-servicing of patients by some doctors are causes for concern in assessing health costs.

Advances in medical technology

Improved technology has resulted in a wider range of treatments available. Many of these treatments utilise the latest expensive technology; for example, organ transplants, use of lasers, joint replacements, open-heart surgery. People obviously want the best possible treatment, but costs are increasing as a result.



Figure 1.10 Increased use of Medicare may place Australia's health system under financial pressure in the future

Research and Review

1 a **Discuss** how an illness or injury can have an impact on the social health of an individual.

b **Explain** why it is difficult to measure the social cost of ill-health.

2 a **Outline** the actions that have been taken in order to improve the emotional well-being of a person with a serious health problem.

b **Identify** further approaches that could be adopted.

3 **Outline** why strategies designed to reduce health care costs may be difficult to implement.

4 a **Describe** four reasons for a possible future increase in health care costs to the community.

b **Propose** any other factors that might contribute to increasing health care costs.

5 **Discuss** how Medicare has affected health care costs.

a **Outline** ways that Medicare helps to contain costs, both short-term and long-term.

b **Explain** Why Medicare might cost more in the future.

how are priority issues for australia's health identified?

chapter summary

- Epidemiology provides information on the distribution of disease, illness and injury and on the determinants within groups or populations.
- The major measures used to determine the health of a population are mortality rate, infant mortality rate, morbidity rate and life expectancy.
- Australia is a very healthy country and the health status of the Australian population continues to improve.
- Infant mortality is the number of deaths of children under the age of 1 year in one calendar year.
- Overall, death rates in Australia have fallen. The decreased incidence of infectious disease, improvements in sanitation and living conditions, increased understanding of infectious diseases, and the development and use of antibiotics and vaccines are reasons for this reduction.
- Injury and poisoning is the most common cause of death in those aged 1 to 24 years.
- The leading causes of death for those aged 25–44 years are injury and poisoning among males and cancer among females.
- Cancer is the most common cause of death in the 45–64 years age group.
- Cancer and cardiovascular disease are the two most common causes of death among those aged 65–84 years.
- Cardiovascular disease is the most common cause of death in the 85 years and over age group.
- Decreasing infant mortality and improvements in life expectancy can be attributed to two major factors: improved public health measures and medical advances.
- Increases in life expectancy have resulted from factors such as national public health strategies, continuing medical advances, education, and cooperation among health care agencies.
- National public health strategies have been effectively implemented in areas such as nutrition, physical activity, drug use, sexual behaviour, sun exposure and immunisation.
- Medical research and improved medical techniques have lengthened life through procedures such as coronary artery bypass surgery to address heart disease, and radiation and chemotherapy to manage cancer.
- Education has played a role in reducing mortality and morbidity from lifestyle diseases. The more active role of schools, government and media in education and health promotion have resulted in the population being more informed regarding the risk factors associated with the major lifestyle diseases.

revision activities

1. **Outline** the measures of epidemiology.
2. **Describe** the current trends in life expectancy and the major causes of morbidity and mortality.
3. **Outline** the differences in health status by gender.
4. **Describe** how priority health issues are identified.

extension activities

1. **Discuss** how the priority issues for Australia's health are identified.
2. **Critically analyse** the use of epidemiology to describe health status.
3. a **Analyse** current trends in life expectancy and major causes of morbidity and mortality for the general population.
   b **Compare** these trends and causes for males and females.
4. **Discuss** the reasons why decisions are made about health priorities.

exam-style questions

1. **Account** for the differences in the health status of men and women in Australia. (7 marks)
2. **Justify** why cardiovascular disease has been identified as a health priority issue in Australia. (10 marks)
3. **Discuss** why mortality, morbidity and life expectancy are important indicators of health status. (8 marks)
4. **Explain** why injury and diabetes have been identified as national health priority issues. (8 marks)
5. **Analyse** why cancer was identified as a priority issue to improve the health of Australians. (10 marks)

chapter 2

what are the priority issues for IMPROVING AUSTRALIA'S HEALTH?

In this chapter you will investigate the groups experiencing health inequities in Australia and the particular health conditions that are preventable. You will be able to assess the impact of a growing and ageing population on health services.

Groups experiencing health inequities

Inequities refer to situations or actions that lack fairness or justice. Inequalities refer to social or economic differences between people or groups.

Not only are there significant inequalities in health status between various countries, there are also enormous inequalities in the health status of population groups within Australia. Some of these inequalities involve injustice and should be described as 'inequities'. A selection of these *inequalities* and *inequities* is described below.

Aboriginal and Torres Strait Islander peoples

No greater contrast in the extremes of health status can be found in Australia than that between Aboriginal and Torres Strait Islander peoples and the rest of the Australian population. Aboriginal and Torres Strait Islander peoples die at a much younger age and are more likely to experience disability and reduced quality of life because of ill-health. There has been some progress in collecting information on the health of Aboriginal and Torres Strait Islander peoples over the last decade but





many challenges in this area remain due to the fact that the population is relatively small: 2.5 per cent of the total population with approximately 25 per cent living in remote areas. The life expectancy of Indigenous Australians is approximately 10 years less than the overall Australian life expectancy. There is some discrepancy between various states and territories, but for those Indigenous Australians born during 1998–2001, the life expectancy at birth of a male is approximately 67 years and for a female is approximately 73 years.

Death rates for Aboriginal and Torres Strait Islander peoples are higher for every specific major cause of death. Other inequities include higher infant mortality (estimated at two to three times higher than the overall Australian figure) and higher mortality rates.

Leading causes of death

The leading causes of death in the Aboriginal and Torres Strait Islander population are circulatory diseases, cancer, diabetes and respiratory diseases.

Compared with non-Indigenous females and males, Indigenous females and males are, respectively, four and five times as likely to die from avoidable causes. Indigenous people are five times as likely to die from heart attack, twice as likely to die from cancer, 18 times as likely to die from diabetes and twice as likely to die from suicide as non-Indigenous people. Indigenous death rates are 8.8 times as high as non-Indigenous death rates for diabetes, 5.7 times as high for cervical cancer, 4.2 times as high for kidney diseases and 3.3 times as high for digestive diseases.

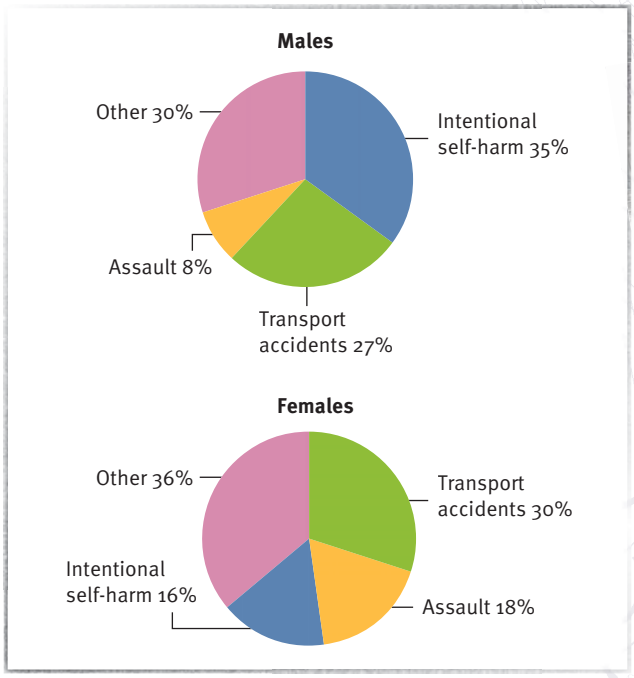
For each of the seven leading contributors to total disease burden Indigenous Australians have higher disability-adjusted life years (DALY) rates than do non-Indigenous Australians. Compared with the rate for the total Australia population, the DALY rates for Indigenous Australians are:

- 5.1 times higher for diabetes
- 4.6 times higher for cardiovascular disease
- 4.1 times higher for intentional injuries
- 2.5 times higher for unintentional injuries
- 2.5 times higher for chronic respiratory disease
- 1.7 times higher for cancer
- 1.6 times higher for mental disorders.

Non-communicable diseases explain 70 per cent of the disease burden gap between Indigenous Australians and the total Australian population. Cardiovascular disease is the leading cause (23 per cent of the gap) followed by diabetes (12 per cent), mental disorders (12 per cent) and chronic respiratory diseases (9 per cent).

Indigenous Australians are more likely than non-Indigenous Australians to die from cancer (such as cancers of the lung and liver) because the cancer is more likely to be fatal, or the cancer may be at a more advanced stage by the time it is recognised. Cervical cancer is more common among Indigenous women than among non-Indigenous women, but breast cancer is less common.

Indigenous Australians are more likely to die from transport accidents, intentional self-harm and assault than other Australians. Injury rates are around three times those of the total Australian population. Figure 2.1 illustrates the leading causes of death from injuries for Indigenous Australians males and females.



Source: AIHW, Australia's Health, 2008

Figure 2.1 Leading causes of death from injuries for Indigenous Australian males and females



Major health issues

Mental health is very important to the total well-being of the whole Indigenous community. Mental health refers to the social and emotional well-being of individuals. It includes how well individuals can cope with stress or adversities that they come across during their life. Trauma and grief related to the history of a new settlement invading Indigenous communities, the impact of colonisation by Europeans, loss of land and culture, high rates of premature mortality, high levels of incarceration, family separations and Aboriginal deaths in custody have been identified as underlying the great burden among Indigenous people of 'mental health problems', which may lead to 'mental illness'. Compared with non-Indigenous Australians, Indigenous Australians aged 18 years or older are almost one-and-a-half times more likely to report experiencing at least one stressor (82 per cent). The stressors reported most frequently by Indigenous people are death of a family member or close friend (46 per cent), serious illness or disability (31 per cent) and inability to find employment (27 per cent).

Diabetes is a major health problem among Indigenous people. Overall, diabetes is around three-and-a-half times more common among Indigenous people than among other Australians. Only around one-half of people with diabetes know they have the condition.

Kidney disease is a very serious health problem for many Indigenous Australians. End-stage renal disease (ESRD), which occurs when the kidneys are no longer able to function, is much more common for Indigenous people than for non-Indigenous people across most of the country.

Asthma is 1.6 times more common for Indigenous Australians than for non-Indigenous people. Hospital admissions for a respiratory condition (including asthma) are over three times more common for Indigenous people than for non-Indigenous people. Death from a respiratory cause is around four times more common for Indigenous people than for non-Indigenous people.

The most common **communicable diseases** among Indigenous people include **tuberculosis**, **influenza**, **meningococcal infection**, **syphilis**, **gonorrhoea** and **HIV/AIDS**.

One in three Indigenous people have eye and/or sight problems, such as refractive error (requiring glasses for correction), cataract (clouding of the lens), trachoma (a bacterial infection that can lead to blindness if untreated) and diabetic retinopathy (damage to the retina, at the back of the eye, caused by diabetes). There has been progress in the area of eye health. Progress is limited amongst Indigenous Australians, however, due to the difficulty in accessing services. For example, the services may not be available where they live, are not culturally appropriate or are too expensive.

Disease of the middle ear can cause permanent hearing loss that limits life opportunities, particularly in education and in employment. Middle ear disease is reported by 12 per cent of Indigenous Australians. **Otitis media** was almost three times more common for Indigenous people than for non-Indigenous people.

The overall level of oral health and dental care is lower for Indigenous people than for non-Indigenous people. Nearly twice as many Indigenous six-year-olds as non-Indigenous six-year-olds have tooth decay.

Skin infections often are the result of poor living conditions. The most common skin infections affecting Indigenous people are scabies (caused by a mite) and streptococcal pyoderma (a bacterial infection). Scabies, in particular, is a problem in many remote Indigenous communities, where up to half the children may be infected.

Causes of the inequities

To explain the extreme inequities in Indigenous Australian health status simply in terms of lifestyle and risk factors ignores the broader socio-cultural factors that severely limit their access to better health. The contributors to the poor health status of many Indigenous people are:

- social factors, such as **dispossession**, **dislocation** and **discrimination**
- disadvantages in education, housing, income and employment
- physical environmental factors.

Lack of access to appropriate health services is another problem. Poor public health measures have negative effects on Indigenous health. Historically, the Aboriginal experience of dispossession and marginalisation has contributed significantly to their continued economic disadvantage and poor health status.

In 2007, the Human Rights and Equal Opportunity Commission of Australia (HREOC) presented a paper at an international symposium on the social determinants of the health of Indigenous Australians. Opposite is an extract from the paper.

WEB

The full version of the paper opposite is available at the website of the Human Rights and Equal Opportunity Commission of Australia, which can be accessed via www.oup.com.au/pdhpe12

Social determinants and the health of Indigenous peoples in Australia: a human-rights based approach

Improving the health status of Indigenous peoples in Australia is a longstanding challenge … The gap in health status between Indigenous and non-Indigenous Australians remains unacceptably wide …

'The relative socioeconomic disadvantage experienced by ATSI peoples compared to non-Indigenous people places them at greater risk of exposure to behavioural and environmental health risk factors' as does the higher proportion of Indigenous households that 'live in conditions that do not support good health'. Indigenous peoples also do not enjoy equal access to primary health care and health infrastructure (including safe drinking water …

Historically, ATSI peoples have not had the same opportunity to be as healthy as non-Indigenous people. This occurs through the inaccessibility of mainstream services and lower access to health services, including primary health care, and inadequate provision of health infrastructure in some ATSI communities …

Indigenous peoples in Australia experience socio-economic disadvantage on all major indicators. For example:

- … the average gross household income for Indigenous peoples in Australia was $364 per week, or 62% of the rate for non-Indigenous peoples ($585 per week)
- … the unemployment rate for Indigenous peoples was 20%; three times higher than the rate for non-Indigenous Australians
- … Indigenous students were also half as likely to continue to year 12 as non-Indigenous students …

Poverty is associated with poor health. For example:

- Poor education and literacy are linked to poor health status, and affect the capacity of people to use health information.
- Poorer income reduces the accessibility of health care services and medicines.
- Overcrowded and run-down housing is associated with poverty and contributes to the spread of communicable disease.
- Poor infant diet is associated with poverty and chronic diseases later in life.
- Smoking and high-risk behaviour is associated with lower socio-economic status …

Indigenous peoples stated that their health status is linked to 'control over their physical environment, of dignity, of community self-esteem, and of justice. It is not merely a matter of the provision of doctors, hospitals, medicines or the absence of disease and incapacity' …

Relatively permanent, negative features of the social environment trigger chronic stress: intergenerational poverty, racism, and so on. It can impact on the body's immune system, circulatory system, and metabolic functions through a variety of hormonal pathways and is associated with a range of health problems, particularly diseases of the circulatory system. These are currently the biggest killer of Indigenous people in Australia…

[The] ability of communities to decide on, and address, their own health priorities has been found to increase the impact of primary health care in communities …

The right of self-determination includes the right of peoples to freely 'dispose of their natural wealth and resources' and that 'in no case may a people be deprived of its own means of subsistence'.

Native title and the title to communally owned land … is the 'natural wealth and resources' of Indigenous peoples …

[Supporting] traditional culture (including customary law and governance structures) is likely to help improve the health status of people living in remote communities … [This] also means ensuring Indigenous peoples have access to their traditional lands.

While Indigenous commentators have highlighted the social and culturally related health benefits of access to land, many possible positive health impacts are likely including improved diet, exercise, and the reconnection of Indigenous peoples with their traditional economic bases…

The poverty and inequality that [Indigenous peoples] experience is a contemporary reflection of their historical treatment as peoples. The inequality in health status that they continue to experience can be linked to systemic discrimination …

Racism is a stressor that … [affects] … mental and physical health … 21.5% of the Indigenous children under 12 surveyed experienced racism in the previous 6 months. This was associated with increased smoking, marijuana use and alcohol consumption …

[Many Indigenous people] had either been removed themselves and/or had relatives who, as a child, had been forcibly or otherwise removed from their natural family …

[The] effect on parents was that they had higher rates of substance abuse and mental health problems. Their children were twice as likely to have emotional and behavioural problems, to be at high risk for hyperactivity, emotional and conduct disorders, and twice as likely to abuse alcohol and drugs.

This paper … demonstrates that the social determinants of health for Indigenous peoples reflect more than just their relative disadvantage ….

An approach to social determinants that fails to recognise the fundamental connections between health status and the enjoyment of human rights will fail.

HREOC

Critical inquiry

1. **Discuss** why the financial resources devoted to improving Indigenous health have so far had little impact.
2. Apart from financial support, **identify** other strategies that have been introduced to improve Indigenous health. **Evaluate** how effective they have been.
3. **Propose** alternative strategies that could be introduced to reduce health inequities in the Indigenous population.
4. **Analyse** the health problems that are faced by Aboriginal and Torres Strait Islander peoples as a result of historical events.
5. Using the extract on page 23:
   a. **Outline** the findings that you believe would have the most severe impact on Aboriginal and Torres Strait Islander health.
   b. For each of the above findings, **explain** how it would impact on health.

Socio-economically disadvantaged people

A person's socio-economic status is determined by several factors, including income, occupation and education. Socio-economically disadvantaged people are those who, as a result of one or more of these factors, experience significant financial limitations. Inequalities occur as a result of socio-economic differences in material resources, access to educational opportunities, safe working conditions, effective services, living conditions in childhood, racism and discrimination.

Socio-economically disadvantaged people:

- have reduced life expectancy
- are more likely to die from cardiovascular disease, respiratory disease and lung cancer
- have higher infant mortality
- have higher levels of blood pressure
- are more likely to smoke
- are more often generally sick.

Socio-economically disadvantaged people are more likely to suffer from long-term health conditions, such as diabetes, diseases of the circulatory system (which include heart disease and stroke), arthritis, mental health problems and respiratory diseases (including asthma).

Another significant difference is that socio-economically disadvantaged people are far less likely to engage in preventative health behaviours, such as having 'Pap' smears and dental check-ups. However, they are more likely to visit doctors, hospitals as an outpatient, and accident and emergency services.

Youth unemployment is also a major issue because it is significantly higher than the national rate. Unemployment can lead to despair and a sense of helplessness among young people, and is therefore linked to social problems, including drug use, violence, vandalism and crime. It is also a factor contributing to depression and suicide in young people.

Medium-density and high-density housing developments often experience higher levels of social problems, as do some suburban and country areas where groups of socio-economically disadvantaged people are gathered. These social problems can include domestic violence, vandalism and family breakdown.

It is difficult for many socio-economically disadvantaged people to make significant positive changes to their lifestyle and improve their health. This does not mean that improvements in health status are not possible for socio-economically disadvantaged people. However, a lack of income and education can reduce alternatives regarding employment, housing and nutrition, and can generally affect the ability to raise standards of living. Socio-economic disadvantage is considered to be the most important indicator of poor health in Australia.



Socio-economic disadvantage is considered to be the most important indicator of poor health in Australia.

Critical inquiry

It is assumed that equal access to heath care and education will result in equal access to good health. Argue if this assumption is valid in relation to socio-economically disadvantaged people.

Research and Review

1. **Identify** the factors that determine socio-economic status.
2. **Describe** the differences in health status that are experienced by socio-economically disadvantaged people.
3. Unemployed people and the children of unemployed people experience poor levels of health. **Discuss** possible reasons for this.

People in rural and remote areas

People living in rural and remote areas have poorer health status than those living in cities and **metropolitan areas**. This is revealed in the higher death rates and lower life expectancy in rural and remote areas; life expectancy decreases with increasing remoteness. Death from coronary heart disease, 'other' circulatory disease and motor vehicle accidents are significant in these areas. Injury (in particular, motor vehicle accidents and suicide) contributes mostly to high death rates, and these deaths are mainly male. Males in these areas are 1.4 times as likely to suffer depression or **psychological distress** as males living in major cities. Females in rural and remote areas have a high incidence of diabetes and arthritis. Cerebrovascular disease (stroke) and coronary heart disease (such as heart attack) are similar across rural and remote areas for both males and females. Children in these areas tend to have decayed, missing or filled teeth. This may be attributed to the lower proportion of adequately fluoridated water supplies.

The poorer health status of rural communities is partly explained by a lack of access to health services, and partly by lower socio-economic status, **occupational hazards** and poorer overall living conditions caused by the harsher environment. People in rural and remote areas are more likely to engage in behaviours associated with poorer health, although their diet is likely to include more vegetables. More people living in rural and remote areas smoke, particularly among males and females aged 25–44 years. Males in rural and remote areas are generally at a greater risk of harmful drug and alcohol use than are females in those areas. Australians in rural and remote areas are slightly more likely to be overweight or obese and are also more likely to report sedentary behaviour. The latter was particularly true for males.

Research and Review

1. **Identify** the factors that impact on the health of people living in rural and remote areas.
2. **Compare** the health needs of rural and urban Indigenous and non-Indigenous populations.
3. **Discuss** possible reasons for mortality rates in rural and remote areas being higher for injury, but not for cancer and stroke.



Figure 2.2 People living in rural and remote areas have poorer health status than those living in cities and metropolitan areas

Overseas-born people

Australia has a very ethnically diverse community, and it is interesting to explore the differences in health status between people born overseas and those born in Australia. In general, immigrants on arrival in Australia have better health than the Australian-born population; often with lower rates of death, hospitalisation, disability and disease risk factors. The differences in health that do exist, however, tend to decrease with length of residence. Reasons for the better on-arrival health status of immigrants are:

- the highly selective health criteria applied by the Australian Government to people seeking to migrate
- the fact that people of poor health and low socio-economic status are less likely to have the economic resources to change countries.

Of all people born overseas who have migrated to Australia, more than half come from non-English speaking backgrounds. Many people from non-English speaking backgrounds experience a deterioration in health status after arrival in Australia. Factors that contribute to this deterioration include:

- socio-economic disadvantage
- poor language skills that limit their access to employment, health information and community services
- the stress associated with resettlement.

People from non-English speaking backgrounds are less likely to report medical conditions they may be experiencing, less likely to **immunise** their children, less likely to exercise and more likely to be slightly overweight. Some ethnic groups within Australia, as a result of their culture, have different understandings of health and illness, and varying expectations of health care.

The Australian Institute of Health and Welfare indicated in 2008 that the health behaviours of most concern for people born overseas are that they are more likely to smoke, exercise less, be overweight and/or obese and have fewer or no daily serves of fruit. These are risk factors for a number of long-term health conditions, such as respiratory diseases, lung cancer and cardiovascular diseases.



Figure 2.3 In general, immigrants on arrival in Australia have better health than the Australian-born population

practical application

Overseas-born people

Visit or contact your local council or community health centre and review the health services and strategies that are designed to specifically target people from a non-English speaking background.

Research and Review

1. **Describe** why, on arrival in Australia, immigrants generally have better health than those born in Australia.
2. Many people from non-English speaking background experience a deterioration in health once they have migrated to Australia. **Discuss** the barriers faced by people from non-English speaking backgrounds when trying to maintain or improve their health.

Elderly

Australia has an ageing population and this trend is expected to continue. It is estimated that the number of people aged over 65 years will increase by more than 1 million before 2015. The most common causes of mortality in people aged over 65 years are cancer, coronary heart disease and stroke. There has been a significant reduction in cardiovascular disease in older people as a result of declining smoking levels, awareness of other contributing risk factors and medical advances.

The most common conditions reported by people aged over 65 years are arthritis, vision problems, hearing problems and **hypertension**. It must be noted that growing old is not the only factor contributing to poor health status. Poor health in older people is also linked to socio-economic status and education. This contributes to older people experiencing higher rates of admission to hospital, and lengthier stays in hospital.

Poor health in older people is not only due to growing old; it is also linked to socio-economic status and education.

As more people in Australia reach older age levels there is concern that the incidence of dementia and other disabilities will increase. It seems logical to assume that an older population means, overall, a more unhealthy population. This might occur, but it is also possible that the older people who will live longest will also be the healthiest older people. These relatively healthy older people might not develop as many medical problems. An older population overall will probably mean a less healthy population overall, but it is uncertain whether this will be a slight change or a more significant change in the health status of the Australian population.

Critical inquiry

1. **Predict** the consequences that will result from an increase in the aged population in Australia.
2. **Outline** steps that have been taken to lessen the possible social and economic impact of an ageing population.
3. **Propose** other strategies that could be employed to deal with this issue.
4. Argue whether the government should bear the ultimate responsibility for caring for the elderly.
5. **Identify** the most common long-term health conditions for persons aged 65 years and over.
6. **Identify** the four most commonly reported conditions for:
   a. males aged over 75 years.
   b. females aged over 75 years.
7. **Identify** the conditions that increase significantly with age.

People with disabilities

Disabilities are defined as any limitations to normal functional abilities. This is a very broad definition and, as such, disabilities of some form or other are experienced by 4 million people in Australia. The large majority of disabilities are of a physical nature, including arthritis, respiratory diseases, circulatory diseases and musculoskeletal disorders. Sensory disorders (such as diseases of the eye and ear) are also common, as are mental disorders.

A *handicap*, by definition, is more severe in nature than a disability, and relates to an individual's limitations as experienced in more complex tasks, such as caring for oneself, moving around and communicating. The most commonly reported severe handicaps relate to **psychiatric conditions**, and head or brain injury.

People with disabilities and handicaps are more likely to experience multiple or interrelated conditions. This is especially so with brain injury.

People with disabilities can experience inequities due to financial constraints. These include factors such as lack of access to employment opportunities and the possible need for ongoing health care. They also encounter more difficulty accessing health services, have lower life expectancy and experience poorer health across a range of areas.

Research and Review

Describe the difference between a disability and a handicap.

practical application

Health inequities

1. 'Regardless of any policy, funding or strategies, health inequities will always exist in Australia.' Prepare and engage in a debate on this issue.
2. Research and **analyse** Aboriginal and Torres Strait Islander peoples and ONE other group experiencing health inequities by investigating:
   a. the nature and extent of the health inequities
   b. the socio-cultural, socio-economic and environmental determinants
   c. the roles of individuals and governments in addressing the health inequities.



Figure 2.4 Four million Australians (one in five) have some degree of disability

High levels of preventable chronic disease, injury and mental health problems

Chronic disease causes much suffering and disability and reduces quality of life. Australia's main health problems that cause the greatest overall disability and/or premature death include cardiovascular disease, cancer, diabetes, asthma, injury and mental health problems and illnesses.

Cardiovascular disease

Cardiovascular disease includes all the diseases and conditions of the heart and blood vessels. Despite the health achievements made, cardiovascular disease is still a major cause of death.

The nature of cardiovascular disease

The major cardiovascular conditions are coronary heart disease, stroke and peripheral vascular disease. One of the major contributing factors to cardiovascular disease is a build-up of fatty tissue (called atherosclerosis) on the inside lining of the arteries. This build-up interferes with the supply of blood around the body.

Coronary heart disease

Coronary heart disease is the most common type of cardiovascular disease and accounts for just over 20 per cent of all deaths. It occurs when the blood supply to the heart is decreased by a narrowing (usually caused by atherosclerosis) in one or more of the coronary arteries. If the blockage severely decreases blood flow to the heart it can lead to a condition called angina. Angina is chest pain that occurs as a result of cramping of the heart muscle due to constricted arteries. In some cases the decrease in the blood supply can result in a more serious sudden heart attack, which can be fatal.

Cerebrovascular disease

Cerebrovascular disease is a disease of the arteries of the brain. An interruption (usually caused by atherosclerosis) of the blood supply to the brain results in what is commonly known as a 'stroke'. A stroke can also occur as a result of a blood vessel bursting in the brain. The effects that a stroke has on the person will depend on which part of the brain has had its blood supply restricted.

Peripheral vascular disease

Peripheral vascular disease is a type of cardiovascular disease that affects the blood vessels in the limbs. Hardening of the arteries that interferes with blood supply to the muscles and skin is known as arteriosclerosis. This disease has close links to smoking, and to diabetes and certain other diseases. In extreme cases, this can result in gangrene and possibly limb amputation.

Extent of and trends in cardiovascular disease

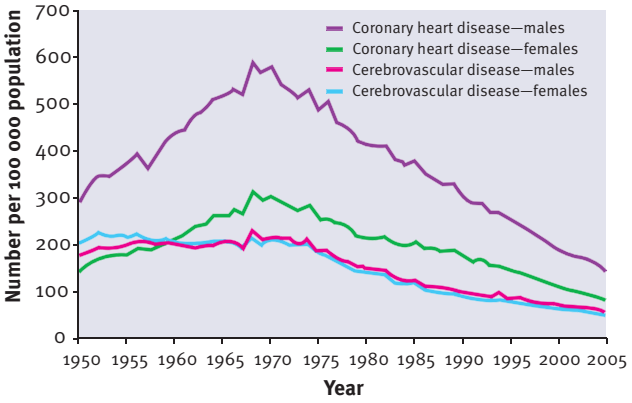
WEB

Internet support concerning cardiovascular disease can be accessed via www.oup.com.au/pdhpe12

Cardiovascular disease is the second leading cause of disease and accounts for approximately 35 per cent of all deaths in Australia. The death rate increases sharply with age and causes the greatest number of deaths among older people. Despite this high percentage, there has been a downward trend for all cardiovascular disease, and levels are below those of a hundred years ago. Heart attack rates are falling and survival from the attacks is improving. Since the mid-1970s, consistent declines have been noted for both males and females.

The decline in cardiovascular disease can be attributed to two main factors:

- improved medical care (for example, drugs to manage blood pressure)
- a reduction in risk behaviour that contributes to cardiovascular disease (for example, smoking).



Source: AIHW, Australia's Health, 2008

Figure 2.5 Death rates for coronary heart disease and cerebrovascular disease

Critical inquiry

1 a The decrease in cardiovascular disease is very pleasing. In your opinion, **discuss** whether this trend is going to continue.

b **Propose** any emerging management strategies in the area of cardiovascular disease.

Risk factors and protective factors for cardiovascular disease

Risk factors

Factors that make the occurrence of a disease more likely are called risk factors.

The factors that make the occurrence of a disease more likely are called **risk factors**. The potential for individuals to alter their lifestyle to prevent disease will vary according to the environmental factors identified earlier; for example, socio-economic status.

Some risk factors for cardiovascular disease cannot be modified. The non-modifiable risk factors for cardiovascular disease are:

- *Age*—The risk of cardiovascular disease increases as people age; this is often the result of the slow progression of atherosclerosis.
- *Heredity*—People with a family history of cardiovascular disease are more prone to developing the disease themselves.
- *Gender*—Males are more at risk of coronary heart disease than are females.

Other risk factors for cardiovascular disease can be modified. The modifiable risk factors for cardiovascular disease are:

- *Smoking*—Smokers are up to five times more likely to develop a cardiovascular disease than are non-smokers. The chemicals contained in cigarette smoke (such as nicotine, tar and carbon monoxide) can increase heart rate, constrict the vessels (reducing blood flow) and reduce the oxygen-carrying capacity of the blood.
- *High blood pressure*—Blood pressure is one of the most common causes of heart disease; high blood pressure is linked to a high-salt diet and being overweight. If left untreated, it significantly increases the risk of both cerebrovascular disease and coronary heart disease.
- *High blood fats*—High levels of cholesterol and triglycerides (types of lipids or 'fats') in the blood significantly increase the chances of cardiovascular disease. Dangerously high levels of these substances can often be decreased by low-fat diets.
- *Overweight and obesity*—People who are overweight are at an increased risk of heart disease because of the extra burden placed on the heart and lungs, and because obesity is linked to high blood pressure and an increased level of blood fats.
- *Lack of physical activity*—People who do not engage in regular physical activity can have a less efficient heart, higher levels of blood fats and a propensity to gain weight. These factors combine to increase the risk of coronary heart disease.

Besides these major risk factors, other possible influences include poor nutrition, alcohol, the contraceptive 'pill' (especially coupled with smoking) and diabetes.

Protective factors

Protective factors are the opposite of risk factors in that they help lower a person's chances of developing a disease.

Protective factors are the opposite of risk factors in that they help lower a person's chances of developing heart disease. Some protective factors are discussed below:

- *Maintain healthy levels of blood pressure and blood cholesterol*—Regular blood pressure and cholesterol checks will assist in early identification and management of any factors associated with heart disease.
- *Quit smoking*—Stopping smoking is the single most important action a person can take to reduce his or her risk of cardiovascular disease.
- *Enjoy healthy eating*—Healthy eating means enjoying a variety of foods from different food groups. Healthy eating involves choosing mainly vegetables and fruits; moderate amounts of lean meats, poultry, fish and reduced-fat dairy products; and moderate amounts of polyunsaturated or monounsaturated oils and fats.
- *Visit the doctor regularly*—Regular visits to the doctor can assist in maintaining any early signs of risk for cardiovascular disease. This includes assessing blood pressure, cholesterol, family history and lifestyle factors. With this information, a doctor can provide individualised advice on the best ways for the patient to lower his or her risk and lead a healthy-heart lifestyle.
- *Be physically active*—Regular, moderate-intensity physical activity is good for the heart. Engaging in at least 30 minutes of physical activity, such as brisk walking, on most days of the week can help lower blood pressure, lower blood cholesterol and assist in maintaining a healthy weight range.
- *Achieve and maintain a healthy weight*—Being overweight and carrying too much weight around the waist are risk factors for cardiovascular disease and diabetes. Therefore, maintaining a healthy body weight by eating healthily and participating in regular physical activity will act as a protective factor to cardiovascular disease.



Figure 2.6 Smoking is a major risk factor for cardiovascular disease



Figure 2.7 Thirty minutes of physical activity a day maintains a healthy heart

Other possible protective factors include controlling diabetes, managing stress and limiting the intake of saturated fats and simple carbohydrates, such as sugar.

Socio-cultural, socio-economic and environmental determinants

A social determinant contributing to cardiovascular disease is socio-economic status. Socio-economically disadvantaged people are more likely to develop cardiovascular disease, and the well-documented reduction in the condition over the past 20 years is not as significant in this group. The risk of cardiovascular disease for women of low socio-economic status is twice that of women from a higher socio-economic status. People who are socio-economically disadvantaged demonstrate more risk behaviour, such as smoking, obesity and physical inactivity. This is a major contributor to these differences in the incidence of cardiovascular disease.

There are variations in the incidence of cardiovascular disease between people who live in metropolitan areas and those who live in remote or rural locations. The variation is most notable in coronary heart disease, and can be linked to higher levels of smoking and obesity, a lack of access to appropriate health services, and a lack of availability of prevention support in rural and remote areas. The higher percentage of Aboriginal and Torres Strait Islander peoples in remote populations is also a contributing factor. People in these communities are more likely to consult elders for advice regarding health issues, and are often reluctant to access conventional Western health care.

Higher rates of cardiovascular disease in males can, to a certain degree, be attributed to the fact that they are more likely to ignore early warning signs and less likely to access health services. This behaviour might be due to social expectations and the concept of masculinity, or might be due to genetic and biochemical characteristics of males.

The effective use of the mass media and education in health promotion has contributed to the decline in cardiovascular disease. A greater awareness of the behaviour that prevents cardiovascular disease has resulted from health promotion campaigns conducted by both government and non-government agencies; for example, the National Heart Foundation. Increased access to healthy products (such as low-fat, low-salt foods) has led to improved nutrition, and improved exercise amenities in public parks and the workplace have promoted physical activity. For some groups, however, increased access to a healthier lifestyle might not be possible; for example, for people who are socio-economically disadvantaged.

Groups at risk of cardiovascular disease

The groups at highest risk of developing cardiovascular disease are males, Aboriginal and Torres Strait Islander peoples (see the article opposite), socio-economically disadvantaged people and those born in Australia. Within these broad population groups the more specific groups at risk include people with a family history of cardiovascular disease, people who smoke, people with high blood pressure, people who are overweight, 'blue-collar' workers and people aged over 65 years.

Critical inquiry

Read the article opposite, then complete the following tasks:

1. **Describe** the reasons for Indigenous Australians dying from cardiovascular disease at a rate that is 1.4 times higher than other Australians.
2. **Describe** the nature of cardiovascular disease presented in the article.
3. **Identify** the risk factors and protective factors outlined.
4. **Discuss** the socio-cultural, socio-economic and environmental determinants that impact on members of the community.
5. **Evaluate** the effectiveness of the proposed strategies suggested.

Too many of us have gone early: priorities in heart health education for Aboriginal people

By Penny Abbott, Joyce Davidson and Louise Moore

Aboriginal people have a higher burden of cardiovascular risk factors and heart disease and poorer outcomes after heart attacks when compared with other Australians … The importance of education about heart attack symptom recognition and prompt hospital presentation, as well as risk factor management, by general practitioners and other health practitioners working with Aboriginal people, is highlighted …

Cardiovascular disease (CVD) is the single greatest cause of premature death in Aboriginal people. Prompt presentation to hospital with heart attack symptoms is critical …

[Participants] highlighted the need for community recognition of the symptoms of heart attacks and the importance of early hospital presentation. Strikingly, they did not identify risk factor management as a key heart health message for their community …

[Compared] to other Australians, Indigenous Australians have 1.4 times the likelihood of dying from a heart attack before reaching hospital, twice the likelihood of dying in hospital, and less chance of undergoing revascularisation procedures. Late presentation to hospital is likely to contribute to these suboptimal outcomes and geographic barriers are not enough to explain this. In a Northern Territory study, Indigenous people sought hospital care for heart symptoms much later than non-Indigenous people (10 vs 3.26 hours) regardless of whether they were from urban or remote communities …

In Australia, a substantial number of heart attack patients present first to their GP, causing unnecessary delay. Studies have shown a lack of knowledge of symptoms and the correct course of action is associated with low education, low income and language barriers. In addition social and emotional factors are important, with embarrassment and not wanting to bother others cited as common reasons for late presentation …

The main causes of delayed hospital presentation of Aboriginal people with heart attack symptoms are lack of symptom recognition, failure to act despite knowledge that a heart attack is probably occurring, and taking inappropriate action.

Mass media campaigns, including that of the National Heart Foundation of Australia, have had mixed results and are generally less effective in reaching marginalised communities. However, there is evidence that health professionals can make a difference through individual patient education, particularly highlighting to patients that they are at high personal risk of a heart attack and that symptoms are not always dramatic, and promoting the correct course of action in the event of heart attack symptoms, including the use of action plans …

Aboriginal people have a much higher burden of all vascular risk factors. Reduction of these biomedical and behavioural risk factors will help prevent premature heart disease and is a strong focus of Aboriginal heart health programs … Aboriginality is itself a recognised risk factor for CVD, decreasing the thresholds for initiating medical management of other risk factors such as hypertension and hyperlipidaemia [a condition characterised by elevated or abnormal levels of lipids or lipoproteins in the blood] …

In addition, it is unclear whether beliefs as to the causes of coronary heart disease affect heart attack survivors' ability to change their risk behaviour. Studies are contradictory on this point. Cultural differences can affect understandings of the relationship between heart disease and vascular risk factors.

One study of urban Aboriginal people's perception of diabetes found that the people interviewed saw diabetes as a series of acute illnesses that needed to be dealt with when they happened, rather than as a preventable or manageable chronic disease …

It is possible that cultural understandings about the relationship between risk factors and heart attacks may contribute to some of the practical challenges encountered in improving Aboriginal heart health, such as decreased adherence to prescribed risk factor medication and lower attendance at cardiac rehabilitation. Exploration of Aboriginal people's perceptions of the causation of heart disease and what they can do to prevent it may improve the quality of heart health education for Aboriginal people.

It is important for health professionals to discuss how to recognise and act on possible heart attack symptoms with high-risk Aboriginal patients …

Investigation of the reasons behind delayed hospital presentation by Aboriginal people with heart attack symptoms, and effective strategies for CVD risk factor education are required. Better knowledge of cultural understandings about heart disease and CVD risk factors may increase the effectiveness of heart health education programs for Aboriginal people.

Australian Family Physician, Vol. 37, No. 4

Research and Review

1. **Define** 'cardiovascular disease' and 'atherosclerosis'.
2. **Describe** the three major types of cardiovascular disease.
3. **Identify** the trend in cardiovascular disease. Explain reasons for this trend.
4. **Outline** the modifiable and non-modifiable risk factors for cardiovascular disease.
5. **Discuss** the socio-cultural, socio-economic and environmental determinants that contribute to cardiovascular disease.



Figure 2.8 Skin cancer is a form of carcinoma

Cancer

Over the last decade, improvements in early detection and treatment of cancer have resulted in improved survival and a decline in mortality for most cancers, despite the overall cancer incidence rate remaining virtually unchanged. Cancer was the leading cause of the total burden of disease and injury in Australia in 2003, with four-fifths of this burden due to premature death.

The nature of cancer

Cancer refers to a group of diseases that result when the process of cell division becomes uncontrolled. These cells multiply in a random manner and form tumours (swellings). Tumours can form and remain localised with no threat of spreading. These are called *benign tumours*, and can be treated surgically. However, if the tumour has the potential to spread uncontrolled throughout surrounding normal cells and affect their functioning, it is called *malignant*.
If left untreated these cancer cells can break off and enter the blood stream and **lymphatic system** and travel to other parts of the body, where they can cause new cancers to grow. This is known as *metastasis*, and results in the formation of what is called secondary cancer.

There are various types of cancer. Some develop slowly; some quickly. Some have known causes; others are of unknown cause. Cancers are classified according to the area of the body where they initially began.
The four classifications of cancer are:

- *carcinoma*—cancer of epithelial cells (including skin, mouth, throat, breasts and lungs)
- *sarcoma*—cancer of bone, muscle or connective tissue
- *leukaemia*—cancer of the blood-forming organs of the body
- *lymphoma*—cancer of the infection-fighting organs of the body.

WEB Internet support concerning cancer can be accessed via www.oup.com.au/pdhpe12

Extent of and trends in cancer

A benign tumour is not cancerous so does not pose a threat to life or long-term health.

A malignant tumour invades the tissue around it and may spread to other parts of the body. It is a threat to life or long-term health.

Since the 1990s, cancer has replaced cardiovascular disease as the greatest cause of years of life lost or fatal burden. Cancer is second among the causes of death in Australia. It accounts for approximately 30 per cent of all deaths. According to a 2008 AIHW report, in 2005 there were 38 838 deaths from cancer. Of these, 21 860 were of males (33 per cent of all male deaths) and 16 978 were of females (27 per cent of all female deaths). Cancer reaches its highest incidence and mortality in the 65 years and over age group, in whom it accounts for 45.5 per cent of deaths.

In the past 15 years the incidence rate of melanoma has increased more rapidly than that of any other type of cancer. With an ageing population, it is anticipated that there will continue to be increases in melanoma and breast cancer.

As Figure 2.9 shows, some types of cancer have decreased in incidence, while others have increased. After taking all cancers into account, however, there has been an increase in incidence in the last 20 years. The overall cancer incidence rate was higher among males than females. Reasons for the increase in cancer incidence include:

- exposure to risk factors (for example, ultraviolet radiation)
- improvements in the quality of detection techniques (for example, prostate-specific antigen, or PSA, testing for prostate cancer, and mammograms for breast cancer)
- more widespread use of personal and medical detection techniques (for example, self-examination for breast and skin cancers)
- people being less likely to die from other causes (for example, from coronary heart disease and accidents).

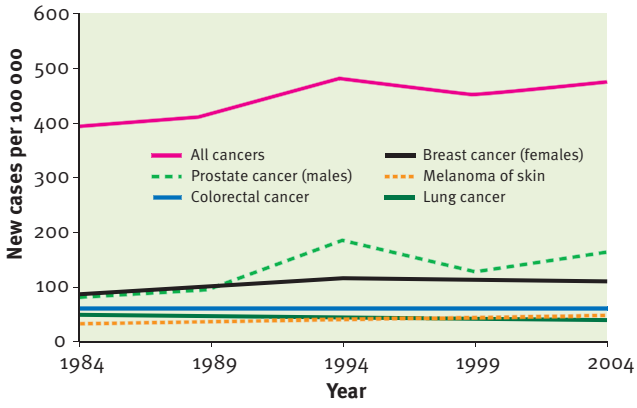
While there has been a fall in the death rate from cancer, there has been an increase in the number of people in the 65 years and over age group who have the highest rates of cancer incidence and mortality.

By the age of 75 years, one in three Australian males and one in four females will have been diagnosed with cancer at some stage of their life. The risk by age 85 years increases to one in two for males and one in three for females.

The risk of dying from a cancer before the age of 75 years is one in eight for males and one in 11 for females. The risk of dying from cancer before the age of 85 years is double those proportions: one in four for males and one in six for females.

The most common type of cancer among new cancer cases registered for females in 2004 was breast cancer. This was followed by colorectal cancer, melanoma and lung cancer. These four accounted for 59 per cent of all registered cancers in females in 2004.

Males accounted for 53 per cent of the cancer burden. Prostate cancer was the most common cancer among men. The use of prostate-specific antigen tests in screening for prostate cancer has allowed researchers to determine the cause of death. Colorectal cancer, lung cancer and melanoma (a malignant tumour, most often on the skin) were the next most common cancers diagnosed.



Source: AIHW, Australia's Health, 2008

Figure 2.9 Trends in the incidence of selected cancers

Overall, there has been a decrease in the incidence of certain cancers as the graph above illustrates. The decrease in the cases of lung cancer is due, mostly, to reduced rate of smoking in males. Stomach and bowel (colorectal cancer) cancer are decreasing as a result of better diet and improved food preservation. There is a downward trend in deaths from breast cancer as a result of improved treatments and screening. An increased use of 'Pap' tests is a significant contributor to the decline in cervical cancer.

Critical inquiry

Explain why there has been an increase in cancer incidence, but a decrease in mortality.

Research and Review

1. Research the incidence of prostate cancer. It was anticipated that there would be a levelling off, and even a possible decrease, in the incidence of this disease. Has this occurred?
2. Research the incidence of cancer in females to determine whether the trends presented are still current.

Risk factors and protective factors for cancer

As with cardiovascular disease, the risk factors for cancer can be divided into two categories: those that can be modified and those that cannot be modified. The risk factors vary according to the type of cancer.

Skin cancer

The major cause of skin cancer is exposure to the sun's ultraviolet rays. The sun is at its most damaging between the hours of 11.00 am and 3.00 pm. Exposure to sunlight in childhood increases the chances of skin cancer later in life. Further risk factors include having fair skin (which readily burns) and having a large number of moles. Both of these increase the risk of developing melanoma. These are hereditary factors, which cannot be modified.

Breast cancer

There are still many unanswered questions regarding the cause of breast cancer. The major risk factor that is unavoidable is, of course, gender. Family history of breast cancer increases the risk of developing the disease. Risk factors associated with lifestyle are believed to be obesity, and a late maternal age (over 40 years) at the time of the first full-term pregnancy.



Figure 2.10 Media coverage of the breast cancer diagnoses of Kylie Minogue and other high-profile breast cancer sufferers has raised awareness of breast cancer

Lung cancer

The risk factors related to lung cancer that cannot be modified are gender, age and family history. Risk factors that can be modified include smoking and exposure to **carcinogenic** chemicals; for example, asbestos and lead. People who are regular smokers are up to 20 times more likely to develop lung cancer. It is never too late to give up smoking because the body has the capacity to repair the damage done by smoking, and thus reduce the risk of lung cancer.



Figure 2.11 Smoking causes, among other diseases, lung cancer and emphysema

Socio-cultural, socio-economic and environmental determinants

Skin cancer

The incidence of skin cancer is increasing as a result of improved education relating to detection. Education and media health promotion strategies have alerted the community to the importance of detecting skin **anomalies** early, and reporting for medical advice. This increased education and awareness has resulted in common, less-harmful skin cancers being recorded and treated more frequently than in the past, thus resulting in a higher rate of incidence. On the negative side, the media are sometimes guilty of promoting tanned skin as being desirable, and thereby encouraging people to expose themselves to dangerous ultraviolet rays.



Figure 2.12 Lying in the sun puts you at risk of developing skin cancer

In Australia, society has for many decades regarded a suntan as 'healthy' and attractive. There has been a shift in attitudes, however, and it is now less fashionable to aspire to the traditional image of the 'bronzed Aussie' lifesaver.

Exposure to the sun in the workplace, and in recreational and school activities, is of concern with respect to rates of skin cancer.

Breast cancer

The increased incidence of breast cancer in females can, in part, be linked to changes in family structure and the changing role of women in society. The average age at marriage is now later, as is the average age of a female's first pregnancy. This delay is a response to greater financial demands placed on young families, and the desire of females to focus on establishing a career before having a family. The result has been more females experiencing their first full-term pregnancy after the age of 40 years, and thus increasing their risk of breast cancer.

Lung cancer

The incidence of lung cancer is decreasing in males, reflecting a decrease in the smoking rate over the past two decades. Improved education and effective health promotion strategies have contributed to this behavioural change, as has society's changing attitude to smoking. People are more aware of **passive smoking** and less tolerant of other people's smoking, especially in public areas and the workplace.

Improved workplace safety codes and equipment have also resulted in reduced exposure to carcinogenic substances (for example, asbestos) in the workplace. People of low socio-economic status, however, are more likely to be employed in occupations that involve exposure to dangerous materials, and involve high-risk tasks. These occupations include mining and construction.

In females, the incidence of lung cancer has increased, and smoking levels in young females remain high. The changing role of females in the workplace might be a cause for this increase in lung cancer. Females are challenging traditional gender roles and stereotypes, and are more active in a range of occupations that previously were the domain of males. These occupations are, in most cases, more 'high-powered', which can lead to higher stress levels. For some of these women, smoking might be a factor in presenting an image of being 'in control'. The media might also have a negative influence through the promotion of high-profile, attractive females smoking, and in the promotion of a link between smoking and weight control (which is, of course, important in relation to perceptions of body image).

The National Drug Strategy Household Survey: tobacco smoking

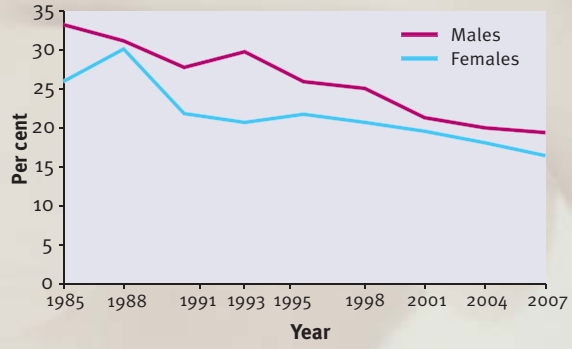
Tobacco smoking is the single most preventable cause of ill health and death in Australia, contributing to more drug-related hospitalisations and deaths than alcohol and illicit drug use combined. It is a major risk factor for coronary heart disease, stroke, peripheral vascular disease, cancer and a variety of other diseases and conditions …

The tangible costs of tobacco use in Australia were estimated to be $10.8 billion in 2004–05 or about 1.3% of gross domestic product…

[One] in six Australians aged 14 years and over smoked daily (16.6%) … Males were more likely to be daily smokers (18.0%) than females (15.2%). Former smokers outnumbered smokers at 25.1% of the population … and 55.4% had never smoked … Compared with overall smoking rates, smoking is far more common among those of lower socioeconomic status and among Indigenous Australians.

In Australia, the overall smoking rate has been declining since the 1950s, when an estimated 70% of males and 30% of females smoked. Between 1985 and 2007, the prevalence of daily smoking declined by 14.7 percentage points for males and 10.9 percentage points for females … [Daily] smoking among those aged 18 years and over declined from 19.2% in 1998–99 to 16.1% in 2006–07 …

In 2007, about one in 18 persons aged 12–19 years smoked daily. Rates were around 2% for those aged 12–15 years and markedly higher for those aged 16 years and over [see Table 2.1]. About 97% of the 12–15 years age group reported having never smoked a full cigarette; about the same proportions for both males and females …



Source: AIHW, Australia's Health, 2008

Figure 2.13 Daily smokers, population aged 14 years and over, 1985–2007

Table 2.1 Daily smokers: proportions among those aged 12–19 years, 2007 (per cent)

Sex	Age group			
	12–15	16–17	18–19	12–19
Males	1.5	4.1	11.6	4.7
Females	2.5	7.4	13.7	6.6
Persons	2.0	5.7	12.6	5.6

AIHW, Australia's Health, 2008

The ability of teenagers to purchase cigarettes increases their likelihood of smoking. Accordingly, all states and territories in Australia have legislation that prohibits the supply of cigarettes to people under the age of 18 years.

Estimates from the Australian Secondary Schools Alcohol and Drug surveys show that the proportion of current smokers aged 12–15 years who had purchased their most recent cigarette (instead of acquiring it in some other way) declined markedly from 52% in 1987 to 17% in 2005, and for current smokers aged 16–17 years the decline was from 64% to 29%.

Children are particularly susceptible to the effects of passive smoking … For children, this so-called environmental tobacco smoke increases the risk of a range of health problems. These include respiratory infections, middle ear infections, onset and worsening of asthma, decreased lung function, eye and nose irritation, low birth weight, and sudden infant death syndrome.

The benefits of reducing children's exposure to environmental tobacco smoke at home include reduced school absenteeism, increased school performance, reduced uptake of smoking, and lower consumption of tobacco among children who smoke …

With the general decline in smoking prevalence, and the increasing awareness of the effects of environmental tobacco smoke, … less than 8% of households in 2007 or around 300 000 dependent children [are] exposed to tobacco smoke inside the home.

AIHW, Australia's Health, 2008

Groups at risk of cancer

The groups at risk of cancer include:

- smokers
- people who are socio-economically disadvantaged
- people with high-fat, low-fibre diets
- people with a family history of cancer
- people with fair skin
- people who spend long periods of time exposed to the sun
- women who have never given birth.

The National Drug Strategy Household Survey is conducted by the Australian Institute of Health and Welfare every three years. It collects comprehensive information about people's use of and attitudes towards tobacco, alcohol and illicit drugs; experiences of alcohol- and other drug-related harm; and physical and mental health. The extract on page 35 is from the 2007 survey and is concerned with tobacco smoking.

practical application

Tobacco smoking and cancer

In small groups, design a poster to illustrate one of the trends occurring in tobacco smoking and its contribution to the incidence of cancer. Your poster should include a:

- title
- graph labelled correctly
- short description.

Research and Review

1 **Identify** the three leading causes of:
   - a cancer in males and females
   - b cancer mortality in males and females.

2 The increase in cancer incidence has been partly attributed to improvements in detection techniques.
   - a **Identify** the steps that are available to individuals to detect cancers at the earliest possible time.
   - b **Explain** why some people do not take full advantage of available screening services.
   - c **Propose** how screening services could be further promoted and utilised.

3 a There have been significant increases in melanoma (a form of skin cancer) over the last 15 years. **Explain** why this is so.
   - b **Describe** the steps that have been taken to reduce the incidence of skin cancer.

Critical inquiry

1 **Analyse** the impact of tobacco smoking on health by investigating:
   - a the extent of tobacco smoking (that is, trends)
   - b risk factors and protective factors related to tobacco smoking
   - c the socio-cultural, socio-economic and environmental determinants related to tobacco smoking
   - d groups at risk of tobacco smoking.

Diabetes

The incidence of diabetes is on the rise in Australia and across the world. Recent increases in the number of people with diabetes have led to claims that it has now risen to 'epidemic' proportions.

WEB

Internet support concerning diabetes can be accessed via www.oup.com.au/pdhpe12

The nature of diabetes

Diabetes mellitus is a hereditary or developmental disease caused by the improper functioning of the pancreas. This results in a disturbance in the sugar levels (glucose concentration) of the blood. If there is insufficient sugar in the blood, the condition is known as **hypoglycaemia**. Too much sugar in the blood is known as **hyperglycaemia**.

Too little sugar in the blood is known as hypoglycaemia. Too much sugar in the blood is known as hyperglycaemia.

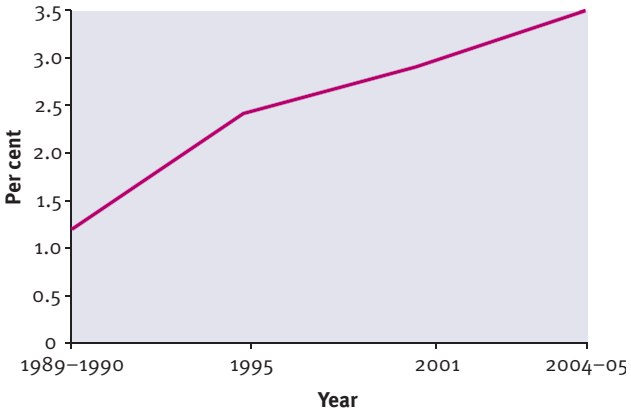
Type-1 diabetes is not a lifestyle disease. It is an **auto-immune disease** and, as yet, cannot be prevented.

Type-2 diabetes results from a combination of genetic and environmental factors. Although there is a strong genetic predisposition, the risk is greatly increased when associated with lifestyle factors, such as high blood pressure, overweight or obesity, insufficient physical activity, poor diet and the classic 'apple shape' body where extra weight is carried around the waist.

Diabetes produces a high level of blood sugar if untreated. A person with diabetes has an increased risk of coronary heart disease and atherosclerosis. Diabetes is also linked to kidney failure, nerve disease in the lower limbs and blindness.

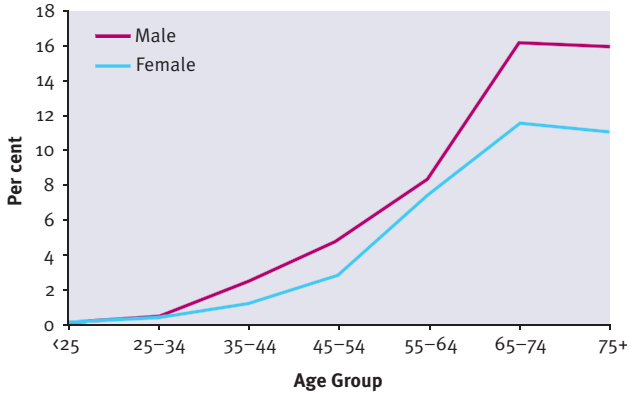
Extent of and trends in diabetes

There has been a significant increase in the number of people with diabetes in Australia over the last 20 years, and it is now a major cause of morbidity and early mortality. In 2005, there were 901 new cases of type-1 diabetes in children aged under 15 years, 788 new cases in people aged 15–39 years and a 20 per cent increase in the rate of new cases since 2000.



Source: AIHW, Australia's Health, 2008

Figure 2.14 Trends in the prevalence of diabetes



Source: AIHW, Australia's Health, 2008

Figure 2.15 Age-specific prevalence of diagnosed diabetes by sex

An increase in the incidence of diabetes may play a major role in trends in diabetes prevalence. Yet the increased incidence may also result from rising awareness in the community, better detection and better survival.

A total of 11 864 deaths in Australia in 2005 were caused to some degree by diabetes. Where diabetes was the underlying cause of death, common conditions listed as associated causes included coronary heart diseases, kidney-related diseases, stroke and heart failure. There have not been major changes in the death rate from diabetes (as an underlying cause) over the last 25 years, although there have been some differences in the rates for males and females. For males, the death rate rose by an average of 0.7 per cent per year. In contrast, the rate for females fell by an average of 0.5 per cent per year.

The death rate for diabetes increases progressively with age; about 87 per cent of people who died with diabetes in 2005 were aged 65 years and over. Males are more likely to die from diabetes than are females.

More than half (56 per cent) of the people with diabetes also have a disability. Diabetes is the eighth leading cause of disease and injury in Australia. It increases the risk of coronary heart disease and stroke and, when this contribution is added, diabetes is then ranked fourth out of all diseases. It is projected that by 2023, type-2 diabetes will be the leading specific cause of disease burden for males and the second for females.

Australia has a relatively low prevalence of overall diabetes compared with other countries, ranking the third lowest in 2006. Australia's incidence of type-1 diabetes among 0–14 year olds in the late 1990s to early 2000s was the fourth highest in the world.

Risk factors and protective factors for diabetes

Risk factors for diabetes differ by type of diabetes. There are two main types of diabetes: insulin-dependent diabetes (type 1) and non-insulin-dependent diabetes (type 2).

Insulin-dependent diabetes (type 1)

Insulin-dependent diabetes is more common in children and young adults, and is caused by the failure of the pancreas to supply sufficient amounts of insulin to convert glucose into energy. The cause of insulin-dependent diabetes is not confirmed, but is possibly linked to genetic factors and to viral infections contracted while young. It can also be caused by biological interactions and exposure to environmental agents among genetically predisposed people. Type-1 diabetes is managed by artificially supplying the body with insulin through regular injections.

Non-insulin-dependent diabetes (type 2)

Age is a risk for type-2 diabetes and genetic predisposition is shown by family history and ethnic background. Unlike type-1 diabetes, non-insulin-dependent diabetes has strong links to lifestyle. Type-2 diabetes occurs in adults, and is related to obesity, physical inactivity and an unhealthy diet. It is related to high blood pressure, the intake of too much **saturated fat** and refined sugar, and high alcohol consumption. As such, it is controlled through strict dietary measures and weight reduction.

Type-2 diabetes is sometimes referred to as adult-onset diabetes.

The protective factors for diabetes include regularly participating in physical activity, eating a well-balanced diet, consuming no or little alcohol, limiting the intake of saturated fat and refined sugar and maintaining a healthy weight range.

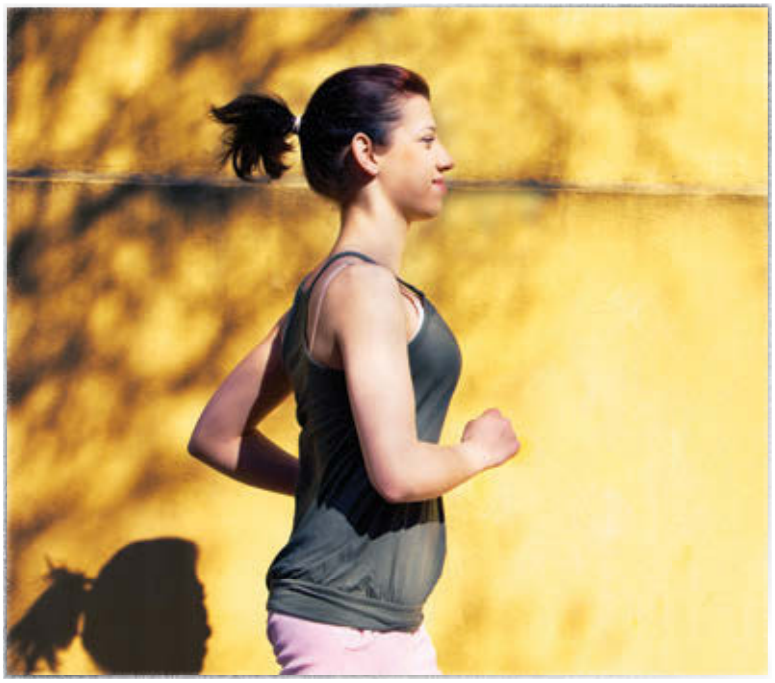


Figure 2.16 Regular participation in physical activity is a protective factor for diabetes

Socio-cultural, socio-economic and environmental determinants

The increased incidence of non-insulin-dependent diabetes is linked to social factors, such as socio-economic status. Socio-economically disadvantaged people are less likely to engage in physical activity, are more likely to consume large amounts of alcohol, are more likely to be obese, and more likely to have diets that are high in saturated fats. The significantly higher incidence of non-insulin-dependent diabetes in Aboriginal populations results from a combination of these factors, in addition to a lack of access to education and medical care.

Another contributing factor is the social acceptance of alcohol. Dangerous levels of alcohol consumption are considered a normal part of the Australian lifestyle, despite the fact that it is a significant risk factor for conditions such as non-insulin-dependent diabetes.

An ageing population has also contributed to an increased incidence of non-insulin-dependent diabetes. As the Australian population ages, the most rapid growth will occur in the age group of 45 years and over.

Groups at risk of diabetes

Groups at risk of type-2 diabetes are:

- those aged over 65 years
- those with a family history of adult-onset diabetes
- people who are overweight
- those with high intakes of saturated fat and refined sugar
- people who frequently consume alcohol
- those who engage in little or no exercise.

Aboriginal and Torres Strait Islander peoples have markedly higher rates of diabetes (specifically type 2) compared with other Australians. Six per cent of the total Indigenous population has diabetes/high-sugar level. The prevalence of diabetes among Indigenous people is almost three times as high as that of non-Indigenous Australians. There are also higher rates of diabetes among other sections of the Australian community, namely those living in more remote areas, those with lower socio-economic status and those born overseas.

Research and Review

1. **Define** diabetes.
2. **Describe** the differences between type-1 diabetes and type-2 diabetes.
3. Diabetes is considered to be under-reported. **Explain** why this is so.
4. **Discuss** the links between the social acceptance of alcohol and the increase in diabetes.

Respiratory disease

We may take breathing for granted, thinking that it is just an involuntary reflex action. But for the millions of people who suffer from respiratory disease, each breath is a major accomplishment.

WEB

Internet support concerning respiratory disease can be accessed via www.oup.com.au/pdhpe12

The nature of respiratory disease

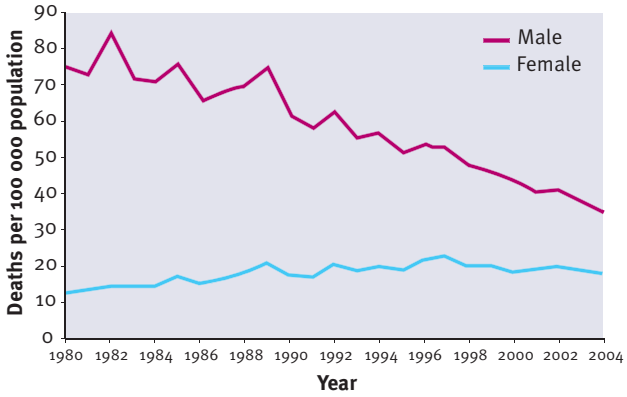
Respiratory disease, or chronic obstructive pulmonary disease (COPD), is a disease that destroys the lung tissue and narrows the air passages to obstruct oxygen intake, causing chronic shortness of breath. A person with COPD is prone to episodes where shortness of breath is more severe and he or she has fits of coughing with mucus. The lung damage is mainly due to the long-term inhalation of irritant gases and particles, and by far the main cause of this is cigarette smoking. Common COPDs are **emphysema** and chronic bronchitis.

Extent of and trends in respiratory disease

An international survey of people aged 20–44 years ranked Australia third out of 16 high-income countries in the prevalence of mild COPD. In this survey, Australia had the lowest prevalence of the identified groups considered at risk of respiratory disease. The World Health Organization (WHO) predicts that COPD will become the third leading cause of death worldwide by 2030.

Deaths due to respiratory disease were 45.2 per cent and 3.7 per cent of all deaths. The death rate among males was almost double the female rate. Overall, the death rate for COPD has fallen over the last 25 years. In males, the death rate due to COPD fell every year for the last 10 years, except in 2002. In females, the rate appeared to level off after peaking in 1997 until a small fall in 2005.

In 2004–05 fewer Australians had emphysema and/or bronchitis than in 2001. Among those aged 65 years and over, 8 per cent had emphysema and/or bronchitis compared with 3 per cent of all Australians. For people aged 65 years and over, emphysema and/or bronchitis is more common in males than in females. Influenza and pneumonia can worsen the symptoms of COPD, decrease lung function and lead to hospitalisation or even death. These risks can be reduced significantly by vaccination.



Source: AIHW, Australia's Health, 2008

Figure 2.17 Trends in COPD mortality

Risk factors and protective factors for respiratory disease

Tobacco smoking is the most important risk factor for COPD. Other risk factors for COPD may worsen respiratory symptoms or may contribute to the risk of developing the disease, either independently or in conjunction with tobacco smoking. These include respiratory infections and exposure to environmental (passive) tobacco smoke, indoor and outdoor air pollution, and occupational dusts and chemicals.

Socio-cultural, socio-economic and environmental determinants

Social factors that influence the risk of COPD include socio-economic status. People of low socio-economic status are more likely to smoke. Thus, children of low socio-economic status are more likely to be exposed to passive smoking in the home. Indigenous adults are twice as likely to smoke as are other Australian adults, thus increasing asthma risk for their children. The death rate from asthma is higher in rural and remote locations than in capital cities. This might reflect difficulty in accessing emergency care when a serious asthma attack occurs.

Asthma can be triggered by exposure to environmental pollutants. Children from lower socio-economic groups are more likely to live in areas close to factories or high-density housing near industrial areas. Children from low socio-economic groups might also be less likely to obtain adequate medical care regarding asthma prevention, control and treatment. Asthma might be more common in people from low socio-economic areas because they are more likely to work in hazardous jobs involving chemicals and fibres.

Groups at risk of COPD

Groups at risk of COPD are those aged over 65 years, people who smoke and people prone to allergies. Young children are at highest risk of developing asthma. In particular, Aboriginal and Torres Strait Islander peoples, people from low socio-economic areas and people from non-English speaking backgrounds are also at risk of COPD.

Research and Review

1. **Identify** the typical signs and symptoms of respiratory disease.
2. **Describe** the trends of respiratory disease.
3. **Describe** the factors that have contributed to a decline in deaths from respiratory disease.
4. **Outline** the triggers for respiratory disease.
5. **Discuss** how socio-economic status affects the incidence of respiratory disease.
6. **Identify** the groups at highest risk of respiratory disease.

Injury

Injury has a major, but often preventable, impact on Australia's health. It affects Australians of all ages, is the greatest cause of death in the first half of a person's life and leaves many with serious disability or long-term conditions.

WEB

Internet support concerning injury can be accessed via www.oup.com.au/pdhpe12

The nature of injuries

For the purpose of this study, 'injuries' are defined as those that are caused by any form of external violence. These include injuries and death suffered as a result of motor vehicle and workplace accidents, suicide, violence, drowning and poisoning. Because of the sudden nature and tragedy of deaths from injuries, such deaths are often accompanied by severe emotional trauma. There is also significant loss to the community because deaths from external violence are most likely to occur in young adults.

Extent of and trends in injuries

Injuries caused by accidents, poisonings, suicide and violence are the fourth most common cause of death in Australia. They account for approximately 7.5 per cent of all deaths. The overall injury death rate for males was almost 1.7 times that of females. Injury was the most common cause of death from early childhood through to middle age. In 2004–05, half of all deaths of persons aged 1–44 years were due to injury.

The three main causes of death through injury are self-harm or suicide, falls and transport-related injuries. Other injuries include those caused by poisoning, drowning, fires, homicide and machinery. Injury death rates are relatively low in childhood (see Figure 2.18). For those aged 1–14 years, 38 per cent of all deaths in 2004–05 were due to transport injuries (especially as car occupants and pedestrians); drowning (especially for toddlers); and fires, burns and scalds. Injury is the main cause of death in the age range during which teenagers become adults. In 2004–05, 71 per cent of all deaths at ages 15–24 years were injury deaths, mainly due to transport injuries and suicide. Suicide and transport-related injuries are also prominent causes of injury death in middle age. At older ages, fall-related injury predominates.

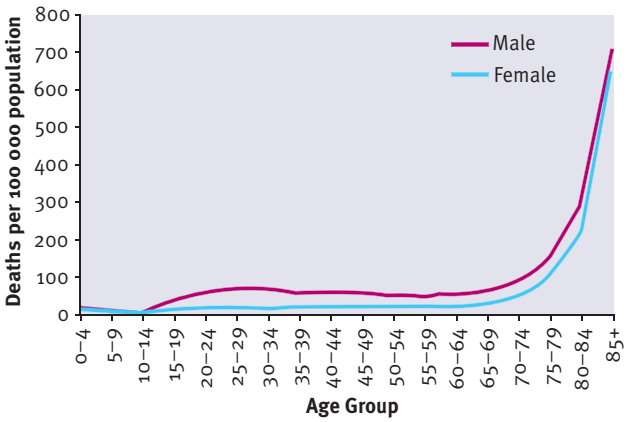
Overall, injury mortality has tended to decline during recent decades, largely due to a decline in road deaths. The decline in road deaths has slowed more recently. From the late 1990s, noteworthy declines occurred in drug-related deaths and in suicides.

Falls by older people commonly result in a fracture, often of the hip. Nearly one-third of hospitalised fall-related injuries for older Australians in 2005–06 involved the hip or thigh. Head injuries due to a fall were also common, particularly for males. Most injurious falls for all Australians are due to slips, trips and stumbles.

Table 2.2 Injury deaths by type of external cause, 2004–05

External cause of injury	Males		Females	
	Count	Per cent	Count	Per cent
Unintentional				
Transport	1239	20.3	437	11.9
Drowning	174	2.9	62	1.7
Poisoning, pharmaceuticals	508	8.3	238	6.5
Poisoning, other substances	227	3.7	79	2.1
Falls	1151	18.9	1729	46.9
Fires/burns/scalds	103	1.7	53	1.4
Other unintentional	1162	19.1	661	17.9
Subtotal	*4308*	*70.7*	*3172*	*86.0*
Intentional				
Intentional, self inflicted	1609	26.4	420	11.4
Intentional, inflicted by another	116	1.9	57	1.5
Subtotal	*1725*	*28.3*	*477*	*13.0*
Undetermined intent	68	1.1	26	0.7
Other	12	0.2	13	0.4
All external causes	**6090**	**100.0**	**3688**	**100.0**

AIHW, Australia's Health, 2008



Source: AIHW, Australia's Health, 2008

Figure 2.18 Injury death rates by age and sex

Risk factors and protective factors for injury

For the major causes of injury there are specific sets of risk factors. Youth suicide can be linked to a number of social changes that have placed extra pressures on young people. High levels of unemployment, higher levels of illicit drug use and increased breakdown in family structure are just some factors that could possibly lead to depression and eventual suicide. Young people feeling depressed might also lack access to quality counselling and treatment. Other factors that can contribute to suicide include a mental disorder and inappropriate role modelling.

The major risk factors leading to injury through motor vehicle accidents have been clearly identified. They are speeding, alcohol, fatigue and not wearing a seat belt. Other factors that can contribute to motor vehicle injuries include overcrowding, driver inexperience, and road or environmental conditions.

Risk factors for child accidents include a lack of supervision and an unsafe environment. The reductions in transportation deaths can be attributed to improved car safety and restraining devices, along with helmet legislation and other cycling and pedestrian safety initiatives. Other initiatives such as pool fencing, electricity cut-off switches, smoke alarms and product safety standards have also contributed.

Socio-cultural, socio-economic and environmental determinants

Suicide

The incidence of suicide in young males is of concern and can be linked to several social factors. Lifestyle patterns of young people have changed dramatically from those of earlier generations, and have possibly resulted in higher levels of depression.

One significant change has seen young people seeking more independence from their parents or carers at an earlier age. For some young people this independence is by choice as they desire more control over their lives and the decisions that affect them. For others, there is little choice because the extra independence and responsibility is forced upon them as they escape from a home life where they experience violence and neglect or due to family breakdown. Other young people find greater responsibility thrust upon them at an earlier age because both parents are in full-time employment.

As young people seek more independence, they can be confronted with unemployment, homelessness, an inability to develop positive relationships and the need to make decisions related to drug use. Some young people turn to drug use to cope with the extra pressures associated with their new independence and extra responsibilities. A lack of access to appropriate support networks for young people is also a contributing factor.

Motor vehicle accidents

The media have become a very influential part of today's society, and there is no better example of their influence than the role they have played in the reduction of road accidents. Although there are numerous factors that have contributed to this reduction, the 'shock' tactics used in many road safety television commercials appear to have had some impact on road-user behaviour. The increased use of community organisations involved in accident prevention has also played a part. An example of this is the Lions Club with its 'Driver Reviver' stops.

Deaths from motor vehicle accidents remain highest in young males. The desire to seek independence at an earlier age might contribute to this, and motor vehicle ownership is considered an integral part of this independence. For young males, motor vehicle ownership and the driving of a vehicle is also a symbol of adulthood and masculinity. For some, the desired image also involves driving a car that has been modified; for example, with 'mag' wheels and a turbo engine. Young males also engage in driving vehicles that are overcrowded, and this significantly increases the risk of accidents.

P-plate drivers in NSW may only carry the number of passengers that can be properly seated in seats and restrained by approved seat belts or child restraints.



Figure 2.19 Police conduct random breath testing to deter people from drink-driving.

practical application

Risk factors and protective factors for injury

It has been suggested that the following 'get-tough' measures should be introduced to reduce deaths and injuries resulting from motor vehicles:

- 'P' plates to last a minimum of three years, and progression to a full licence to be allowed only after merit points have been earned
- all drivers to be re-tested every 10 years
- drink-driving rules to be further tightened
- lower speed limits to apply in wet weather
- road safety to be taught as part of the Higher School Certificate
- banning from the road of 'hotted-up' cars
- responsible attitudes to road safety to be taught in kindergarten
- jaywalking to be discouraged
- more traffic police patrols to be used
- an examination of why cars are sold with maximum speeds of 220 km/hour.

1 From the above list, **identify** three proposals that you believe will be most effective in lowering the number of deaths from motor vehicle injuries and suggest three proposals that will have little or no effect on road fatalities. **Discuss** reasons for your answer.

2 **Describe** how drink-driving rules can be further tightened. Is a 'zero-tolerance' approach to drink-driving the most effective strategy?

3 Fatigue is believed to be a major contributing factor in fatal road accidents. **Discuss** what measures can be taken to reduce fatigue-related road deaths.

Child accidents

Social factors that might result in child accidents include the need for both parents to be engaged in full-time employment, resulting in children being inadequately supervised. People who are socio-economically disadvantaged might not have the financial resources to provide the necessary safety devices designed to prevent child accidents (for example, electricity cut-off switches, smoke alarms and hot-water thermostats). There is also a link between child accidents and a lack of parental education.

Groups at risk of injury

Groups at high risk of injuries include:

- elderly people (mainly through falls)
- males aged 15–24 years
- drivers who speed and/or drink-drive
- young children
- workers in high-risk occupations (for example, mining or construction).

Critical inquiry

See the Practical Application task opposite.

1. **Describe** the difficulties that would be faced in attempting to implement these proposals.
2. **Propose** which groups would be likely to support the proposals and which groups might be opposed to the proposals.
3. **Discuss** how effective legislation is in reducing road accidents and injury.

Research and Review

1. **Describe** the trend in deaths from external sources. What are the three major causes of death from external sources?
2. **Identify** the major gender differences in deaths from external sources.
3. **Discuss** the measures that have contributed to reducing the incidence of injury in children from drowning, poisoning, falls and burns/scalds/fire.

Mental health problems and illnesses

Mental health problems and illnesses have significant impacts on the personal, economic and social well-being of individuals, families and the community.

The nature of mental illness

WEB

Internet support concerning mental health can be accessed via www.oup.com.au/pdhpe12

One in five Australians will experience mental illness at some stage during their lives. Mental illnesses can be categorised as psychotic or non-psychotic.

Psychotic illnesses

Psychotic illnesses are those that cause a person to lose touch with reality. Psychotic illnesses include schizophrenia and bipolar disorder (previously known as manic depression). People experiencing a psychotic illness might see, hear and feel a world that is very different from those experienced by the people around them. For the person with the illness, this world is very real. The person might display extreme emotions (ranging from joy to depression), false beliefs and, possibly, hallucinations. Medication is now available to treat psychotic illnesses effectively, and the associated societal **stigma** of these illnesses has decreased.

Non-psychotic illnesses

All people experience emotions. For some people these emotions can become overwhelming and interfere with their ability to cope with their day-to-day tasks, such as work and maintaining relationships. An individual with a non-psychotic mental illness experiences exaggerated feelings, such as depression, anxiety and fear. Common non-psychotic illnesses include phobias, depression and obsessive-compulsive disorder. As with psychotic illnesses, these conditions can be treated effectively. In some cases, they are more difficult to identify because the person experiencing the condition might hide the behaviour. This is commonly observed in those with anorexia or bulimia, for example.

The stigma associated with mental illness has decreased in recent years as more members of the community become aware of its existence, and become better informed about mental health issues. The stigma has not completely disappeared, however, and many people are still embarrassed or feel uncomfortable about the issue. A person with a mental illness needs the same support as someone with any other disease. These people need empathy, encouragement and care. Most people fully recover from a mental illness. They do not need to be isolated and most do not need hospitalisation.

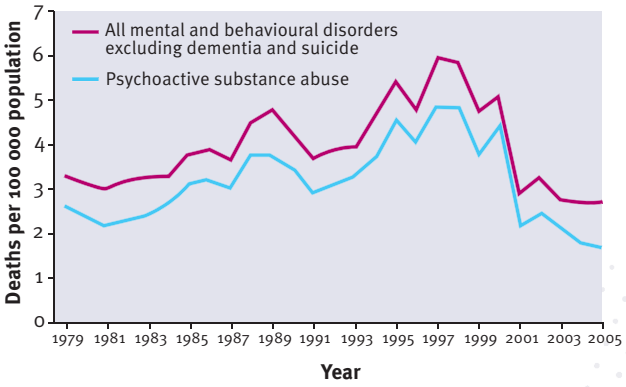
A person with a mental illness needs the same support as someone with any other disease.

Extent of and trends in mental illness

A mental or behavioural disorder was recorded as the underlying cause for 579 deaths in 2005 (excluding dementia and suicide); a rate of 2.7 per 100 000 persons. The rate dropped substantially from the peak years of the mid to late 1990s, and now appears to be plateauing (see Figure 2.20). Most cases with a mental or behavioural disorder as the underlying cause of death were due to abuse of **psychoactive substances**, such as alcohol and heroin.

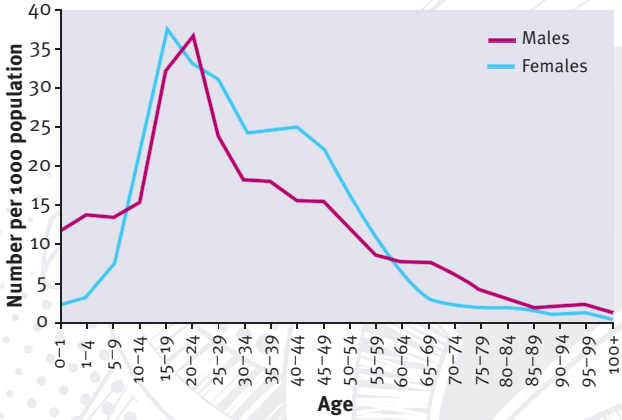
In 2003, after cancer and cardiovascular disease, mental illness was the third highest contributor (estimated at 13 per cent) to the total burden of disease. Mental illnesses accounted for almost one-quarter (24 per cent) of the total disability burden for all diseases. Mental illness was spread across both sexes and all ages, with females accounting for 53 per cent of the burden. In females, anxiety and depression were the foremost causes, accounting for 10 per cent of the overall female burden of disease. Together, anxiety and depression ranked third (at almost 5 per cent) in the overall male burden. The burden from mental illnesses for both sexes was greater in early to mid adulthood than at other ages. Mental illnesses accounted for a relatively large proportion of overall disease burden for age groups up to middle age. Twenty-three per cent of the overall burden for children aged 0–14 years was due to mental illnesses and the proportion was 36 per cent for the 15–44 years age group.

Of those people who had one mental disorder (including anxiety, substance use or **personality disorder**), 40 per cent reported having at least one other mental disorder. People with multiple mental disorders were more disabled, more distressed, had more consultations for mental health problems and had higher measured levels of **neuroticism** than those with only one mental disorder. There is strong evidence establishing depression as a risk factor for heart disease. There is a causal association between depression, social isolation and lack of quality social support and the onset and prognosis (likely outcome) of coronary heart disease.



Source: AIHW, Australia's Health, 2008

Figure 2.20 Death rates for mental and behavioural disorders



Source: AIHW, Australia's Health, 2008

Figure 2.21 Mental Illnesses burden by age and sex

Critical inquiry

1 **a** **Explain** whether mental illness has increased in incidence or is being better diagnosed.

b If it has increased in incidence, is it valid to say that this is because life is more stressful now than it was in, say, the 1950s? If so, **discuss** the factors that have contributed to this increase.

Risk factors and protective factors for mental illness

There are many types of mental illnesses with varying degrees of severity. People who have a mental illness often also experience isolation and discrimination due to the stigma associated with their illness. Sometimes mental illness may develop when a person has a strong reaction to a particular drug. Illicit drug use increases the risk of developing a mental illness or making an existing mental illness worse. People who use drugs have much higher rates of mental illness than people who don't.

Psychotic illnesses

Schizophrenia

Schizophrenia is an illness that affects the mental functioning of a person and may cause changes to their personality. Schizophrenia affects people in different ways. For some, the illness might be only one brief episode, whereas for others it might be a lifetime condition. Schizophrenia might have a rapid onset over a period of weeks, or might develop over several months or years.

No single risk factor has been isolated for schizophrenia, but it is believed to occur as a result of a combination of factors. These include:

- *Genetic factors*—Schizophrenia has hereditary links; if one parent suffers from the illness, the children have a 10 per cent chance of developing the condition.
- *Biochemical factors*—Various neurotransmitters (chemicals that play a part in nerve cell function) have been implicated in schizophrenia. Abnormalities in the type and amounts of these neurotransmitters are likely to be linked to genetic factors.
- *Family relationships*—Although family relationships are not a cause of schizophrenia, relationship tension might lead to relapses. It is often unclear whether the illness contributed to the family tension, however, or the family tension preceded the illness.
- *Environment*—Stressful incidents might lead to an episode of schizophrenia but, as with family tensions (see earlier), it is often unclear whether the illness contributed to the stress or the stress preceded the illness.

Bipolar disorder

A person with bipolar disorder (previously referred to as manic depression) experiences extreme mood swings: episodes of depression alternating with episodes of abnormally heightened mood. This heightened mood is known as mania. The episodes of depression are more common and last longer than the episodes of mania, and many people develop prolonged episodes of extreme depression.

Causes of bipolar disorder include:

- *Genetic factors*—Children of parents with bipolar disorder have a greater risk of developing the disorder.
- *Biochemical factors*—A chemical imbalance in the brain might cause an episode of depression or an episode of mania. This imbalance is treated with medication.
- *Stress*—For some people, the condition can be triggered by a stressful incident, such as a relationship breakdown or unemployment.
- *Seasons*—For some unexplained reason, the likelihood of experiencing a manic episode is higher in spring and early winter.

Psychotic depression

As well as bipolar disorder (with extreme mood swings from depression to mania), some people suffer from severe psychotic depression without any manic features. People with this illness have all the characteristics of non-psychotic depression (described below), but also have psychotic features, such as severely disordered thought patterns, irrational beliefs and difficulty keeping in touch with reality. In common with other psychotic illnesses, this form of depression is probably caused by genetic and biochemical factors. An example of this type of depression is severe psychotic post-natal depression in which some women suffer a severe distortion of reality due to internal biochemical and hormonal factors after giving birth.

Non-psychotic illnesses

Non-psychotic depression

As described above, people with depression can suffer from severe psychotic symptoms in which they have difficulty keeping in touch with reality. However, depression can also occur in a less severe (but still distressing) form known as non-psychotic depression.

Depression is an emotion that all people experience at some time. For many it is a normal reaction to a life experience; for example, the loss of a loved one. However, clinical depression is a more serious condition and is not to be confused with unhappiness. Clinical depression lasts longer, is more intense and might result in anxiety, poor sleep patterns and loss of appetite.

The risk factors for depression include:

- *Genetic factors*—As with many other illnesses, the likelihood of depression is increased if there is a family history of the condition.
- *Biochemical imbalance*—Depression is believed to be due, in part, to a chemical imbalance in the brain. Significant changes in hormone levels, such as occur in menopause or after childbirth can be associated with depression in females. This can sometimes develop into severe psychotic depression.
- *Stress*—Depression is linked to stressful life episodes, such as unemployment, retirement or loss of a loved one.
- *Personality*—People with certain personality traits might be more likely to experience bouts of depression. Such people include those who are perfectionists, extremely stubborn or heavily dependent on others.



Figure 2.22 Phobias are anxiety disorders

Clinical depression is a serious condition and is not to be confused with unhappiness.

Anxiety

In common with depression, anxiety is an emotion that all people experience at some time. Some people are more deeply affected by their anxiety, however, and, in extreme cases, it can manifest itself in physical conditions, such as sweating, erratic heartbeat, headaches, nausea, muscle pain and faintness. The main types of anxiety disorders are simple phobias (for example, fear of spiders), social phobias (for example, fear of failing in the presence of others), obsessive-compulsive disorder (for example, repeated hand-washing and locking of doors), post-traumatic stress disorder (for example, flashbacks of major traumas) and panic disorders.

The risk factors for anxiety disorders are not clear. Anxiety disorders can result from unresolved problems developing into major life traumas, and may be triggered by a significant life experience.

Socio-cultural, socio-economic and environmental determinants

Social causes of mental illness include a lack of employment prospects. This can lead to increased stress levels among young people and the long-term unemployed. Changing family structure is also a factor. Family breakdown ending in divorce reduces the strong relationship support offered by the family and provides a traumatic experience that can trigger an episode of mental illness. Those who are socio-economically disadvantaged might experience more stressful circumstances linked to their poorer financial status.

Mental illness in Aboriginal communities might remain undetected because Indigenous people often consult elders rather than a GP or mental health professional, such as a counsellor, psychologist or psychiatrist. Mental illness might also remain undetected in those affected young people who turn to crime, drugs and violence; and may therefore be dealt with by the justice system rather than by mental health services.

Groups at risk of mental illness

The groups at highest risk of mental illness include:

- those with a family history
- Indigenous males
- those who are frequently exposed to a stressful environment
- those who have experienced significant trauma in their lives
- those with certain personality types (for example, perfectionists).

Research and Review

1. **Explain** the differences between psychotic and non-psychotic illnesses. Support your answer with examples.
2. Stigma often surrounds mental illness.
   a. **Discuss** the reasons for the stigma surrounding mental illness.
   b. **Propose** further steps that can be taken to reduce this stigma.
3. **Identify** the risk factors that are common for many mental illnesses.
4. a. **Describe** the personality traits that make a person prone to anxiety disorders.
   b. **Explain** why those traits make a person more prone to anxiety disorders.
5. **Discuss** the social determinants that contribute to mental illness.
6. Research and **analyse** the most recent information on preventable chronic diseases, injury and mental health problems. Because health information is always changing, your research should aim to confirm or challenge the information provided in this chapter. Once you have compiled the information write a short report to be distributed to the members of your class.

A growing and ageing population

Australia has a growing and ageing population. Older Australians are people aged 65 years and over. This group makes up approximately 13 per cent of the population. The proportion of the population aged 65 years and over is projected to rise by between 27 per cent and 30 per cent by 2051. The ageing of the population is caused by two factors. First, Australian families are, on average, having fewer children. The second factor contributing to the ageing population is that we are living longer. With fewer babies being born, and more people living longer, it is inevitable that the population will become progressively older. With the population ageing and people living longer, there are more people, particularly those at older ages, who have a disability and are limited in their ability to participate in physical activity.

Healthy ageing

All Australians, regardless of age, should have access to appropriate employment, training, learning, housing, transport, cultural and recreational opportunities and care services that are appropriate to their diverse needs. This enables them to optimise their quality of life over their entire lifespan.

Healthy ageing is concerned with quality of life, independence and lengthening the number of healthy years, not just the years of life, enjoyed by an individual. The benefits of adopting a healthy lifestyle even at an older age include the prevention of disease and functional decline, extended longevity and enhanced quality of life. The healthier an individual, the less demand that person places on health and aged care services.

Australian males aged 65 can expect to live to be 83.1 years, while 65-year-old females have an expected life span of 86.4 years. These life spans are about six years more than were experienced

during the beginning of the twentieth century. Males and females aged 85 years can expect to live for a further 5.9 and 7.1 years, respectively, which is about two years more than for those living in the early 1900s. Most of these gains in life expectancy among older Australians occurred during the last three decades, when deaths from cardiovascular diseases (particularly heart disease and stroke) fell rapidly.

The majority of older Australians consider themselves to be in good health. Many older people have a positive view of their health, even though older age may be generally associated with increasing levels of disability and illness. Older females are more likely than older males to rate their health as excellent or very good.

Increased population living with chronic disease and disability

Coronary heart disease and cerebrovascular disease (particularly stroke) are the two leading causes of death among older males and females. These diseases are also major causes of disability among older Australians. Other heart diseases, which include heart failure, are also common. Lung cancer is the third most common cause of death for older males and the fifth for older females. Colorectal cancer is also high for both sexes, and prostate cancer and breast cancer are two important sex-specific causes of death. Other chronic diseases include cancer and chronic pulmonary obstructive disease, which includes emphysema.

Dementia and related disorders, such as **Alzheimer's disease**, still cause many deaths among older Australians. Diabetes is the main underlying cause of death and was ranked the eighth leading cause for both older males and females. It also correlates with disability and poor quality of life. Diseases of the arteries, such as atherosclerosis and other peripheral vascular diseases, are the twelfth leading cause of death for older males and females.

The top causes of death for 65–74 year olds include pancreatic cancer, cirrhosis of the liver for males and ovarian cancer for females. At 75–84 years, deaths from dementia and related disorders are prominent, along with deaths from influenza and pneumonia. For those aged 85 years and over, influenza and pneumonia and kidney failure are among the top causes.

Other conditions with a large impact on older Australians include adult-onset hearing loss, **Parkinson's disease** in males, and osteoarthritis and falls in females.

Table 2.3 Leading causes of death in Australians aged 65 years of age and over

Males	Deaths	Per cent of total	Females	Deaths	Per cent of total
Coronary heart disease	10 016	20.1	Coronary heart disease	10 565	19.7
Cerebrovascular disease	4226	8.5	Cerebrovascular disease	6527	12.2
Lung cancer	3542	7.1	Other heart diseases	4050	7.6
Prostate cancer	2752	5.5	Dementia and related disorders	3234	6.0
Other heart diseases	2625	5.3	Lung cancer	1990	3.7
Chronic obstructive pulmonary disease	2589	5.2	Chronic obstructive pulmonary disease	1839	3.4
Colorectal cancer	1687	3.4	Pneumonia and influenza	1615	3.0
Diabetes	1462	2.9	Diabetes	1594	3.0
Dementia and related disorders	1445	2.9	Breast cancer	1450	2.7
Unknown primary site cancers	1353	2.5	Colorectal cancer	1448	2.7
Pneumonia and influenza	1227	2.6	Unknown primary site cancers	1294	2.4
Diseases of arteries etc.	1090	2.2	Diseases of arteries etc.	1110	2.1
Total (12 leading causes)	**34 014**	**68.1**	**Total (12 leading causes)**	**36 716**	**68.5**
Total (all deaths 65+)	**49 920**	**100.0**	**Total (all deaths 65+)**	**53 566**	**100.0**

AIHW, Australia's Health, 2008

Aged care crisis: a call for kindness and justice

By Tristan Ewins

… [In] light of Australia's ageing population [who is responsible for] … the structural fiscal impact this will have on future Federal budgets? …

The crisis of aged care in Australia has many dimensions …

Charmaine Crowe, the Policy Co-ordinator of the Combined Pensioners and Superannuants Association (CPSA), … explained that … lack of trained staff comprises 'the number one [reason] behind poor standards of care' …

A report on the aged care workforce by the National Institute of Labour Studies at Flinders University found that (in 2008): 'Registered nurses in aged care are reputed to earn $250 to $300 a week less than their colleagues in acute care.

Furthermore, 'the number of registered nurses in aged care [had] reduced from 21 per cent to 16 per cent'.

Residents requiring a higher level of care often need to be 'turned' on a regular basis to avoid bedsores. And in case of incontinence, nurses need [to] check on the conditions of residents regularly, and must be able to assist in showering and washing residents whenever the need arises …

According to Crowe, 'for-profit' aged care is counter-productive. There is a contradiction, here, between an ethic of providing the greatest care and respect, and the motive of maximising profit and share-value. Ideally, there ought to be a mix of public and private providers—where private providers are run on a 'not-for-profit' basis—managed by charities, churches and other community organisations …

There are many dimensions to the problem: but the inability of vulnerable patients to hold their carers accountable—often because of dementia and other conditions—is a central concern …

Crowe holds that the accreditation process 'lacks vigour' resulting in poor quality of care. Currently, nursing home management has the option of 'nominating the assessor' who will conduct the accreditation review: a clear conflict of interest. Reviews need to be more thorough; without such conflicts. And more prolonged and thorough visits should be made without the generous preparation times currently allowed …

Crowe applauded the example of Denmark—whose social wage incorporates compensation schemes to ensure that the cost of care and disability are covered by the State. The principle is that the vulnerable should not be disadvantaged financially.

Denmark provides 'rebates' for the disabled or frail—so that such people are not disadvantaged financially.

A further option, here, is for residents of nursing homes or hostels to receive a 'targeted supplement'. This could assist pensioners and their carers so they can afford basic goods and services …

Perhaps additional funding should be provided for a community and family advocacy group to ensure greater accountability. In Australia, there are several modes by which aged care fees are conducted … Crowe related that there are a number of modes of payment.

Often residents are expected to provide about '85 per cent of the full aged pension' to meet the costs of their care (about $33 a day). Those on higher incomes may be asked to pay up to $118 a day.

Finally, low care hostels can charge a bond—at any rate they like—with the exception that residents must be left with no less than $35 500 in assets.

Importantly, those better suited to 'low care' should not be driven into 'high care' nursing homes, simply because they cannot afford the 'low care' option … There are many other issues pertaining to 'quality of life' for pensioners, including the frail and vulnerable. To begin: nursing homes rarely provide sufficient dental care. Free dental care ought to be a priority for all Australians. But in the case of the most vulnerable Australians, our duty of care is even more plain. Dentists should be regularly commissioned to visit nursing homes and hostels: and should be 'on call' for whenever the need for their services arises.

[Other] elements that would best be implemented to ensure quality of life for vulnerable and elderly Australians [include]:

- Residents should enjoy privacy with their own room …
- Access to the 'simple pleasures' of parks, gardens could potentially provide a significant improvement to residents' quality of life.
- Food must be of the highest quality available …
- …Television, music and radio should be provided … Where residents are increasingly technologically literate—there should be access to internet services as well …
- [Regular] outings, including visits to shops, churches or gardens.
- … And social interaction between residents should be facilitated where possible.
- [Therapy] services where required to maintain as much mobility as possible.

Heating and air conditioning for all nursing homes and hostels are essential …

Finally … the role of carers needs to be recognised and provided for … It is rational—and it is right—that carers' pensions be dramatically increased. And the love of family can be such that even the most caring nursing professionals cannot provide.

On Line Opinion,
17 February 2009

Demand for health services and workforce shortages

During the last 25 years the Australian medical workforce has increased much more rapidly than has the population. Factors contributing to this have included the growing and ageing of the population. The demand for health care increases with age, and medical workforces are derived from the demand for health care. Those in the age group 55 years and older are the heaviest consumers of medical services. The rising national health expenditure is likely to be driven by a combination of factors:

- relative health price increases
- a growing population
- the ageing of the population
- non-demographic growth in health care expenditure in particular.

When older people are discharged from hospital, they are less likely than younger people to return to their usual residence, and more likely to enter residential aged care or die. In particular, a high proportion of injury-related hospitalisations for older people are followed by discharge to a residential aged care or 'other health facility'.

Availability of carers and volunteers

Service providers that offer aged care in the community and through aged care homes include a mix of private and religious or charitable organisations, as well as state, territory and local governments.

Most older Australians prefer to stay in their own homes, so there are a number of programs available to help with daily living activities that may have become harder for these people to manage on their own. This is called 'community care'. The Home and Community Care (HACC) program and Community Aged Care Packages (CACP) are two such programs, with services specifically designed for older Australians who would qualify for at least low-level care in an aged care home. HACC services aim to meet basic needs to maintain a person's independence at home and in the community. They include community nursing, domestic assistance, personal care, Meals on Wheels, home modification and maintenance, transport and community-based respite care.

For the older person who can no longer live at home because of ageing, illness or disability, there are publicly-funded places in aged care homes. This is called 'residential aged care'. There are two types of residential aged care in Australia: high-level and low-level care. High-level care provides nursing care when required, meals, laundry, cleaning and personal care, while low-level care gives the person assistance with meals, laundry and personal care. Other services includes, personal care, home helpers, home maintenance and/or modification, food delivery, transport services and community health centres.

Critical inquiry

1 In the article on page 49, the author expresses his concerns about aged care and proposes strategies to address the issues related to an ageing population and its impact on our nation.

a **Outline** Ewins' assessment of the impact of an ageing population.

b **Describe** the health system and services that Ewins is concerned about. Does he offer any suggestions to improve the system and/or services?

c **Describe** Ewins' perception of the health service workforce.

d **Outline** the strategies Ewins' proposes regarding carers of the elderly and volunteer organisations.

e Do you agree with Ewins' assessment of the impact of an ageing population? Why?

Research and Review

Using relevant Internet and library resources, find the different types of care and services available for the elderly in your local area.

practical application

Aged care

1 Using the information from the Research and Review task above, create graphs that outline:

a the types of care and services available to the elderly who live at home

b the types of care and services available to the elderly who live away from home.

WEB Internet support concerning aged care can be accessed via www.oup.com.au/pdhpe12

what are the priority issues for improving australia's health?

chapter summary

- The Indigenous Australian life expectancy is approximately 10 years less than the overall Australian life expectancy.
- Death rates for Indigenous Australians are higher than for non-Indigenous Australians for every specific major cause of death.
- People living in rural and remote areas have poorer health status than those living in cities and metropolitan areas.
- Immigrants on arrival in Australia have better health than do the Australian-born population.
- Australia has an ageing population and it is estimated that the number of people aged over 65 years will increase by over 1 million before 2015. The most common causes of mortality in people aged over 65 years are cancer, coronary heart disease and stroke.
- People with disability and people from low socio-economic groups experience more difficulty accessing health services, have lower life expectancy and experience poorer health across a range of areas.
- Cardiovascular disease includes all diseases of the heart and blood vessels.
- Cancer refers to a group of diseases that result when the process of cell division becomes uncontrolled.
- There has been an increase in the number of people with diabetes in Australia over the last 20 years.
- Chronic obstructive pulmonary disease is a disease that destroys the lung tissue and narrows the air passages.
- Injuries and death result from motor vehicle and workplace accidents, suicide, violence, drowning and poisoning.
- One in five Australians will experience a mental illness at some stage during their lives.

revision activities

1. **Identify** the groups in Australia that experience health inequities.
2. **Outline** the major health issues that have an impact on the health status of Australians.
3. **Describe** the leading causes of death in the Aboriginal and Torres Strait Islander population.
4. **Outline** the most common health conditions reported by people over 65 years.

extension activities

1. **Discuss** which groups are at risk of the following:
   a. cardiovascular disease
   b. cancer
   c. respiratory disease
   d. diabetes
   e. injury
   f. mental health problems and illnesses.
2. **Describe** the extent of and trends in the conditions listed in extension activity 1.
3. **Discuss** the risk factors and protective factors for health for each of the following groups:
   a. Aboriginal and Torres Strait Islander peoples
   b. socio-economically disadvantaged people
   c. people living in rural and remote areas
   d. overseas-born people
   e. people with disabilities
   f. the elderly.

exam-style questions

1. **Discuss** how the changing nature of the lifestyle patterns of Australians has an impact on the incidence of two major causes of sickness and death. (8 marks)
2. **Outline** the major determinants that contribute to the incidence of two of the major causes of sickness and death in Australia. (8 marks)
3. **Assess** the impact that the health status of Australians has on the provision of health care facilities and services. (10 marks)
4. **Account** for the differences in the health status of Aboriginal and Torres Strait Islander peoples and other Australians. (6 marks)
5. **Explain** why the level of health of older people in Australia is different from that of other population groups in Australia. (8 marks)

chapter 3

what roles do health care facilities AND SERVICES PLAY IN ACHIEVING better health for all australians?

In this chapter you will evaluate health care in Australia by investigating issues in relation to social justice principles. You will examine the advantages and disadvantages of Medicare and private health insurance as well as critically analyse complementary and alternative health care approaches.

Health care in Australia

Health care, for a long time, was seen simply as the **curative** processes adopted by medical professionals in response to illness or injury. It revolved around the doctor–patient relationship and focused on treating the individual. Very little thought was given to the overall health of the population and the social factors contributing to poor health. With a clearer understanding of the wide-ranging factors that influence individual and community health there has been a shift in emphasis. Health care in Australia now involves a strong partnership between public health initiatives and medical care.

Because the major causes of sickness and death relate to lifestyle, the aim is to improve quality of life through health promotion initiatives that establish environments that enhance positive health behaviour. The role of health care is to achieve a delicate balance between resources for prevention and resources for treatment. This changing emphasis towards prevention has been seen in numerous national health campaigns. Examples include HIV/AIDS, breast cancer and mental health.





Health care is now the responsibility of many organisations; predominantly the different levels of government in collaboration with the private sector. With scarce resources available, these organisations must work closely with each other to provide the best possible health service.

In summary, the role of health care is no longer simply curative. Instead, it is concerned with ensuring an improvement in the health of the population as a whole through a combination of preventative strategies and clinical medical care.

Range and types of health facilities and services

A mix of public and private sector providers deliver health services. These services are provided by the following professionals:

- a range of medical practitioners
- nurses
- other health professionals
- hospitals
- clinics
- government and non-government agencies.

When they do not feel well, most people will visit their general medical practitioner (GP). People can choose their own GP. For specialised care, however, a GP may refer them to specialist medical practitioners, other health professionals, hospitals or community-based health care organisations. Community-based services provide care and treatment for mental health issues, alcohol and drug use, and family planning. Individuals can access these services directly without being referred by their GP.

Public hospitals can be used by visiting an emergency department, through the ambulance services or after referral from a medical practitioner. Public hospital emergency and outpatient services are provided free of charge, as is inpatient treatment for public patients. People admitted to a public hospital can choose to be treated there as public or private patients.



Figure 3.1 Most people visit their GP when they are not feeling well

Some people choose to be admitted to a private hospital. Private patients treated in a private hospital can choose their treating medical specialist. However, fees for all the hospital's services (such as accommodation and surgical supplies) will be charged.

People may also choose to visit dentists and other private sector health professionals, such as physiotherapists, chiropractors and natural therapists.

Several state and territory governments and the Australian Government have established free 24-hour telephone-based health advice services. These services are staffed by health professionals who answer queries from callers about health problems. Other public health preventative services include:

- immunisation services and other communicable disease control
- public health education campaigns (including health promotion in the areas of nutrition and physical activity)
- activities to ensure food quality
- injury prevention activities
- programs to reduce the use and harmful effects of tobacco, alcohol and illicit drugs
- environmental monitoring and control
- screening programs for diseases such as breast cancer and cervical cancer.

Public health services	Primary care and community health care services	Hospitals	Specialised health services
Cancer screening	Primary health care for Aboriginal and Torres Strait Islander peoples	Admitted patient care	Specialised medical practitioner
Immunisation	Dental	Emergency department	Specialised mental health
	Allied health	Outpatient care and other non-admitted care	Sexual and reproductive health
	Community health		Alcohol and other drug treatment
	Ambulance and Royal Flying Doctor Service		National Diabetes Service Scheme
	Complementary and alternative health		Hearing
			Palliative care
			Health services in the Australian Defence Force

Source: AIHW, Australia's Health, 2008

Figure 3.2 Categories of health services

Health services are categorised into public health services, primary care and community health services, hospitals and specialised health services, as illustrated in Figure 3.2.

Public health services

Public health in Australia is 'the organised response by society to protect and promote health, and to prevent illness, injury and disability; the starting point for identifying public health issues, problems and priorities, and for designing and implementing interventions, is the population as a whole, or population subgroups' (Australia's Health, 2008). The term 'public health' is also called 'population health' and 'preventative health'.

Public health focuses on prevention, promotion and protection rather than on treatment; on populations rather than on individuals; and on the factors and behaviours that cause illness. Public health activities include programs, campaigns or events. They use a variety of methods (such as health education, lifestyle advice, infection control, risk factor monitoring and tax loadings) to discourage unhealthy lifestyle choices. They also focus on particular settings to target particular population groups through schools, homes, workplaces, the media and GP consultations.



Public health focuses on prevention, promotion and protection rather than on treatment; on populations rather than on individuals; and on the factors and behaviours that cause illness.

Cancer screening

Screening programs for breast, cervical and bowel cancers aim to reduce morbidity and mortality as early as possible. BreastScreen Australia uses mammography for screening, the National Cervical Screening Program uses Pap tests and the National Bowel Cancer Screening Program uses faecal occult blood tests. Breast cancer screening services are free to females in the target age group. Bowel cancer screening is free to those males and females who have been invited to participate in the screening. Screening for cervical cancer is covered by a Medicare rebate.

Immunisations

Vaccinations covered by funding for children include diphtheria, tetanus, pertussis (whooping cough), polio, measles, mumps, rubella, *Haemophilus influenzae* type b (Hib), meningococcal type C disease, varicella (chickenpox), pneumococcal disease, hepatitis B, rotavirus and, for females aged 12 years and over, human papillomavirus (HPV). Aboriginal and Torres Strait Islander children living in high-risk areas are covered for hepatitis A. For adults, influenza and pneumococcal vaccines are available free to all Australians aged 65 years and over, to Indigenous Australians aged 50 years and over, and to those younger Indigenous Australians who are deemed to be medically at risk.

Primary care and community health services

General practitioner and other non-specialist services

Approximately 85 per cent of Australians see a doctor at least once a year. The workloads of GPs are changing in terms of the patients with whom they spend most time. The number of people aged 45–64 years and 75 years choosing to visit their GP increased. There was a decrease in the proportion of younger patients aged less than 14 years. There was also a decrease in the number of patients aged 25–44 years. There has been a slight but significant trend towards an increase in the proportion of encounters that were with males, although females still accounted for 56 per cent of all GP visits. People visit a GP because they have symptoms, complaints or a known diagnosis; for example, asthma. About half the visits to a GP are related to the respiratory, musculoskeletal, skin, circulatory or digestive systems. Patients ask GPs for partial or full check-ups, new or repeat prescriptions and test results.

Table 3.1 GP consultations: 20 most common patient reasons for frequent encounters (RFEs), 2006–07

Patient reason for encounter	Percentage of total RFEs	Per 100 encounters
Check-up	9.7	14.6
Prescription	7.8	11.8
Test results	4.6	6.9
Cough	3.8	5.8
Immunisation/vaccination	2.9	4.3
Throat complaint	2.2	3.3
Back complaint	2.1	3.2
Rash	1.9	2.8
Upper respiratory tract infection	1.6	2.4
Hypertension/high blood pressure	1.4	2.1
Depression	1.3	1.9
Fever	1.2	1.8
Abdominal pain	1.2	1.8
Administrative procedure	1.1	1.6
Headache	1.0	1.6
Skin complaint	0.9	1.4
Ear pain	0.9	1.4
Weakness/tiredness	0.9	1.4
Diarrhoea	0.9	1.3
Knee complaint	0.8	1.3

AIHW, Australia's Health, 2008

Primary health-care services for Aboriginal and Torres Strait Islander peoples

Indigenous Australians tend to use mainstream services differently from the rest of the Australian population. For geographic, social and cultural reasons, mainstream services are not always accessible to, or the most appropriate provider of health care for, Indigenous Australians. Australian governments recognise this and, given the relatively poor health status of Aboriginal and Torres Strait Islander peoples, provide specific health care services to meet their needs. Indigenous-specific health services are important providers of comprehensive primary health care. The state and territory governments provide community-based Indigenous primary health care services. These include management of acute and chronic health conditions, preventative health measures (such as immunisation and screening), health promotion activities, transport services and assistance in accessing other appropriate community and health services. A small number provide specific programs only, such as health promotion and counselling.

Community health services

Community health services usually consist of multi-disciplinary teams of paid health professionals who aim to improve the health of particular communities. Community services are delivered in a variety of settings, including specially built community health centres, local council buildings, schools and clients' homes. The Australian Government funds community health services that include:

- the regional health services program
- rural primary health projects.

State and territory governments also provide a variety of community health services. These include:

- maternal and child community health services, such as antenatal and postnatal parenting support services, early childhood nursing programs, disease prevention programs and treatment programs relating to child development and health
- women's health services, encompassing health promotion programs and services for females across a range of health-related areas
- men's health programs, including promotional and educational programs
- community rehabilitation programs, including case management, prosthetics services, equipment schemes and home modification.

Dental services

Most dental services are provided by private dental practitioners. Services include endodontic (root canal) and crown and bridge services, orthodontic and prosthodontic (denture) services, tooth extraction services, periodontal (gum) services, and cleft lip and cleft palate services. State and territory governments provide public dental services to primary and secondary school children. Disadvantaged adults are also provided general dental services and some specialist services are provided to adult holders of concession cards.

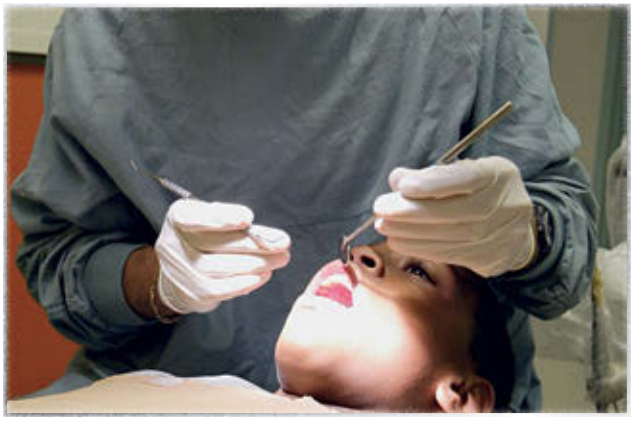


Figure 3.3 Public dental services are provided to primary and secondary school children

Ambulance services

The role of ambulance services generally includes providing emergency pre-hospital patient care and transport in response to sudden illness and injury. It also involves retrieving emergency patients, transporting patients between hospitals, conducting road accident rescues and coordinating patient services in multi-casualty events.

The Royal Flying Doctor Service

The Royal Flying Doctor Service (RFDS) provides aeromedical emergency health services, and primary and community health care clinics at remote sites. These services and clinics include routine health checks and advice; immunisation; child health care; and dental, eye and ear clinics. The RFDS also provides telehealth consultations via radio, telephone or videoconference; pharmaceutical supplies at remote sites; and transfers of patients between hospitals.

Complementary and alternative health services

Australians have access to a range of services that either complement or are alternative to mainstream health care services. Of those who used complementary or alternative therapies in the previous 12 months, 40 per cent had seen a chiropractor, 32 per cent a naturopath, 23 per cent had remedial massage and 20 per cent had acupuncture.

Private health insurance policies have begun to cover complementary and alternative therapies, which is one reason for their growing in acceptance.



Figure 3.4 The Royal Flying Doctor Service provides health services for remote communities

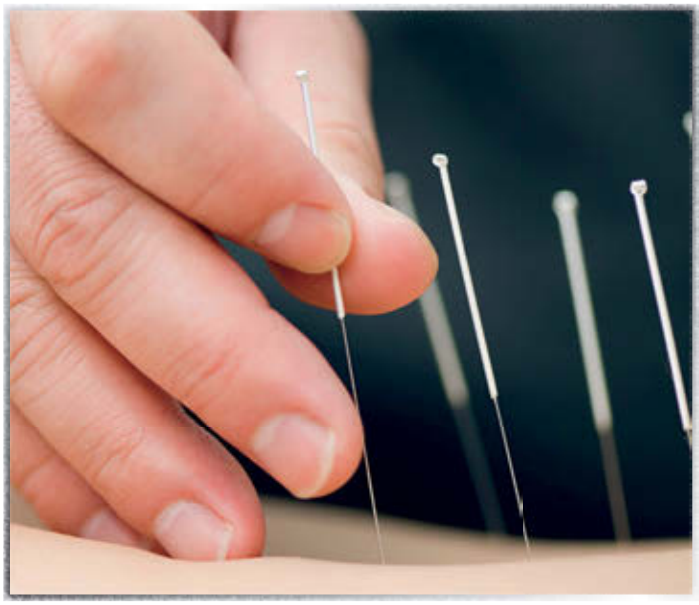


Figure 3.5 Acupuncture is classed as an alternative health service

Hospitals

On a typical day, around 20 000 Australians are admitted to a hospital, with about the same number leaving. There are about 124 000 non-admitted services.

Admitted patient care

The reasons people are admitted to hospital are of interest to health service managers, planners, funders and researchers. The conditions dealt with and treatments carried out in hospitals include renal dialysis, chemotherapy, gastrointestinal endoscopies (viewing the inside of the stomach, bowel and so on), replacement of the eye lens (usually because of cataracts) and childbirth (including caesarean sections).

Institutional health care refers to the facilities and services offered by general hospitals (also called **acute-care hospitals**), psychiatric hospitals, nursing homes and hostels, and ambulance services.

Public and private acute-care hospitals

Acute-care hospitals include public and private hospitals that provide medical, surgical and obstetrical (pregnancy and childbirth) care for inpatient treatment, with 24-hour nursing services. State and territory governments retain the major responsibility for the operation of the public hospital system. Private hospitals are conducted by religious and charitable organisations as well as by proprietors operating for profit.

Psychiatric hospitals

Psychiatric hospitals are devoted mainly to the treatment and care of admitted patients with psychiatric, mental or behavioural disorders. Reforms under the National Mental Health Strategy introduced in 1992 meant that their role declined in the early to mid-1990s. This change reflects the moves made to take mental health services out of institutions, and to integrate hospital services with care in the community setting. There is still a small need for some people with mental illnesses to have access to full-time care, and there are also short-stay specialised psychiatric units available.

Nursing homes and hostels

Nursing homes provide long-term nursing care for chronically ill, frail or disabled persons. Many elderly people require the services provided within a nursing-home setting. Despite this, current government policy is aimed at redirecting the elderly into hostel settings, and to providing more community-based care through services such as home nursing, meals and transport.



Figure 3.6 Nursing homes provide long-term nursing care for chronically ill, frail or disabled persons

Emergency departments

Public and private hospitals also provide emergency department services. The types of services provided in each hospital may reflect a number of factors, including the availability of other health care services, patterns of disease and injury, and the generally poorer health of Aboriginal and Torres Strait Islander peoples, who have higher population concentrations in remote areas.

Outpatient care and other non-admitted care

Individuals may receive services through specialised public hospital outpatient clinics, which provide allied health, **obstetrics**, **oncology**, dental, **orthopaedic** and other medical services. Additional non-admitted care provided by public hospitals includes **pathology**, **pharmacy**, community health and **radiology** and organ imaging.

Specialised health services

Specialised health services are provided by specialists in private practice, as well as medical services for private patients in public and private hospitals. These services included pathology (such as the collection of specimens), specialist attendances and diagnostic imaging items.

Specialist medical practitioners

Specialist medical practitioners provide specialist services in private practice as well as medical services for private patients in public and private hospitals. Some of these specialist services include:

- obstetrics—the surgical specialty dealing with the care of a woman and her offspring during pregnancy and childbirth
- anaesthesia— the use of anaesthetics to temporarily reduce or take away sensation, usually so that painful procedures or surgery can be performed
- pathology—the study and diagnosis of disease through examination of organs, tissues and bodily fluids
- diagnostic imaging—the use of techniques and processes to create images of the human body for medical procedures seeking to reveal, diagnose or examine disease
- radiotherapy—the medical use of ionising radiation as part of cancer treatment to control malignant cells.

Specialised mental health services

Mental health is a matter of national importance. It is estimated that one in five Australians will experience mental illness at some stage in their lives and that over 1 million people have a disabling psychiatric condition. There are a variety of public and private health service providers for mental health care. They include GPs and specialised mental health services, such as private psychiatrists, community-based public mental health services, public and private psychiatric hospitals and specialised residential mental health services.

Depression is the most common mental illness managed by GPs, followed by sleep disturbance and anxiety. Services also include visits with psychiatrists, clinical psychologists, GPs and other allied health professionals. More females than males use mental health services.

Sexual and reproductive health services

A range of clinical, community education and professional training services in sexual and reproductive health is provided by family planning organisations. Clinical services include contraceptive services, counselling and information services, early intervention and health promotion services, and the management of sexual and reproductive health.

Alcohol and other drug treatment services

Alcohol and other drug treatment services cover a wide variety of treatment interventions and are provided in both residential and non-residential settings. Services provided can include **detoxification** and rehabilitation programs, information and education courses, and **pharmacotherapy** and counselling treatments.

National Diabetes Services Scheme

The National Diabetes Services Scheme (NDSS) contributes money to the supply of specialised equipment to people with diabetes registered with the scheme. It is funded by the Australian Government and managed through Diabetes Australia Ltd, which coordinates the supply of products in all states and territories.

Hearing services

Most hearing services are provided by private practitioners. The Australian Government also provides free hearing services to:

- anyone under 21 years of age
- Aboriginal and Torres Strait Islander peoples aged 50 years and over
- adults with special needs
- those living in remote locations.

Palliative care services

People who are terminally ill require specialised care called palliative care. This type of care takes a holistic approach that focuses on maintaining quality of life and reducing the suffering a patient may experience. Palliative care services may be provided in a variety of settings, such as in acute hospitals, designated palliative care units (hospices) and in the community.

Health services in the Australian Defence Force

Australian Defence Force (ADF) personnel are provided with an extensive range of health services, including emergency, acute and ongoing clinical care; rehabilitation; health screening; occupational fitness assessment; and preventative health activities. Primary health care is also provided by medical, dental and nursing officers; allied health personnel; and medical assistants.

Research and Review

1. **Describe** how the range and types of health care have changed and how they reflect the 'public health approach'.
2. a **Identify** the numerous organisations involved in health care.
   b **Discuss** why it is necessary for a wider variety of groups and organisations to play a role in health care in Australia.
3. **Describe** the major areas that make up:
   a institutional health care.
   b non-institutional health care.
4. **Describe** how the role of nursing homes and psychiatric hospitals is changing.
5. **Explain** the difference between nursing homes and hostels.

Responsibility for health facilities and services

The health care system in Australia is complex. Responsibility for the funding and delivery of health services is split among all levels of government, and among many groups within the public and private sectors.

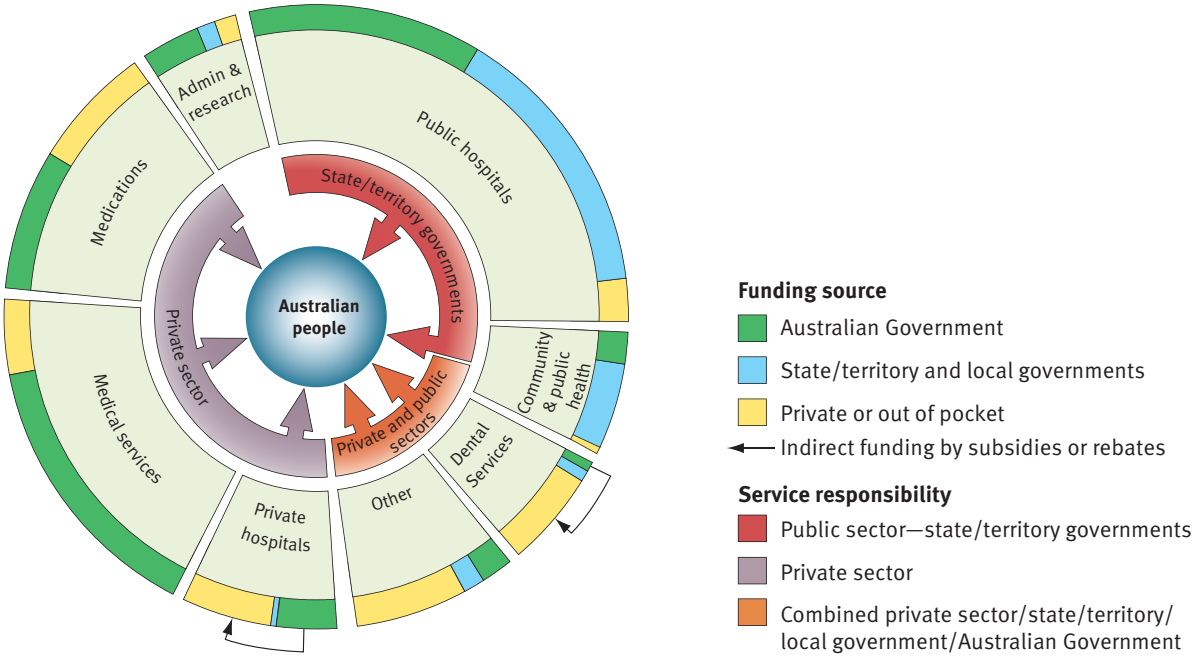
Public sector

Under the Australian Constitution the Commonwealth Government has very little direct responsibility for the delivery of health services; this responsibility is limited to **repatriation hospitals**. The main role of the Commonwealth Government is to provide funding to the state and territory governments for them to deliver appropriate health services to their populations. In recent years, however, the Commonwealth has expanded its role, introducing and controlling schemes such as Medicare and the Pharmaceutical Benefits Scheme, as well as health promotion initiatives that focus on issues such as mental health, alcohol and HIV/AIDS. The Commonwealth Government shares with the states the responsibility for occupational health policy and standards. Managing **Worksafe Australia** is another Commonwealth role.

Medicare was introduced in 1984 and the PBS has been in place for more than 60 years.

Responsibility for delivering the majority of health services lies mainly with state and territory governments. These governments administer public acute-care hospitals and public psychiatric hospitals. They also develop the legislation and regulations under which private hospitals, nursing homes and health professionals operate. State and territory governments manage mental health programs, dental health services, home and community care, family health services and rehabilitation programs.

The health care responsibilities of local government are more related to personal preventative areas; for example, immunisation programs. They are also largely responsible for the enforcement of environmental health and hygiene regulations. The states draw up the regulations, and local government enforces most of them. Local government is also responsible for some home-care operations and community health centres.



Source: AIHW, Australia's Health, 2008

Figure 3.7 Range and types of heath services and facilities

The range and types of health facilities and services in Australia are illustrated in Figure 3.7. The outer ring in the diagram illustrates the different funding sources for each service. The next ring shows the major groups of services that comprise the health system. The health system is made up of:

- public hospitals
- private hospitals
- dental services
- medications
- community and public health
  - community nursing
  - public health education campaigns
- medical services
  - general practice
  - specialist care
  - pathology and medical imaging
  - patient transport and aids
  - other health professionals, such as physiotherapists and psychologists
- administration and research
  - state departments of health
  - hospital or community health administration research and its funding.

The darker arc inside the circle shows whether the service is provided by the private sector, public sector or both. Examples of private sector providers include individual medical practices and pharmacies. Public sector providers include public hospitals and a mixture of community and public health services.

Private sector

All the preceding governmental roles are carried out in association with a health system that is largely private in nature. Private hospitals, private specialist doctors and private GPs make up the majority of the services provided by the health care system. The private sector also provides a range of other health services, such as physiotherapy, dentistry, pharmacy, chiropractic services, **optometry** and radiology. Larger organisations within the private sector also deliver a broad range of health services. Examples of private sector, non-profit health organisations are the Spastic Centre of NSW, Cancer Council, Royal Blind Society, National Heart Foundation, Diabetes Australia, Royal Life Saving Society, Salvation Army and Red Cross.

Equity of access to health facilities and services

Access to health services and facilities is essential to health and well-being. The cornerstone of Australia's health care system is Medicare. Medicare is designed to allow simple and equitable access to all Australian citizens regardless of location and socio-economic status. Supporting programs, such as the Medicare Safety Net and Pharmaceutical Benefits Scheme, are also in place to promote equity of access.

Although, in principle, equity of access is the intention, some individuals and groups continue to find it difficult to access appropriate health services and facilities. Medicare does not fully cover, or provide access to,

a range of medical services that are vital for maintaining good health. This places people of low socio-economic status at a disadvantage. General dental services, speech therapy, physiotherapy and some optometrical services are examples of health care services that, for many, might not be accessible due to financial constraints.

Access to health services has also been hampered in recent years by overcrowding and lack of bed availability in public hospitals. For many years there has been community dissatisfaction with long waiting lists for elective surgery and with over-burdened public health services. The article below suggests a variety of strategies to improve the Australian hospital system.

Access can also be difficult for people in rural or remote areas. The poorer health status of Indigenous people and other Australians living in rural or remote areas supports this notion. People from non-English speaking backgrounds and different cultures might also not take full advantage of the services available to them. More culturally sensitive health services would be of greater value. Actively involving these communities in the establishment and delivery of their health services will result in more effective care and improved health choices.

Fixing the problems that beset the Australian hospital system

By John M Dwyer

Public hospitals need an injection of cash to help reduce demand for hospital services; networking and role delineation among hospitals would immediately increase safety and quality.

While most patients in our public hospitals receive a very high standard of care, the incidence of misadventure [accidents] and the inequities that currently exist are unacceptable. These problems are a product of a workforce crisis, ever-increasing demand for hospital services from ever-sicker patients, and too many episodes where the clinical needs of a patient are not attended to by suitably skilled staff.

This last problem is a feature of a political climate in which warnings by hospital clinicians that a hospital cannot provide a quality service (such as an intensive care unit) are too often ignored for fear of community anger about that service not being available locally! …

Hospitals do not function optimally with occupancy rates that exceed 85%, yet many regularly exceed 100%. In very busy, inadequately staffed hospitals, communication breakdowns all too often compromise safety.

Solutions

[Too many hospitals] are expected to provide a broad array of quality services. Each hospital should be able to offer services based on its ability to guarantee quality and safety …

Poor urban planning has seen the development of smaller hospitals in close proximity to each other. These should act as a single hospital on split sites, offering excellence at each site, but not duplication … Instituting and … improving interhospital transport will be an essential ingredient of such an integrated hospital system.

Commonsense changes like these do require political leadership and public understanding … We would be promising our patients that, wherever they entered the public hospital system, we would ensure that they are given the highest quality care, even if that means moving them to a more appropriate facility.

Public hospital clinicians [feel that] … budgetary control dominates the thinking and actions of hospital managers and promotes centralisation that removes clinicians from the frontline environment … Clinicians are extremely frustrated when their concerns cannot be addressed by inhouse administrators with decision-making power … Up-front bonuses may attract some nurses to return to work, but flexible working conditions with support and mentoring replacing bullying and excessive workloads would be more effective …

Senior doctors should be encouraged, and financially remunerated, to spend more time in their hospitals helping to improve the quality of decision making …

We need to develop a … mutually beneficial partnership between public and private hospitals. With additional funding, public hospitals that do not have any additional capacity could purchase services for their patients from private hospitals. …

However, the public hospital system … needs a major and immediate injection of cash … The next Australian Health Care Agreements must represent both an instrument for these reforms and a return to the 50/50 funding split for the federal and state governments, as was mandated at the inception of the scheme.

Additionally, these reforms must be accompanied by major efforts to reduce demand for hospital services by focusing on disease prevention, the maintenance of wellness, and earlier diagnosis and treatment of potentially chronic diseases.

Our health care system needs dollars, reform, public understanding of the rationale for changes needed and, most of all, political courage …

Medical Journal of Australia, Vol. 189, No. 4

practical application

Non-institutional health care

Conduct a research project within your school or class. Ask participants to provide information on their use of non-institutional health care during the last year. Non-institutional health care encompasses services provided by doctors, dentists and other health professionals; community health services and public health services; and health goods (pharmaceuticals and aids and appliances).

Critical inquiry

1. Read the article on page 61, then complete the following tasks:
   - a **Identify** the misadventures and inequities in the Australian hospital system highlighted by Emeritus Professor Dwyer.
   - b **Identify** the solutions proposed by Dwyer.
   - c **Evaluate** if the solutions identified above would improve the issues of access and adequacy in relation to social justice principles.
   - d **Describe** how equitable the access and support is for Australian hospitals, as proposed by Dwyer.
   - e Draft a letter to Emeritus Professor Dwyer discussing your support for or opposition to his solutions. **Propose** relevant solutions that may support Dwyer's ideas.

Research and Review

1. **Discuss** four factors that affect access to health services and facilities.
2. **Identify** the trend and reasons for the trend of the following measures of hospital use:
   - a admission rates
   - b average length of stay
   - c occupancy rates
   - d same-day surgery.
3. a **Outline** the most commonly used medical services.
   b **Describe** the trend in use of these services.
4. **Identify** the most common reasons for visits to GPs by:
   - a males
   - b females.
5. **Explain** why there has been an increased demand for dental services.
6. a **Discuss** the link between socio-economic status and dental health.
   b **Describe** steps that can be taken to address this inequity.
7. Two of the most common reasons for people consulting health professionals are eye disorders and back pain. **Discuss** the social causes for this.
8. a **Identify** the health care services most relevant to you at this point in your life.
   b Are they easily accessible?
   c Is the quality of service adequate?

Health care expenditure versus early intervention and prevention expenditure

In 2005–06 Australia spent $1 in every $11 on health, totalling $86.9 billion, or 9.0 per cent of gross domestic product (GDP), which is a basic measure of a country's economic performance. The majority of health expenditure is on health goods and services, such as medications and hospital care. The Australian Institute of Health and Welfare reports on *health expenditure* in terms of who spends the money, whereas *health funding* is reported in terms of who provides the funds that are used to pay for health goods and services.

A major matter of consideration for all levels of government is the delicate balance of treatment versus early intervention and prevention. In recent times significant steps have been taken in the area of health promotion and illness prevention. Health promotion and prevention programs were supported by an increase in funding during the 1990s. Despite this increase, more than 90 per cent of government health expenditure is still allocated to curative services. With Australia's leading causes of death and illness being lifestyle-related, the argument that prevention will be more cost-effective than cure has gained considerable support.

Prevention programs that have been implemented include school medical and dental services, immunisation programs, the fluoridation of water supplies, anti-smoking campaigns, the National Campaign Against Drug Abuse, the National Mental Health Strategy and the National HIV/AIDS Program.

Organisations such as the Heart Foundation, the Cancer Council and the Asthma Foundation also make significant contributions to illness prevention. Despite the strength of the arguments supporting an increase in preventative measures over curative, there seems little hope for a significant shift in government expenditure in the short term. Governments are reluctant to cut back on funding to curative health services and divert it towards preventative strategies. The reason for this is that the results, especially financial savings, are not seen in the short term. Therefore, such a change might not be economically viable. For example, a large amount of expenditure dedicated to reducing the number of young people who smoke or to limiting sun exposure will not be reflected in lower cancer rates—and resultant financial savings—for 15–30 years. For a government currently in office, that expenditure might be more beneficial politically if used to shorten hospital waiting lists or to provide for other over-burdened curative services.

It is extremely difficult to withdraw curative health services because they are currently stretched to their maximum to meet the needs of the population. In recent years the controversy surrounding cutbacks in curative services (such as hospital bed closures and shifting of hospital services to new developing areas) has shown how politically sensitive health care delivery is for a government.

A strong argument put forward by many health organisations is that a source of additional funding for prevention is the extensive government revenue from tobacco and alcohol taxation. Currently only a small amount of taxation revenue from these areas is devoted to preventative programs.

Critical inquiry

1 a Governments are reluctant to divert money from curative to preventative measures because it might not win them votes at the ballot box. (For example, closing a hospital or decreasing hospital bed numbers could be politically costly.) What is your opinion of this?

b Are there other reasons for so much health expenditure being devoted to cure and so little to prevention?

Research and Review

1 Some people believe that the current health system in Australia will not be sufficient in the future. **Explain** why this belief is held by some people. Do you agree with them?

2 a **Describe** the strategies that have been considered to support the cost of the health system.

b **Identify** the most recently introduced strategies designed to ease the burden on Medicare.

c **Discuss** to what degree these recently introduced strategies have been successful.

3 Over 90 per cent of health expenditure is devoted to curative services. **Identify** three examples of curative treatments (for example, removal of a skin cancer) and two health promotion strategies designed to prevent the occurrence of the conditions that you choose (for example, the 'No Hat, No Play' policies in schools).

4 **Discuss** the factors that prevent governments from devoting more funding to prevention strategies.

Impact of emerging new treatments and technologies on health care

Health care funding is a very complex matter, and it is easy to make errors in interpreting data on health expenditure. For example, if a comparison is made between the amount spent on health care 20 or 30 years ago, and the amount spent today, the first impression is that health care costs are rising very steeply. For example, health expenditure today is more than twice as great as in 1972–73. However, allowance has to be made for several factors. These include:

- *Population increase*—Australia must expect to pay more to look after more people.
- *Inflation*—One billion dollars spent in the last decade was worth much more than a billion dollars spent now.
- *Australia's wealth*—Measured as gross domestic product, the country's wealth has increased in the last 20 years, and health would seem to be a good area on which to spend the extra wealth.
- *Medical research and technology*—These have produced many wonderful new treatments, but they can be expensive. If we wish to use these newer treatments (and few people refuse them when they or their loved ones are ill), we should expect health expenditure to increase.
- *Ageing population*—The population is getting older, and older people require more medical care.

For all these reasons, and others, it is not surprising that health expenditure has increased over the past 20 or 30 years.

A good measure of health costs is to estimate health costs as a percentage of Australia's wealth (GDP). Australia spends about 9 per cent of GDP on health care. Australia's health to GDP ratio in 2005 was comparable to Italy's (8.9 per cent) and New Zealand's (9.0 per cent). It was more than that of the United Kingdom (8.3 per cent) and much lower than that of the United States (15.3 per cent), which had by far the highest ratio. This proportion of GDP spent on health has been fairly steady over the past 20 years. So, it would seem that Australia's health care costs have been fairly well contained for some time. In recent years, however, there have been some more worrying signs.

Between 1994–95 and 1996–97, expenditure on health services grew, in real terms, by an average of 4.1 per cent. This was above the average of the previous five years (3.3 per cent) and the long-term (1975–76 to 1994–95) average growth rate of 3.5 per cent.

According to this assessment, we should expect some increase in health expenditure, but the rate of increase is, itself, beginning to increase. That is, while we should expect to be spending more—even allowing for population growth, inflation and a growth in Australia's wealth (GDP)—our health expenditure is starting to accelerate faster than we might have expected. This more recent increase has caused some health economists to become concerned about whether Australia's long-term health budget can be sustained.

Figure 3.8 Australians are visiting the doctor more often



It seems that three factors are responsible for this more recent increase:

- more expensive medical treatments
- more visits to doctors and other health care professionals by people of all ages
- the increasing age of the population.

All these factors seem likely to continue, which is why some health economists are beginning to worry. Medical research continues to develop new procedures for investigation and treatment. A better informed population has greater awareness of health matters and the importance of screening and preventative measures, and therefore attend doctors more often. Some of the benefits of early detection include less invasive treatment, less cost to the individual and community and greater chance of recovery. Along with this, the population continues to age.

The government sets the Medicare rebate schedule, and the government decides which medical procedures will be covered by Medicare. '**Bulk-billing**' allows easy access to doctors, and can encourage overuse of doctors by patients for trivial matters. It can also allow some doctors to 'over-service'; that is, provide services that are not strictly necessary, thus increasing the income of those doctors.

It is estimated that total health expenditure will increase by 127 per cent over the next three decades and it is projected that it will increase from 9.4 per cent of GDP to 10.8 per cent. These estimates should be interpreted with caution as the projected outlook for some diseases may drastically change due to developments in health technologies and health service use and advances in prevention and treatment.

Critical inquiry

1. **Describe** the trend you believe health expenditure will take in the next 10 years.
2. **Discuss** whether the current funding system is sufficient to cope with future changes.
3. **Propose** funding changes that might need to be introduced.

Research and Review

1. **Describe** the responsibilities of the different levels of government and the private sector in respect of health expenditure.
2. a **Describe** the trend in expenditure on health care.
   b **Discuss** the factors that have contributed to this trend.
3. **Discuss** the major areas where Australia's health dollar is spent.
4. Using an Excel spreadsheet, **construct** a pie chart detailing the institutional and non-institutional health expenditure as components of total health expenditure.

Health insurance: Medicare and private

Medicare is health insurance that ensures all Australians have access to free or low-cost medical, optometrical and hospital care. Australians are also free to choose private health services.

Medicare

Medicare was introduced in Australia in 1984 as a national system of health care funding. It is designed to protect people from the huge costs of sickness and injury by providing free or subsidised medical care, and free hospital treatment in public hospitals. All Australian residents are eligible for Medicare benefits. Short-term overseas visitors are not eligible unless they are from a country with which agreements have been made between governments.

The three principles upon which Medicare is based are:

- universality
- equity
- simplicity.

Through the Medicare system every Australian resident is guaranteed adequate health care at minimum cost.

Medicare is funded from general taxation revenue plus an additional contribution known as the Medicare Levy. The Medicare Levy is 1.5 per cent of each taxpayer's income, and people pay it in addition to their ordinary income tax. Individuals and families on higher incomes may have to pay a 1 per cent surcharge in addition to the Medicare Levy if they do not have private health insurance. The government introduced this change in the hope of encouraging more financially able people to take out private health cover, and thus ease the pressure on the public health system. It seems that this strategy had little effect and a further incentive to take out private health insurance was introduced in 1999. This strategy was a 30 per cent rebate on health fund premiums, regardless of income.

Medicare has established a schedule of fees for medical services provided by private practitioners. The amount of the benefits provided by Medicare for medical services relates to the Medicare Benefits Schedule (MBS). The MBS sets down fees determined by the government to be fair to both patient and doctor. Although the MBS is used as the basis for calculating Medicare benefits, it is not binding on the doctor. Medical practitioners often charge above the MBS fee for services. The difference between the medical practitioner's charge and the MBS fee is known as the 'gap'. Rather than charge the patient the full MBS fee, some doctors agree to accept the patient's Medicare rebate (75–85 per cent of the full MBS fee) as full payment of the doctor's account. The doctor sends a form to Medicare in which the patient assigns this benefit directly to the doctor. This practice is called 'bulk-billing' or 'direct billing' and enables the service to be provided to the patient free of charge.

Medicare Safety Net

To protect people who require a large number of medical services, the government has put in place a Medicare Safety Net. Once a person has paid 'gap' amounts totalling a certain amount (about $365) in a calendar year, any future Medicare benefits increase to 100 per cent of the MBS fee. The Medicare Safety Net does not cover any charge above the MBS fee.

Medicare provides benefits for almost 200 million individual services each year. Table 3.3 provides details of where these benefits were allocated in 2006–07.

The difference between the medical practitioner's charge and the MBS fee is known as the 'gap'.

Table 3.2 What does Medicare cover?

Medicare does cover	Medicare does not cover
• 85 per cent of the MBS fee for out-of-hospital services provided by registered medical practitioners (for example, GPs, specialists, X-rays, pathology tests) • 75 per cent of the MBS fee for medical services provided in-hospital • 85 per cent of the cost of eye tests • The full cost of accommodation and treatment by hospital-appointed doctors for public patients in recognised public hospitals • The full cost of X-rays and pathology tests for public patients • 75 per cent of in-hospital medical procedures performed by oral surgeons (general dental services are covered by Medicare) • Free out-patient services in some public hospitals	• General dental services • Private patient hospital costs (other than dental examinations and treatment) • Ambulance • Home nursing • Physiotherapy • Speech therapy • Chiropractic services • Podiatry • Psychology • Acupuncture • Glasses and contact lenses • Hearing aids • Medicines • Some medical costs incurred overseas

Table 3.3 Allocation of Medicare benefits

	Items per person			Average annual change (%)	Items in 2006–07		
	Number				Number ('000)	Proportion of total (%)	Benefits paid ($ million)
Broad type of service	**2004–05**	**2005–06**	**2006–07**				
Non-referred medical attendances	4.83	4.91	4.93	1.0	103 433	90.6	4029.6
Practice nurse	0.13	0.16	0.17	14.8	3 664	3.2	38.9
Optometry	0.25	0.26	0.26	1.9	5 473	4.8	239.8
Other allied health	0.01	0.03	0.07	144.8	1 554	1.4	97.5
Total non-specialist items	**5.22**	**5.35**	**5.43**	**2.0**	**114 124**	**100.0**	**4405.8**

AIHW, Australia's Health, 2008

practical application

Medicare

1 Research Medicare, the Medicare Safety Net and Pharmaceutical Benefits Scheme for the dollar amounts for the:
   - a Medicare Safety Net
   - b PBS Safety Net
   - c concessional PBS rate
   - d maximum PBS cost to a general patient.

Critical inquiry

1 **Propose** why some people choose not to take out private health insurance.

2 The 30 per cent rebate was criticised as being wasteful, and critics claimed that the money should have been spent on improvements to the public health care system. Do you agree?

Research and Review

1 **Describe** the three principles upon which Medicare is based.

2 a **Explain** what the 'gap' is.
   b **Discuss** how it impacts on the health care consumer.

3 a **Describe** what the Pharmaceutical Benefits Scheme is.
   b **Explain** its purpose.

4 **Explain** the Medicare Safety Net and PBS Safety Net.
   a Who are these designed to protect?
   b **Discuss** how successful they are in protecting those groups.

5 One of the problems associated with Medicare is 'over-servicing'.
   a **Explain** what has caused this 'over-servicing'.
   b **Propose** how it can be controlled.

6 a **Discuss** why government policy is in favour of Medicare and 'bulk-billing'.
   b **Discuss** how these help the government to control costs.

Pharmaceutical Benefits Scheme

The Pharmaceutical Benefits Scheme (PBS) was introduced by the Commonwealth Government in 1986. This scheme subsidises most prescription medicines bought at pharmacies in Australia. The major aim of the PBS is to allow all individuals, regardless of socio-economic status, access to necessary prescription medication.

Concession card holders (for example, holders of Pensioner Health Benefit cards) can purchase PBS medicines for a lesser amount—known as the concessional rate (approximately $5). General patients should pay no more than about $32 for each item. Once an individual, or family, has paid a set amount they are issued with a Safety Net Card. This enables the holder access to prescribed medicines free of charge, or at the concessional rate, for the remainder of the calendar year.

Private health insurance

Through the Medicare system every Australian resident is guaranteed adequate health care at minimum cost. However, many people choose to supplement this by purchasing private health insurance.

What does private health insurance offer?

Since 1984, when Medicare was introduced, private health insurance funds in Australia have offered insurance cover for various services provided in public and private hospitals. They also offer cover for a range of non-hospital health and health-related services, such as dentistry, physiotherapy, podiatry, pharmaceuticals and spectacles.

People who take out private health insurance have the choice of one or both of the following forms of cover: hospital cover and ancillary (or extras) cover.



Figure 3.9 Many people choose to take out private health insurance

Hospital cover

Hospital cover provides benefits for in-hospital treatment and accommodation for private patients. It includes cover for all or part (depending on level of cover) of the costs of accommodation and related services in a private hospital, or as a private patient in a public hospital. This includes the difference between the Medicare benefit and the MBS fee. However, it does not cover the 'gap' between this amount and what the medical practitioner might actually charge. Hospital cover also provides for the person's own choice of doctor (instead of the doctor assigned to the patient by the hospital) and shorter waiting lists for some treatments.

Ancillary (or extras) cover

Ancillary (or extras) cover entitles the person to benefits not provided by the Medicare scheme. These extras include dental services, physiotherapy, glasses/contact lenses, ambulance and some alternative health therapies and medicines.

Numbers with private health insurance

The introduction of Lifetime Health Cover in 2000 encouraged people to continue private health insurance cover throughout their lives. People who join a health insurance fund before the July following their thirtieth birthday and maintain their hospital cover pay lower premiums throughout their lives than those who join later in life. People aged over 30 years who take out hospital cover pay a loading of 2 per cent for each year their entry age is over 30. Fund members who had hospital cover at 1 July 2000 and maintain it are exempt from the loading. People who were aged 65 years or over at 1 July 1999 are also exempt from premium loading.

Changes to Lifetime Health Cover were announced in 2006 and were being implemented progressively from 2007. Under the new legislation, people who keep their health insurance for 10 continuous years, and remain members, will stop paying a loading.

practical application

Private health insurance

1 Obtain information pamphlets from four of the major private health insurers, which include Medibank Private, HCF, MBF, Manchester Unity and NIB. The information must contain the different levels of cover available and the cost of each. In groups, **evaluate** which insurer and level of cover would best suit each of the following individuals and groups:

- a a 21-year-old single male living away from home
- b a 30-year-old married couple with no children
- c a 40-year-old married couple with three children under 12 years of age
- d a 65-year-old retired couple.

Critical inquiry

1 **Discuss** the role an individual can play in reducing individual and community health care costs.

2 **Compare** Australia's health bill with that of various other countries.

3 **Describe** the advantages and disadvantages of Medicare and private health insurance. In your answer look at cost, choice and ancillary benefits.

Complementary and alternative health care approaches

There are many terms used to describe approaches to health care that are outside the realm of conventional medicine. Complementary and alternative health care approaches is a group of diverse medical and health care systems, practices and products that are not generally considered to be part of **conventional medicine**.

Reasons for growth of complementary and alternative health products and services

Australians spend approximately $1 billion per year on alternative health care. This amount is increasing. For many years alternative health care approaches were dismissed as unscientific—even radical and weird. The popularity of alternative therapies is growing, however, and there is a new sense of acceptance building in the community, and in the medical field, regarding what are also called 'complementary therapies'. Complementary therapies are so-called because they are not necessarily designed to replace orthodox medicine, but are an additional approach that can be used alongside traditional treatments. Treatments such as acupuncture and **osteopathy**, and the use of herbal medicines, are now far more common than they once were.



Another reason for the growth in alternative medicines and health care approaches has been the increase in the number of trained personnel as a result of courses now being provided in some universities. Government-accredited advanced diplomas and tertiary degrees are now available in areas such as **naturopathy** and osteopathy. This has served to advance the credibility of these areas in the community.

The popularity of alternative medicines and health care is also linked to a reaction in the community against the use of conventional drug-based medication, and a preference by some people for the holistic approach offered by natural therapies. There is no question that conventional medicine saves lives and is extremely successful in acute and emergency conditions. For chronic conditions, however, many people are starting to prefer the holistic approach provided by natural therapists where diet and lifestyle are discussed. People are also more aware of the dangers or side effects associated with some pharmaceuticals, and are more likely to question the recommendations of doctors than they have been in the past.

People are also starting to show a greater interest in natural health care because it is designed to prevent illness occurring, whereas conventional medicine is largely reactive. Another reason for the growth of alternative health care is that some private insurers are now recognising natural therapies and placing them on their benefits list.

Research and Review

1. **Describe** some of the most commonly used alternative health approaches.
2. **Explain** why alternative medicines are called 'complementary therapies'.
3. **Describe** the factors that have contributed to the increased acceptance and popularity of alternative medicines and approaches.
4. a **Outline** how a health consumer can ensure that an alternative approach is of some value.
   b **Describe** what recourse the consumer has if the treatment is unsuccessful.

Critical inquiry

Should Medicare cover alternative approaches so that socio-economically disadvantaged people can have access to these treatments? If so, which approaches should be covered?

Range of products and services available

Provided below is a sample of the alternative health services available. Others include reflexology (using pressure points on the feet to stimulate the circulatory system) and iridology (examining the iris of the eye to assess health status).

Acupuncture

Acupuncture is based on ancient Chinese beliefs that propose that energy (*chi*) flows through the body via meridians. *Meridians* cross the surface of the body and are said to be linked to the major body organs. Through the painless insertion of very fine needles into the skin at certain points along the meridians it is believed that health benefits can result. Acupuncture is widely used for pain relief and also to manage conditions such as asthma.

Chiropractic treatment

The aim of chiropractic treatment is to relieve pain and improve health through the manipulation of the spine. The basis of this treatment is the theory that many ailments are the result of poorly aligned vertebrae. Chiropractors believe that because the nervous system controls the body, adjusting the spine can deliver health benefits to other body parts.

Osteopathy

Osteopathy involves manual deep-tissue massage and the manipulation of the spine, joints and surrounding tissue to alleviate back pain, joint problems and muscular disorders. Osteopathy is based on the principle that the well-being of an individual depends on the skeleton, muscles, ligaments and connective tissues functioning together smoothly.



Naturopathy

Naturopathy involves treating the whole person by harnessing the body's natural ability to heal itself. Naturopaths will often adopt a variety of therapies tailored to meet individual needs. These can include massage, relaxation techniques, herbal medicine and nutrition.

Herbal medicine

For thousands of years many cultures have used plants and plant extracts to form the ingredients of herbal medicines. Naturopathy practice today uses herbal medicines to treat the individual, not necessarily the disease. The total lifestyle of the individual is analysed before herbal medicines are prescribed.

Homoeopathy

Homoeopathy was developed in the eighteenth century. It is based on the notion that substances (usually herbal or mineral) that produce symptoms of illness in a healthy person will cure that same illness in a sick person. Patients are given very small doses of substances.

Yoga

Yoga has been found to reduce stress and lower blood pressure through a combination of breathing exercises, physical postures and meditation. Many exponents of yoga claim that it provides a greater feeling of overall well-being.

Aromatherapy

Sometimes used to treat stress and skin disorders, aromatherapy involves a combination of specialised massage techniques using blends of different oils. The benefits of aromatherapy are claimed to be 'holistic', covering all aspects of health, including the physical, social and emotional aspects of an individual's life.

How to make informed consumer choices

Despite the increased acceptance of alternative health care approaches there are still many treatment options promoted as cures or remedies that have been designed by unscrupulous dealers attempting to take advantage of people desperate to obtain relief from ailments.

Much health information is false and promoted by people who are motivated by short-term financial gains. Such people are called 'quacks'. They sometimes promise quick cures on a money-back-guaranteed basis, and often support their products with personal testimonies and anecdotal evidence. With the wealth of information now available in relation to health improvement, it can be difficult to know which health information is reliable. Unfortunately, many 'quacks' are very convincing salespeople and exploit vulnerable people who desire quick health gains and improved quality of life.

In assessing alternative health care approaches, it is vital that individuals put thought and time into selecting a natural therapist. Ensure the practitioner is accredited before using the services. The Australian Natural Therapists Association has a list of accredited practitioners who have signed a code of ethics.

Critical inquiry

1 **Critically analyse** the complementary and alternative health care approaches by addressing the following tasks.

a **Discuss** how you know who to believe.

b **Discuss** what you need to do to help you make informed decisions.

practical application

Complementary and alternative health care

Conduct a research project on the methods and effectiveness of one alternative health care approach. As a part of the research, conduct an interview with an alternative health care practitioner whose name appears on the list of accredited practitioners as maintained by the Australian Natural Therapists Association. From the information gathered, write an article for your next school newsletter.

Research and Review

1 **Identify** whether any alternative approaches appear false to you. Provide reasons for your answer.

2 **Discuss** the reasons for the success of 'quacks' in exploiting some people.

3 **Outline** the skills and knowledge that individuals need to help them make informed health care decisions.

WEB The website of the Australian Natural Therapists Association can be accessed via www.oup.com.au/pdhpe12



what roles do health care facilities and services play in achieving better health for all australians?

chapter summary

- The role of health care is to achieve a balance between resources for prevention and resources for treatment.
- Health care is the responsibility of many organisations—predominantly the different levels of government in collaboration with the private sector.
- The role of health care is no longer simply curative, but is concerned with ensuring an improvement in the health of the population as a whole through a combination of preventative strategies and clinical medical care.
- A mix of public and private sector providers deliver health services.
- Most people visit their general medical practitioner when they are unwell.
- Public hospitals can be used by visiting an emergency department, through the ambulance services or after referral from a medical practitioner.
- Health services are categorised into public health services, hospital services, primary care and community health services, and specialised health services.
- Responsibility for the funding and delivery of health services is split between all levels of government, and among many groups within the public and private sectors.
- Responsibility for delivering the majority of health services lies mainly with state and territory governments.
- The health care responsibilities of local government are more related to personal preventative areas; for example, immunisation programs.
- Medicare is designed to provide all Australian citizens, regardless of their location or socio-economic status, with simple and equitable access to health care.
- The majority of health expenditure is on health goods and services, such as medications and hospital care.
- Medicare was introduced in Australia in 1984 as a national system of health care funding.
- The Pharmaceutical Benefits Scheme subsidises most prescription medicines.
- Complementary therapies are so called because they are not necessarily designed to replace orthodox medicine, but are an additional approach that can be used alongside traditional treatments.

revision activities

1. **Describe** the range and types of health facilities and services available.
2. **Describe** the role of public health services.
3. **Outline** the specialised health services for:
   a. mental health
   b. sexual and reproductive health
   c. alcohol and other drug treatment
   d. diabetes.
4. **Describe** who is responsible for health facilities and services.

extension activities

1. **Evaluate** health care in Australia in relation to social justice principles.
2. **Describe** the advantages and disadvantages of Medicare and private health insurance.
3. **Critically analyse** complementary and alternative health care approaches.

exam-style questions

1. **Discuss** the advantages and disadvantages of private health insurance for both the individual and the community. (10 marks)
2. There is a range of health services and information available to the individual. **Justify** the factors you would consider when deciding on the suitability of health services and information. (10 marks)
3. **Outline** the cost of ill-health to the Australian community. (6 marks)
4. **Propose** the reasons for the growth of alternative health care approaches in Australia. (8 marks)
5. **Explain** why some Australians may choose to take out private health insurance. (8 marks)

chapter 4

what actions are needed to address AUSTRALIA'S HEALTH PRIORITIES?

In this chapter you will learn about health promotion and study health promotion initiatives related to Australia's health priorities. You will investigate the principles of social justice and analyse the importance of the action areas of the Ottawa Charter.

Health promotion based on the five action areas of the Ottawa Charter

Over the last 20 years there has been a rapid growth in the way health issues are addressed through health promotion. Health promotion is a comprehensive social and political process, not only including actions directed at strengthening the skills and capabilities of individuals, but also action directed towards changing social, environmental and economic conditions so as to lessen their impact on public and individual health. Effective health promotion requires multiple approaches involving many individuals and organisations. Political, economic, social, environmental and behavioural factors all interact in establishing a climate that is fully supportive of individual and community well-being.





Levels of responsibility for health promotion

Health is everybody's business and therefore everyone is responsible for promoting health. Health promotion is not just the responsibility of the health sector but requires a coordinated action by all governments as well as by health and other social and economic sectors, non-government and voluntary organisations, local authorities, industry and the media. Every person can take on the responsibility to promote health, whether as an individual or as a member of a family or community. Professional and social groups and health personnel have a major responsibility to mediate between differing interests in society for the pursuit of health.

The Ottawa Charter was developed in 1986 to build a global 'all for health' movement as a means to realise the right to health of all humans. The five action areas of the Ottawa Charter are:

- developing personal skills
- creating supportive environments
- strengthening community action
- reorientating health services
- building healthy public policy.

The charter aims to develop partnerships and support networks with public, private, government, non-government and international organisations to create and maintain actions to promote health.

At the *national level*, the job of government and organisations is to create an environment for improving health. This is done by providing coordination and leadership; encouraging federal, state and territorial collaboration; providing the public and other stakeholders with the information and resources they need; working together with international bodies to share information; and developing the infrastructure to establish and support a social health approach.

At the *state and territorial level,* the responsibility of government and organisations is to work together to develop healthy public policies, balance investments and regularly provide health information to members of the public. They are also responsible for developing health goals and effective frameworks or structures that reflect the population health approach. Population health is an approach to health that aims to improve the health of the entire population and to reduce health inequities among population groups.

The responsibility of the *private sector* in promoting health is to ensure that it provides a safe and healthy working environment that has opportunities for continuous learning. In promoting health, the private sector must also take into account its responsibility for protecting the environment and contributing to the overall well-being of the community.

At the **community** level, communities with a common interest or concern can focus their energies on developing partnerships that address the determinants of health. For example, the government may provide funding to health-related organisations, such as the Heart Foundation or Cancer Council, to support research; plan and provide high-quality services that promote health; share information and resources designed to have optimum health impacts; and involve the individuals who have a vested interest in setting priorities and implementing programs.

As *individuals*, we can all contribute by taking responsibility for our own health and well-being; actively seeking out the information we need to make informed health decisions; building supportive communities; and participating in community activities that have an impact on health. For example, schools have a 'no hat no play' policy to protect students from the sun.

Within the above levels, there may be partners at different levels. Depending on the context and the nature of the **intersectoral action**, levels may be defined in different ways; for example, in terms of:

- geography (such as local/community, regional, state, national and international levels)
- levels of government (that is, local, state/territorial and federal)
- levels within organisations (such as senior decision-making level and service-delivery level).

As the broad list of examples in Table 4.1 shows, effective health promotion must involve the cooperation of a variety of government and non-government organisations. The public health approach acknowledges that effective health promotion requires intersectoral involvement. It also emphasises the importance of creating an environment that is fully supportive of positive health behaviours and actively involves the community.

Critical inquiry

Choose five of the health promotion initiatives listed in Table 4.1. **Identify** the levels of responsibility involved for each initiative.

The benefits of partnerships in health promotion

The key aspect of health promotion is understanding that improving health is a shared responsibility. Intersectoral collaboration is the teamwork among health and other groups to improve health outcomes. Health groups and those groups not normally associated with health, but whose activities may have an impact on health or the factors known to influence it, share the responsibility and accountability for health outcomes. Successful initiatives developed by different sectors are, by their nature, challenging to achieve.

Intersectoral action about a health concern makes possible the joining of all the knowledge available about the health concern. It also allows for access to the resources and skills needed to understand and solve complex issues where possible solutions lie outside the capacity and responsibility of a single sector. Intersectoral action can be used to promote and achieve shared goals in a number of areas; for example policy, research, planning, practice and funding. It may be implemented through numerous activities, including **advocacy**, legislation, community projects, policy and programs. Intersectoral action may take many forms, such as passing of legislation. It is most successful when characterised by a dynamic and flexible process that is perceived as a 'win-win' situation by all participants.

Intersectoral action requires the development of a strategic plan. This is a clear outline of the steps taken to achieve the goals and intended outcomes of the initiative. For example, the strategic plan outlines a timeline as well as the key people or organisations involved, the budget requirements and an evaluation of the results. A relationship between one or more parts of the health sector and one or more parts of another sector is important.

Table 4.1 Sample health promotion initiatives

Initiative	Examples
Awareness-raising media campaigns	'Slip, Slop, Slap', 'Stop, Revive, Survive' and 'Drink, Drunk, the Difference is U'
Reducing risky behaviour and maintaining a healthy environment	Bicycle helmet laws, pool fencing, health warnings on cigarette packets, reduced speed limits, unleaded petrol, reduction of chlorofluorocarbons (CFCs)
Programs to address specific health problems	National Drug Strategy, National Mental Health Strategy
Initiatives for socio-economically disadvantaged people	Aged pensions, single-parent pensions, unemployment benefits, Medicare Safety Net, housing support
Non-government organisation initiatives	National Heart Foundation's 'tick' for healthy food, Cancer Council mobile clinic, Red Cross first-aid courses, Sun-Herald City-to-Surf, Sydney City Mission emergency accommodation, 'Quit' programs, Alcoholics Anonymous
Business-sector developments	Lean beef, 100 per cent ultraviolet (UV) clothing, car air bags, ergonomic furniture, sports safety equipment, 'Weight Watchers', nicotine patches
Economic incentives	Lower tax on low-alcohol beer, reduced life insurance premiums for non-smokers
Economic disincentives	Higher taxes on alcohol and cigarettes
Environmental developments	Smoke-free areas, lead-free petrol, dual-lane carriageways, shaded areas at beaches, exercise equipment in public parks
Community/individual initiatives	Car pooling, Neighbourhood Watch, Safety Houses, environmental protection groups, Lions Clubs' 'Driver Reviver' stations, Health Promoting Schools, Healthy Food Canteens

This will help to ensure the action taken to address an issue and achieve health outcomes is a more effective, efficient and sustainable approach than is possible when the health sector works alone.

There is no doubt that intersectoral action for health has worked. There are many success stories at international, national and local levels. For example, publicly funded immunisation programs that involve the health, education and, in some cases, social services systems have been successful in reducing the incidence and prevalence of communicable diseases and their complications. Healthy communities projects all across Australia have brought about changes that have resolved health problems and greatly improved the quality of life of people. The National Mental Health Strategy brought together federal government departments with state and territorial governments, community groups, professional associations and private sector organisations to develop an intersectoral response to addressing mental health issues. Intersectoral action results in increased public awareness; implementation of a range of health, social service, criminal justice and housing services; and networks of partners who continue to work together.

There are significant potential benefits to be realised from adopting, supporting and sustaining an intersectoral action approach, including:

- a greater capacity to tackle and resolve complex health and social problems that have eluded individual sectors for decades, resulting in improved population health and well-being, and reduced demand for health care and social services in future
- a pooling of resources, knowledge and expertise, and development of networks, that will allow partners to address current problems more effectively and position them to respond better to future issues
- reductions in duplication of effort among different partners and sectors
- new collaborative and inclusive ways of working together that will enable partners to contribute to improvements in social cohesion, provide increased opportunities for sustainable human development, and create a more dynamic and vibrant society.

Research and Review

1. The public health approach requires the cooperation of government and community. **Explain**, with the use of examples, how this cooperation can take place.
2. Smoking is a major health concern in Australia. Conduct a review of health promotion strategies designed to reduce smoking. Argue the benefits that partnerships have had on health promotion in relation to smoking.
3. Complete the task for other major risk factors related to the national health priorities; for example, nutrition and physical activity.



Figure 4.1 There are significant benefits of partnerships in health promotion

How health promotion based on the Ottawa Charter promotes social justice

The Ottawa Charter promotes **social justice** as it is designed to provide access to health opportunities for all members of society. This requires policy approaches, planning decisions and strategies to enhance access to those factors and situations that support health. Resources need to be allocated appropriately, taking into account that some need more than others. It is important that all individuals or groups be accounted for in the decision-making processes, as this allows the decisions to be made within a social justice framework.

Social justice involves treating all people equally and providing people with equal rights. Basically, it is about giving everyone a 'fair go'. Since inequality still exists in society, treating everyone the same does not necessarily mean fairness of treatment. Social justice targets the marginalised groups of people in society—it focuses on the disadvantaged. Social justice recognises that there are situations where applying the same rules to unequal groups can generate unequal results. Social justice provides equitable outcomes to marginalised groups by recognising the existence of past disadvantage and that structural barriers embedded in the social, economic and political system perpetuate systemic discrimination. In promoting health, equity underpins practice. A socially just society is much more likely to be a healthy society—physically, economically, spiritually, emotionally and environmentally.

According to a 1986 report by WHO, the Ottawa Charter refers to health promotion as the 'process of enabling people to increase control over, and to improve, their health'. The Fourth International Conference on Health Promotion held in Jakarta in 1997 provided an opportunity to reflect on what had been learned about effective health promotion, to re-examine the determinants of health, and to identify the directions and strategies that must be adopted to address the challenges of promoting health in the twenty-first century. The Jakarta Declaration presents actions for health promotion that need to occur in the twenty-first century. According to a 1997 report by WHO, it reinforces the importance of collaborative partnerships in effective health promotion; that is, where organisations work together to achieve common goals. The Jakarta Declaration also highlights the need to 'increase community capacity and empower the individual'.

Those groups who do not have power, or feel powerless, experience worse health. However power might be measured, those with more power are healthier. When individuals are given the opportunity to participate in the political, cultural or social process they are able to state their needs accurately. They are in a position to contribute actively to the development of strategies designed to assist them. Rather than merely be the recipient of the health promotion outcome, they become a part of the process. Individuals are empowered when their decision-making abilities are improved and this gives them more control over their lives. The empowerment of individuals is fundamental to the public health approach.

When individuals are empowered, social justice is achieved. People are enabled to make changes in the context of their lives that enhance their health. Health workers can be advocates to influence policy at all levels through formal lines of authority. Health promotion work involves advocating on behalf of vulnerable community groups for the desired changes to be enshrined in policy. Policy within government can also be used to bring about change in the social environment, management systems and structures, and to provide the rationale for action in support of the community.

In a similar fashion to individual empowerment, communities are given the opportunity to express their needs and to be an active part of the health promotion process. The public health approach develops structures and policies to support communities in achieving their goals. According to a 1986 WHO report, as the Ottawa Charter for Health Promotion stated: 'At the heart of this process is the empowerment of communities, their ownership and control of their own endeavours and destinies'.

The Ottawa Charter identified the 'strengthening of community action' as a fundamental principle of health promotion. The emphasis of the public health approach is on working with communities. This approach supports strategies that are developed by communities, not those strategies that are imposed on them. In this way, communities feel a sense of ownership and confidence. As a result, the chances of successful interventions significantly increase. It is important to note that communities are not necessarily defined by geographic barriers. Communities may be characterised by other factors, such as race, socio-economic status or profession.



Communities are not necessarily defined by geographic barriers.

The scenarios opposite are common examples of situations that occur in our society. By applying the actions of the Ottawa Charter we can promote social justice and promote health.

practical application

Social justice principles

1 Read each of the scenarios opposite. For each scenario:

- a **Discuss** the principles of social justice that are not applied.
- b **Discuss** the responsibility of individuals, communities and governments under the action areas of the Ottawa Charter.

Principles of social justice: health promotion scenarios

'I wish my mum didn't live so far way. I never knew it would be this hard juggling work and the kids. And Cal and I hardly see each other, what with him working the overnight shift. You're so lucky to be home with your kids ... I know, I know, but really, you're lucky! I worry all the time. The sitter lets them watch way too much TV. But it's so hard to find someone. And my eldest, JJ, is only in kindergarten, but already the teacher wants to get him tested for behaviour problems. I try to do everything but ...'



'Do I like cleaning windshields for a living? Except for the dirty looks, it's okay. And sometimes drivers are really nice. But do I like it? Look, I'm 16, I don't live at home and I need the money. I'm not into trading sex for money—my best friend just found out she has HIV—and I won't deal drugs. Getting a straight job is hard, really hard—especially when you don't have a permanent address. I've been staying with a bunch of kids and everybody comes in at all hours. I'm not sleeping much and I've got a really bad cough. If I had a place of my own, I'd probably feel a whole lot better about everything, but I doubt I'll ever be able to afford that.'



'Things haven't been so great, so I was glad to find out about this place. I left school pretty early—always had trouble with reading—so I'm taking classes here to upgrade. And after lunch, I get to play a little basketball and let off a bit of steam. They're hoping to start up a retraining program again, and the staff here say for sure I'll qualify for it. My life sure has changed. I got work right after I dropped out of school—on the assembly line. Not a union job, but still pretty good, and I put in 16 years there. But six months ago, the place closed down. A year ago, I remarried, and we had planned to start a family. But now I wonder how we'll manage.'



'I don't know what's gotten into me—I just don't feel like myself. For one thing, I know I'm jumpy. Maybe it's worrying about the bills, with everything getting more expensive. I suppose I could move into something smaller, but this is my home. I surely don't want to go to some institution, and where else would I go? Anyway, I made an appointment with Dr Jones, and maybe I'll ask about those nerve pills.'



The Ottawa Charter in action

The five action areas of the Ottawa Charter reflect the 'public health approach', with a special emphasis on social justice issues. (The action areas are listed on page 73.) Australia's six health priorities were discussed in detail in Chapter 3. The six priority issues for investigation are:

- cardiovascular disease
- cancer
- diabetes
- respiratory disease
- injury
- mental health problems and illnesses.

Table 4.2 Ottawa Charter framework for the analysis of the six health priority issues

Developing personal skills	Reorientating health services
Modify personal behaviour • What behaviour modifications will reduce the risk of developing this illness/condition? • What personal skills are needed to adopt positive behaviour? **Accessing information and support** • Where can reliable information on this illness/condition be obtained? • What support services can assist in developing this positive health behaviour?	**Range of services available** • List the range of services available for people with this illness/condition. • Are these services aimed at prevention, promotion or cure? **Gaining access to services** • Is access to these services equitable for all? • What factors restrict equitable access for all? • What can be done to improve access?
Creating supportive environments	**Building healthy public policy**
Support networks and community services • What community services exist to support people with this illness/condition? • How has the environment been modified to reduce the incidence of this illness/condition? **Environmental influences on health** • Some population groups experience this illness/condition more than others. With this point in mind, how do the following impact on: – socio-cultural factors – physical factors – political factors – economic factors?	**Public policy developments** • Identify a range of public policy developments aimed to address the priority issue. • What additional public policies will assist in addressing the priority issue? **Impact of policy on health** • What impact, if any, have these policies had on health in relation to the priority issue? • How can public policy in relation to the priority issue be influenced by individuals and communities? • Who decides where money is spent in relation to the priority issue?
Strengthening community action	**Further questions**
Empowering communities to take action • What community-inspired initiatives have been designed to address this priority issue? • What motivates individuals and communities to take action? • How have these initiatives been supported by the government and private sectors? • How have the government and private sectors worked in opposition to these initiatives?	• Which of the five action areas of the Ottawa Charter are most significant for the priority issue? • How do the five action areas of the Ottawa Charter interact in relation to the priority issue?

practical application

The Ottawa Charter in action

Choose two health promotion initiatives related to Australia's health priorities. You may like to choose the initiatives from those listed in Table 4.1 (page 74). Critically **analyse** the importance of the five action areas of the Ottawa Charter to improve health. Use the questions in Table 4.2 to assist your investigation.

what actions are needed to address australia's health priorities?

chapter summary

- Health promotion is a comprehensive social and political process, not only including actions directed at strengthening skills and capabilities of individuals, but also action directed towards changing social, environmental and economic conditions.
- Effective health promotion requires multiple approaches involving many individuals and organisations.
- Health promotion is not just the responsibility of the health sector but requires a coordinated action by all.
- The Ottawa Charter was developed to build a global 'all for health' movement as a means to realise the human right to 'health for all'.
- Population health is an approach to health that aims to improve the health of the entire population and to reduce health inequities among population groups.
- The public health approach acknowledges that effective health promotion requires intersectoral involvement.
- The key aspect of health promotion is understanding that improving health is a shared responsibility.
- The Ottawa Charter promotes social justice as it is designed to provide access to health opportunities for all members of the society.
- Social justice is treating all people equally and providing people with equal rights.
- The five action areas of the Ottawa Charter are developing personal skills, creating supportive environments, strengthening community action, reorientating health services and building healthy public policy.

revision activities

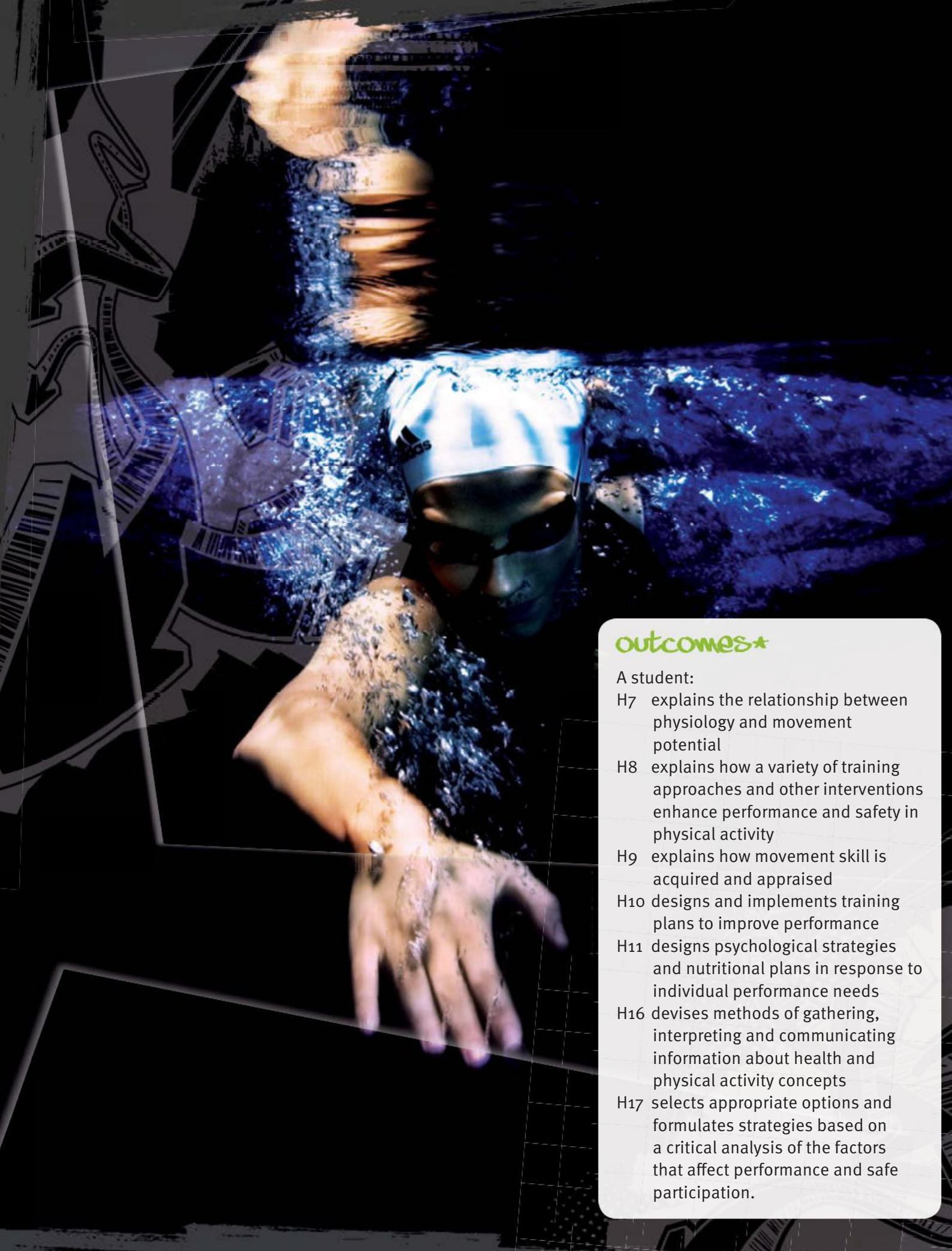
1. **Define** the term 'health promotion'.
2. **Identify** and **describe** the actions of the Ottawa Charter.
3. **Describe** a health promotion initiative that is:
   - a. an awareness-raising media campaign
   - b. an economic incentive
   - c. an environmental development
   - d. a community or individual incentive.
4. **Define** the term 'social justice'.

extension activities

1. **Discuss** the benefits of partnerships in health promotion.
2. **Compare** and **contrast** the levels of responsibility for health promotion.
3. **Discuss** how health promotion based on the Ottawa Charter promotes social justice.
4. Argue the benefits of health promotion.

exam-style questions

1. **Analyse** how building healthy public policy can address two national health priority issues you have studied. (10 marks)
2. **Analyse** two action areas of the Ottawa Charter that are used to address either skin cancer or lung cancer. (10 marks)
3. **Describe** the influence of the Ottawa Charter on the implementation of a major health promotion initiative in Australia. (6 marks)
4. **Discuss** how the Ottawa Charter influences the development of health promotion initiatives in Australia. (8 marks)
5. **Identify** two principles from the Ottawa Charter for health promotion and show how they apply to the management of one health issue. (8 marks)



outcomes

A student:

- H7 explains the relationship between physiology and movement potential
- H8 explains how a variety of training approaches and other interventions enhance performance and safety in physical activity
- H9 explains how movement skill is acquired and appraised
- H10 designs and implements training plans to improve performance
- H11 designs psychological strategies and nutritional plans in response to individual performance needs
- H16 devises methods of gathering, interpreting and communicating information about health and physical activity concepts
- H17 selects appropriate options and formulates strategies based on a critical analysis of the factors that affect performance and safe participation.

core 2

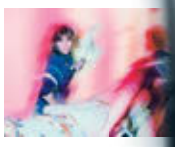
factors affecting performance

coming up The following chapters examine the dynamic and varied factors that affect performance, including the theoretical and practical applications of the physiological and psychological influences on performance. Students are encouraged to participate in, and critically analyse, experiences relating to the following as they relate to performance: exercise physiology, training principles, skill acquisition, sports psychology, sports nutrition and recovery from exercise.

FOCUS QUESTIONS

- How does training affect performance? .....[page 82]
- How can psychology affect performance? .....[page 114]
- How can nutrition and recovery strategies affect performance? ..... [page 130]
- How does the acquisition of skill affect performance? ..... [page 148]






chapter 6

how does TRAINING affect performance?

When individuals begin to train they are trying to improve the way their bodies function. They may wish to improve a particular way their bodies deliver and use energy or they may want to develop strength, flexibility or aerobic or anaerobic endurance. Regardless of the particular type of benefits they want to gain, there are many similarities in the way training programs are designed and the principles that underline these programs. This chapter explores the way training programs can be designed and the effects on the body of individuals who undertake them.

Energy

Energy can be defined as the capacity or ability to perform work. Without energy there would be no light or heat and everything would be stationary and unchanging. When change takes place, the presence of energy in the process is revealed. Energy is fundamental to everyday living. We are all familiar with the common use of the term 'energy' as a description of performance for both humans and machines; for example, 'I have no energy' or 'This washing machine is energy-efficient'. What do such comments mean? First, it is obvious that there are various forms of energy. Second, energy can be used in numerous ways. Third, energy can be measured.





Energy can be categorised into various forms, such as heat, light, electrical, nuclear, chemical and mechanical. Each of these can be converted from one form to another. For example, a light globe converts electrical energy into light energy; a gas heater converts chemical energy into heat energy.

For the purposes of human movement we are mainly concerned with the transfer of chemical energy into mechanical energy. In this process, the breaking of chemical bonds in molecules releases energy for use by the body. An excellent example of this transfer of energy is that of a football player who converts chemicals in the body (derived from food) into mechanical work (for example, jumping to take a mark). Heat energy is also given off in this transfer, which is why a person feels warm after jogging for a short while.

The body does not directly use the energy that is released in the breakdown of food; rather, the energy is used to make a chemical compound called **adenosine triphosphate (ATP)**. Only when the energy is released by the breakdown of this compound can the cell perform its specialised function. This specialised function is dependent on the cell type. For example, cells in the intestine have a digestive function.

Adenosine triphosphate

Adenosine triphosphate (ATP) is an energy-rich chemical compound found within the cells of the body. It is almost always the source of energy for the reactions that take place in the body—especially for muscle contraction leading to movement.

As shown in Figure 5.1, ATP is made up of a smaller compound (adenosine) and three chained phosphate (P) groups (hence the name *tri*-phosphate). The final phosphate group is held on to the chain with a high-energy bond. A great deal of energy is released when this bond is broken and this provides the energy that powers the human body. It provides energy for all processes, from breathing and digestion through to muscular movement.

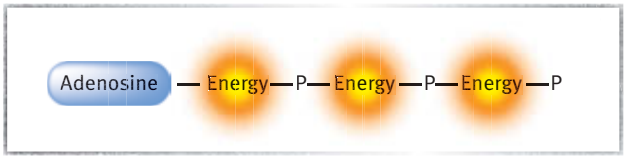


Figure 5.1 An ATP molecule

When ATP is broken down, it releases energy. ATP is broken down into **adenosine diphosphate (ADP)**—that is, adenosine plus two phosphates—and a separate phosphate group (see Figure 5.2).

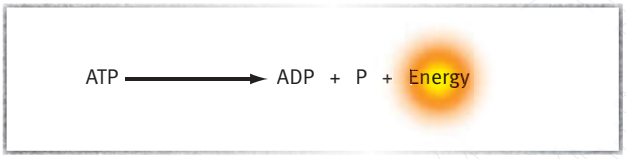


Figure 5.2 The breakdown of ATP

Food provides the source for ATP. Stored fuels, such as carbohydrates and fats, are not changed into ATP; rather, a portion of the energy that is released when these food chemicals break down triggers the joining together of molecules to form ATP.

Energy from foods

There is a strong link between what a person eats and the production of ATP. The three major nutrients found in food—carbohydrates, fats and proteins—all work in different ways to help with the production of ATP.

Carbohydrates

Carbohydrates are broken down by the body into glucose. This glucose is then stored in the muscles and liver as glycogen, which is a ready source of energy. Chemical reactions involving glucose or glycogen produce ATP. Sugars (simple carbohydrates) can provide muscle glycogen, but the best sources come from complex carbohydrates, such as grains, cereals, breads, legumes and vegetables. One gram of carbohydrate yields approximately 16 kilojoules of energy when broken down.

Complex carbohydrates are the best sources of muscle glycogen.

Fats

Triglyceride, which is found in fatty foods, is the digested form of fat for energy production. **Triglycerides** are stored in the muscles and are broken down when needed during exercise to produce glycerol and free fatty acids. Free fatty acids are the primary energy source when fat is used for energy. They can be stored in fat cells and in muscles.

Fatty acids can be stored as adipose tissue (body fat) or they can travel around the body in blood. These substances can produce ATP, but are usually used only at lower intensities over longer periods of exercise. One gram of fat yields approximately 37 kilojoules of energy when broken down.

Proteins

After digestion and absorption, **proteins** are broken down into amino acids. Under normal conditions, protein is not used to produce ATP. During extreme conditions (for example, starvation or prolonged exercise), however, protein will be used as a fuel source for ATP. Protein is used only when stores of fats and carbohydrates have been exhausted. One gram of protein yields approximately 17 kilojoules of energy when broken down.

Research and Review

1. **Outline** how energy is measured.
2. **Identify** the different forms of energy and provide an example of each.
3. **Describe** the process by which humans are able to engage in physical activity.

There is a strong link between what a person eats and the production of ATP.

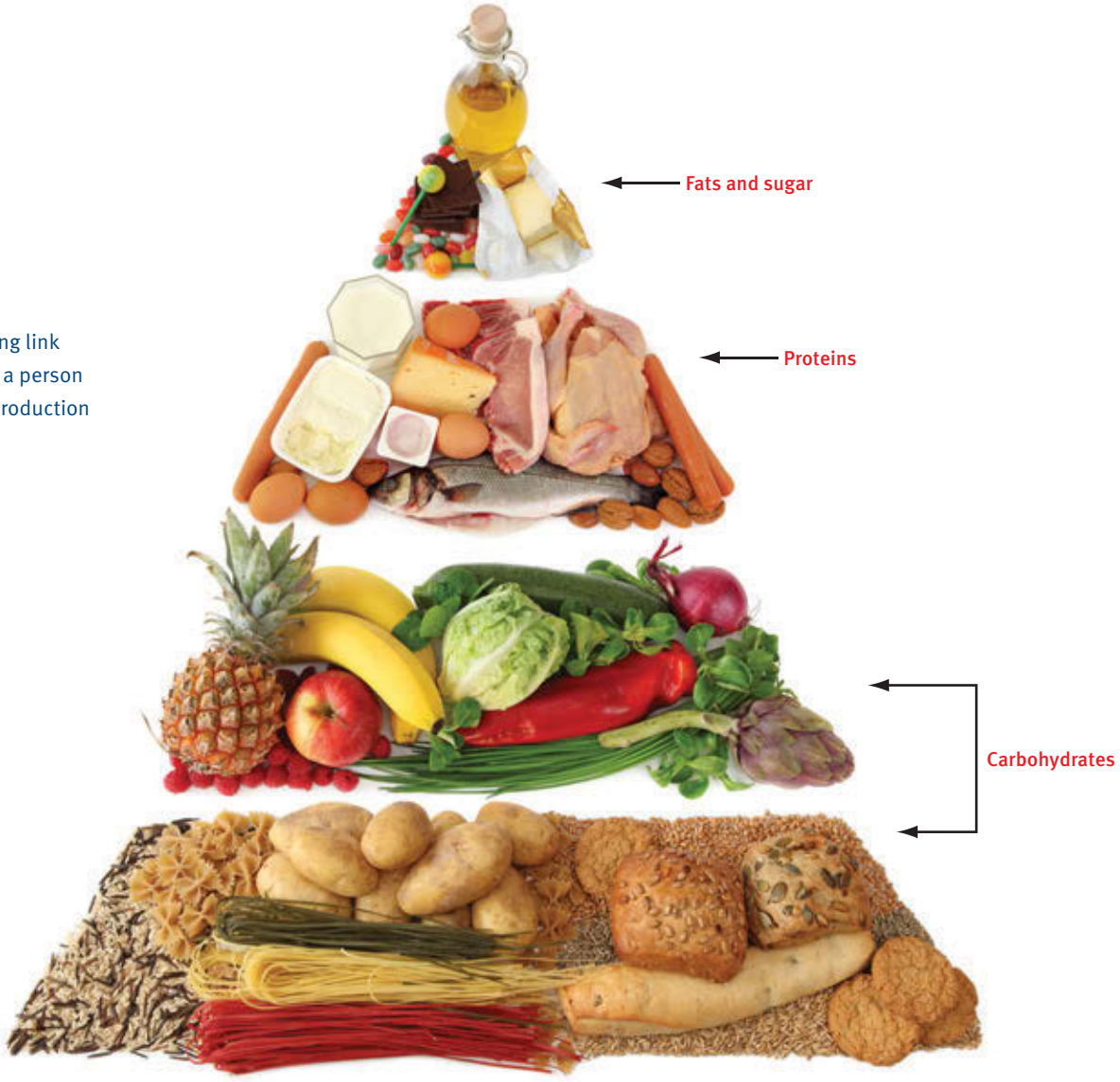


Figure 5.3 Examples of foods that provide energy

Energy systems

ATP does not exist in the muscles and tissues in abundant supply waiting for activity to occur. In fact, the small amount of ATP that is present provides only enough energy for a few seconds of intense activity. The body does not produce ATP continuously, so it must be recycled in a process known as **resynthesis**. This process rebuilds ATP from ADP using one of three energy systems. The energy system used by the body is dependent on:

- how long the activity will take place
- the intensity of the activity
- how quickly the activity is performed.

The three common energy-yielding processes for the replenishment and recycling of ATP are the:

- **alactacid system** (also called the phosphagen or ATP–PC system)
- **lactic acid** system (also called the anaerobic glycolysis system)
- **aerobic** system (also called the oxygen or oxidative system).

All three systems work in fundamentally the same way to resynthesise ATP. The energy that is released during the reactions occurring within them is used to recombine ADP and P to form ATP. This process is best described by the principle of *coupled reactions*. This means that the energy produced in one reaction is used to drive another reaction. The coupled reactions for the resynthesis of ATP are shown in Figure 5.5.

The major difference between the systems is that the alactacid and lactic acid systems both resynthesise ATP **anaerobically** (without oxygen present), whereas the aerobic system resynthesises ATP *aerobically* (with oxygen present).

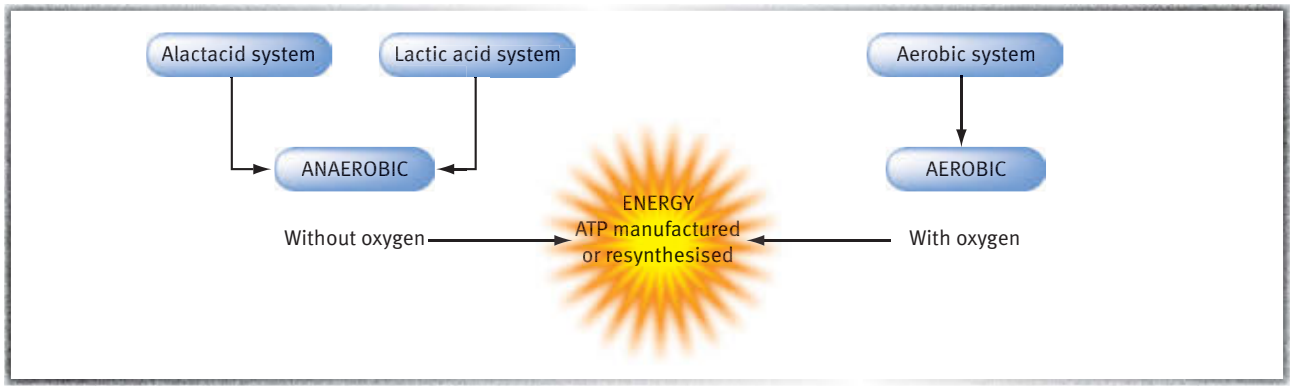


Figure 5.4 Aerobic and anaerobic energy systems

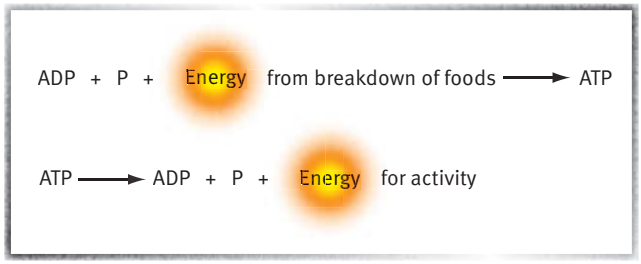


Figure 5.5 ATP resynthesis coupled reactions

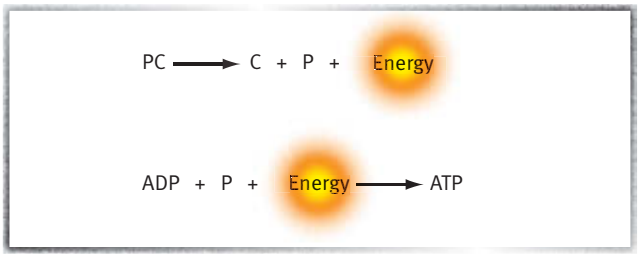


Figure 5.6 Alactacid system

Research and Review

1. **Explain** what is meant by ATP resynthesis.
2. **Describe** how coupled reactions allow the release of energy for ATP resynthesis.
3. **Define** the terms 'anaerobic' and 'aerobic'.

Alactacid system (ATP-PC)

The alactacid system is used by the body to produce ATP when there is insufficient time to break down glycogen in the presence of oxygen for the replenishment of ATP. At the same time that ATP is being broken down in the muscle, another high-energy substance—**phosphocreatine (PC)**—is also being broken down. The cells contain more PC than ATP, so PC can be considered to be a phosphate reservoir. The breakdown of PC produces energy, which is used to join ADP and P back together to produce ATP. So the coupled reaction appears as in Figure 5.6 (page 85).

The amount of PC in muscles is limited. After about 5–10 seconds of maximal work the supply is depleted. This reduces its ability to contribute to movement and therefore another energy system is activated. High-intensity activity lasting for 10 seconds or less uses the ATP-PC system as the primary source of energy. Such activities include shot put, 100-metre sprint, jump shot and kicking a football. As the stores of PC are broken down, they are quickly restored; within 2 minutes if resting. This allows for the activity to be repeated in intense, short bouts, without immediate exhaustion. The only way that PC can be restored is to recombine the P and C released to resynthesise ATP. This is done during recovery. This system represents the most readily available source of ATP for use by the muscles. There are several reasons for this, including the following:

- It does not depend on a long series of chemical reactions.
- It does not depend on transportation of oxygen to muscles.
- Both ATP and PC are stored in the contractile tissue of muscles.



Figure 5.7 The ATP in these athletes is waiting to explode

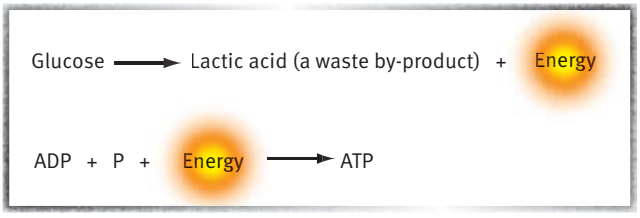


Figure 5.8 Lactic acid system



Critical inquiry

Explain some of the facts and fallacies surrounding the subject of lactic acid. Use the Internet links below to assist you with your research.

WEB Internet support concerning the role of lactic acid in energy production and fatigue can be accessed via www.oup.com.au/pdhpe12

Lactic acid system

The other system that does not require the presence of oxygen to resynthesise ATP in muscles is the lactic acid system. This system involves the partial breakdown (*lysis*) of glucose to form lactic acid in a series of 12 chemical reactions known as *glycolysis*. The glucose for this process comes either from glucose stored in the blood or from the breakdown of glycogen in the liver or muscles—known as *glycogenolysis*. These reactions occur within the cell. The simple coupled reaction for the resynthesis of ATP via the lactic acid system is shown in Figure 5.8.

The energy provided during this process is very important as it provides a relatively quick supply of ATP. Unfortunately, however, this process can yield only about 5 per cent of the number of ATPs that are produced when oxygen is available. (Yet it does yield more ATPs than by the alactacid system.) The lactic acid system is an important energy system because it provides a very quick supply of ATP for intense, short bursts of activity (usually 30–60 seconds, but may last up to 3 minutes). If the intensity of the activity is maintained, lactic acid will accumulate, which results in muscle fatigue and exhaustion. This will usually cause the performer to decrease the intensity of the activity, or to stop altogether.

To break down and remove lactic acid can take up to 2 hours, and an active recovery will aid this process. During this recovery time, the lactic acid is actually converted back to pyruvic acid.

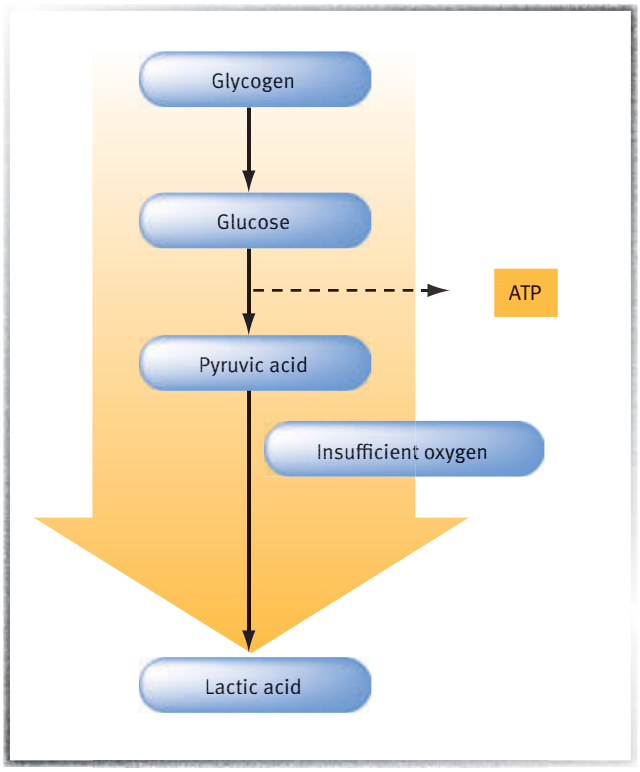


Figure 5.9 Reactions within the lactic acid system

Activities using this system include:

- 200-metre and 400-metre running sprints
- 50-metre and 100-metre swimming sprints
- medium-length sprints in sports such as soccer.

The lactic acid system can last up to 30 minutes if exercise occurs at a **sub-maximal** level (of about 60 per cent).

Aerobic energy system

In the previous two energy systems, energy is produced in the muscle. By contrast, aerobic glycolysis occurs in the specialised cellular compartments of the muscle cells known as *mitochondria*. The aerobic energy system can be divided into three main parts:

- aerobic glycolysis
- the Krebs cycle
- the electron transport system.

Each part plays a significant role in the resynthesis of a large amount of ATP, with water and carbon dioxide as by-products.

Aerobic glycolysis

In the presence of oxygen, glucose broken down into pyruvic acid is converted into a specialised enzyme called acetyl-coenzyme A (acetyl-CoA). This is the first of many reactions that make up the process of aerobic glycolysis.

The Krebs cycle

The enzyme acetyl-CoA enters into a series of reactions called the Krebs cycle, in which it is oxidised (broken down) to produce ATP, hydrogen and carbon. The ATP is used for energy, the carbon combines with oxygen to form carbon dioxide (which is breathed out) and the hydrogen moves on to catalyse the next reaction in the aerobic system. If the hydrogen remains, it will make the cell too acidic and unable to function correctly.

The electron transport system

The Krebs cycle feeds into another series of reactions called the electron transport system. Hydrogen, which has been produced in both the lactic acid system and the Krebs cycle, is picked up and taken to the electron transport system. Here the hydrogen atom is split into two parts: protons and electrons. The protons combine with oxygen to form water, which also acts to decrease the acidity of the cell. The electrons undergo more reactions to form the energy that allows ADP and P to resynthesise to form ATP.

During exercise, carbohydrates are the major source of fuel. As the activity continues, carbohydrate stores become depleted and fats become the major fuel source. (Fats require far more oxygen than carbohydrate to produce the same amount of ATP.) Protein will usually be used as an energy store only in extreme situations—when the previous two stores have been depleted.

Summary of the aerobic system

The major fuels for the aerobic system are:

- glucose (from glycogen stored in muscle tissue or the liver)
- fatty acids (from triglycerides in adipose tissue and blood)
- amino acids (from proteins stored in muscles or the liver; but these are not used for energy production to the extent of the two sources above).

This whole process is best understood by a diagram, as shown in Figure 5.10.

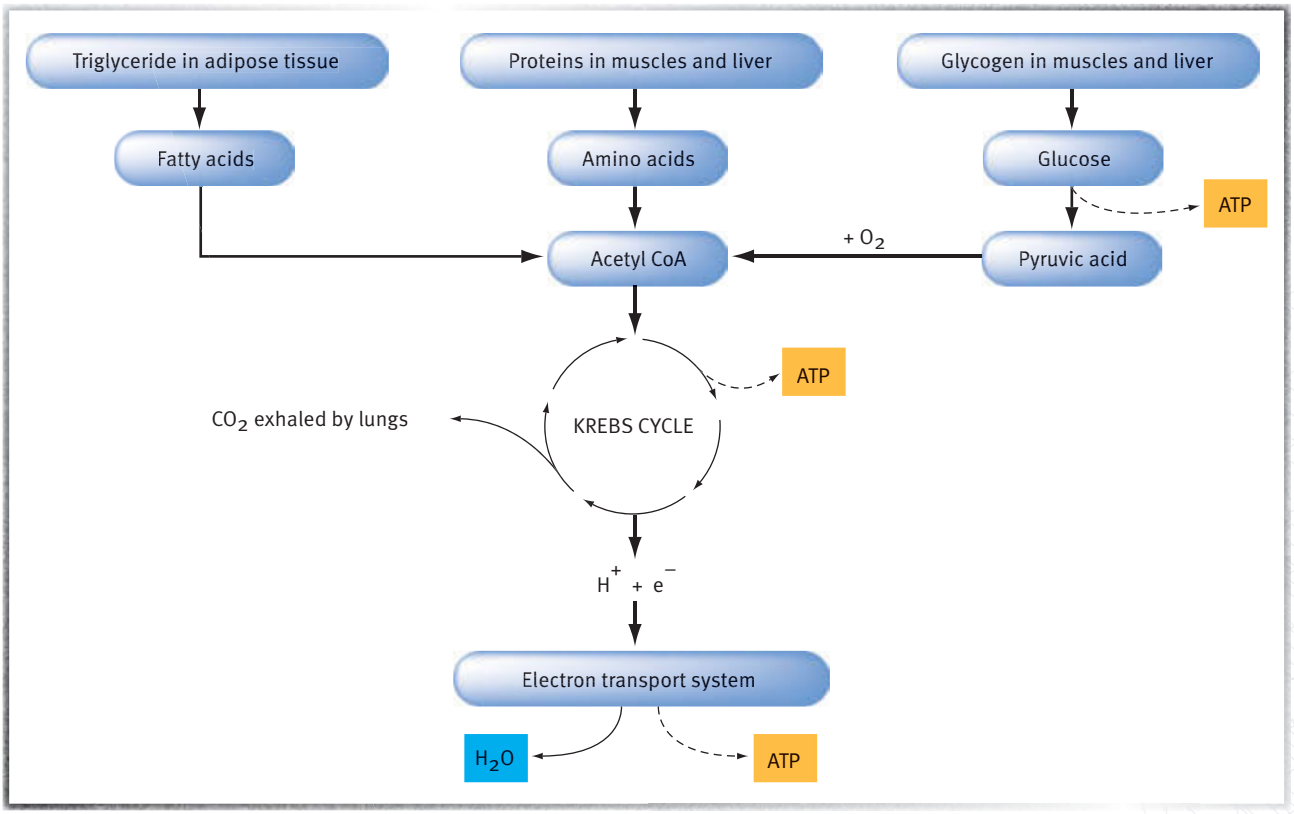


Figure 5.10 ATP metabolism via aerobic pathways

In summary, the general characteristics of the three systems by which ATP is formed appear in Table 5.1 (page 89).

During physical activity the body uses a combination of all three energy systems, depending on the duration and intensity of the activity. For example, soccer mid-fielders use the aerobic system to provide the constant energy required to continually move back and forth on the field—usually at moderate levels of intensity. Occasionally, they may need to sprint down the wing to assist in attack or defence. These short sprints usually last 3–10 seconds, and use the anaerobic energy systems. In most sporting situations, energy systems are used in various combinations.

Athletes should be able to pace themselves to ensure that their ATP supplies are not depleted too early in the race. If athletes go out too hard, or begin the final sprint too soon, lactic acid will accumulate to high levels and decrease their performance. Fatigue results when lactic acid levels are high and muscle glycogen stores are depleted. Coaches and athletes aim to delay the onset of fatigue until after the event. Table 5.2 explains the relative contributions of aerobic and anaerobic energy systems to the various running distances held in major athletic competitions. Table 5.3 shows the contribution of energy systems to a variety of sporting activities.

Table 5.1 ATP from all sources

System	Source of fuel	Duration of system	Cause of fatigue	Efficiency of ATP production
Anaerobic				
Alactacid system (ATP-PC)	PC	Up to 10 secs	Depletion of PC stores	Rapid but limited
Lactic acid system	Glucose	Up to 3 mins	Build-up of lactic acid in muscles	Rapid but limited
Aerobic Aerobic system	Glucose, fats, protein	Indefinite at low intensities	Depletion of fuel sources	Slow but unlimited

Adapted from ML Foss & SJ Keteyian, *Physiological Basis for Exercise and Sport*, 6th edn, WCB McGraw-Hill, USA

Table 5.2 Relative contributions of the energy systems to running events

Duration of event	10 secs	30 secs	60 secs	2 mins	4 mins	10 mins	30 mins	60 mins	120 mins
Anaerobic	90%	80%	70%	50%	35%	15%	5%	2%	1%
Aerobic	10%	20%	30%	50%	65%	85%	95%	98%	99%
Event (run)	100 m	200 m	400 m	800 m	1500 m	5000 m	10 000 m		Marathon
	ATP-PC/LA			ATP-PC/LA/aerobic		Aerobic			

Adapted from ML Foss & SJ Keteyian, *Physiological Basis for Exercise and Sport*, 6th edn, WCB McGraw-Hill, USA, and SK Powers and ET Howley, *Exercise Physiology Theory and Application to Fitness and Performance*, 3rd edn, WCB McGraw-Hill, USA

Table 5.3 Various sports and their predominant energy systems

Sport or activity	Relative contribution of each energy system (%)		
	ATP-PC and anaerobic glycolysis	Anaerobic glycolysis and aerobic	Aerobic
1 Aerobic dance	5	15–20	75–80
2 Baseball	80	15	5
3 Basketball	60	20	20
4 Hockey	50	20	20
5 Football	90	10	Negligible
6 Golf	95	5	Negligible
7 Gymnastics	80	15	5
8 Rowing	20	30	30
9 Skiing			
a Slalom, jumping	80	15	5
b Downhill	50	30	20
c Cross-country	5	10	85
10 Soccer			
a Goalie, wing, strikers	60	30	10
b Halfbacks or sweeper	60	20	20
11 Swimming and diving			
a Diving	98	2	Negligible
b 100-m swim	80	15	5
c 400-m swim	20	40	40
f 1500-m swim	10	20	70
12 Tennis	70	20	10
13 Walking	Negligible	5	95

Adapted from ML Foss & SJ Keteyian, *Physiological Basis for Exercise and Sport*, 6th edn, WCB McGraw-Hill, USA

Tests of physiological responses of the energy systems

The following are three tests that explore the physiological responses of the three energy systems.

Performance-decrement test (ATP-PC)

Objective

To measure the degree to which performance is affected by engaging in various intensities of exercise

Equipment

- Measured distances of 35 metres and 70 metres
- Whistle, pens, recording sheet and witch's hats
- Stopwatches (one for each person participating)

Procedure

1. Subjects should warm up.
2. Timers stand at the timing line; that is, the 35-metre mark along the 70-metre track. Timers will record each sprint time as subjects cross the line.
3. Subjects begin at one end line and prepare to run towards the other end line.
4. At the blast of a whistle, the subjects sprint 35 metres to cross the timing line, and then slow down and jog/walk to the other end line. The subjects turn, rest and prepare to sprint in the opposite direction. Six 35-metre sprints are performed: three in each direction. The time between whistle blasts (that is, between sprints) is 30 seconds. A 5-second warning signal is given before each whistle blast.
5. Each 35-metre sprint is timed to the nearest 0.01 seconds, and the time recorded.
6. If a subject starts a sprint before the whistle blast, the run will not count. That person will have to run an extra sprint.
7. At the end of the sprint, partners are to record (on the recording sheet) the feelings of the subject by asking questions regarding breathing, feeling in legs and overall body feelings. The subject's **heart rate** is also recorded. Record the findings in a copy of Table 5.4 (page 91).
8. Once the sprint distance is covered, the subjects are to continue to jog or walk until the heart rate returns to resting levels. Record the time that this takes.
9. The subjects then reverse roles with their partners.

Results

1. Time 1 is recorded. This time is set aside as the original base-line time. (Record this as *Time 1*.) Times 2–6 are then recorded. (Record these as *Time 2*, *Time 3*, *Time 4*, *Time 5* and *Time 6*.)
2. Times 2–6 are then totalled, and averaged. (Record this as *Average Time*.)
3. The performance decrement is then calculated by subtracting the *Average Time* from *Time 1*. This difference is then expressed as a percentage of *Time 1*. Also record the data requested in procedure step 7 above; this will be used later.

400-metre sprint (lactic acid system)

Objective

To measure the degree to which performance is affected by engaging in various intensities of exercise

Equipment

- Measured distance of 400 metres
- Whistle, pens, recording sheet and witch's hats
- Stopwatches (one for each person participating)

Procedure

1. Subjects are to work in pairs: one performing and one recording. Then roles are reversed.
2. An adequate warm-up is required. Take heart rates before the warm-up, and before the sprint.
3. Subjects are to sprint at maximal effort for 400 metres.
4. At the end of the sprint, partners are to record (on the recording sheet) the feelings of the subject by asking questions regarding breathing, feeling in legs and overall body feelings. The subject's heart rate is also recorded. Record in a copy of Table 5.4.
5. Once the sprint distance is covered, subjects are to continue to jog or walk until the heart rate returns to resting levels. Record the time that this takes.
6. The subjects then reverse roles with their partners.

1.6-kilometre run (aerobic system)

To measure the degree to which performance is affected by engaging in various intensities of exercise

Equipment

- Measured distance of 1.6 kilometres
- Whistle, pens, recording sheet and witch's hats
- Stopwatches (one for each person participating)

Procedure

1. Subjects are to run/walk for 1.6 kilometres, in company with a partner. Partners are to give encouragement and keep count of the laps completed.
2. Partners are to talk to the subject during and after the 1.6-kilometre run and record the subject's feelings in a copy of Table 5.4. Record details at the end of the first lap, at the 800-metre mark (in the middle) and at the end of the 1.6 kilometres.
3. At the conclusion, subjects continue to jog/walk until heart rate returns to normal resting levels.
4. Partners reverse roles.

Results

1. Record the following:
   - **a** **resting heart rate** (HR upon waking in the morning)
   - **b** pre-event HR
   - **c** post-event HR
   - **d** time taken to recover.
2. Complete a copy of Table 5.4 for both the 400-metre sprint and 1.6-kilometre run.

Table 5.4 Energy systems recording sheet

Event	Stage in event		
	Beginning	Middle	End
35-m sprint			
Breathing: rate, depth, ease		Not applicable	
Legs: sore, heavy, light		Not applicable	
Overall body feeling		Not applicable	
400-m sprint			
Breathing: rate, depth, ease		Not applicable	
Legs: sore, heavy, light		Not applicable	
Overall body feeling		Not applicable	
1.6-km run			
Breathing: rate, depth, ease			
Legs: sore, heavy, light			
Overall body feeling			

practical application

Physiological responses of the energy systems

1. **Construct** a flow chart of the processes involved in all three energy systems.
2. **Describe** one of the energy systems to your partner.
3. Perform the three tests on page 90. After completing each test, answer the related questions below.

Performance-decrement test (ATP-PC)

a. What happened to your times from trial 1 to trial 5?
b. What does performance decrement measure?
c. If you trained for this test, what would you expect your percentage score to do, and why?
d. An average score for an elite sportsperson is 10 per cent or less. What does your score indicate and what type of training would improve it?

400-metre sprint (lactic acid system)

e. Were you able to maintain the same pace for the entire lap?
f. Describe the feeling in your legs. How long did the feeling last following the run?
g. Compare the amount of energy you felt you used compared with the ATP-PC test.

1.6-kilometre run (aerobic system)

h. Critically analyse how you experienced the energy systems operating in each of the three tests. Identify the changes in them.
i. What is meant by an aerobic steady state? Explain in terms of the energy systems and fuel metabolism.
j. Did you reach steady state at any time? How did you recognise this?

Research and Review

1. **Identify** the by-products of energy production and the process and rate of recovery for each energy system.
2. **Explain** which energy system is the most efficient at producing ATP.
3. **Predict**, using Table 5.3 (page 89), the predominant energy systems for the following activities: golf, 200-metre swimming, snowboarding, rugby league and lawn bowls.
4. **Describe** the use of the energy systems in a 1500-metre running event.

Fatigue and recovery

Fatigue

The causes of fatigue vary, and are usually activity-specific. For instance, the sensation of fatigue is different for a 400-metre runner than for a marathon runner. However, both will experience the feeling of an inability to continue at a given pace, or with increased exertion. Many factors affect performance, of which fatigue is one. Others are discussed elsewhere in this book.

There are generally three areas of the body that can account for the fatigue felt by an individual. These are the central and peripheral nervous systems, energy systems and muscle fibres.

Central and peripheral nervous systems

When people exercise at maximum intensity they get the sensation of exhaustion before it has actually occurred in the muscles. Examples of this are the footballers who make one more tackle when the crowd cheers them on, or the marathon runners who can manage a sprint when entering the stadium. This is, perhaps, a biological protective mechanism. It might be that, under certain conditions of fatigue, nerves in the central and peripheral systems are unable to activate muscles to work.

Energy systems

Each of the energy systems has its own process of fatigue. In the alactacid system fatigue occurs as a result of ATP-PC depletion. The aerobic energy system will fatigue due to muscle glycogen and blood glucose depletion.

Muscle fibres

Fatigue might occur if the muscle lacks oxygen, or is unable to contract due to insufficient blood flow; for example, as a result of an injury.

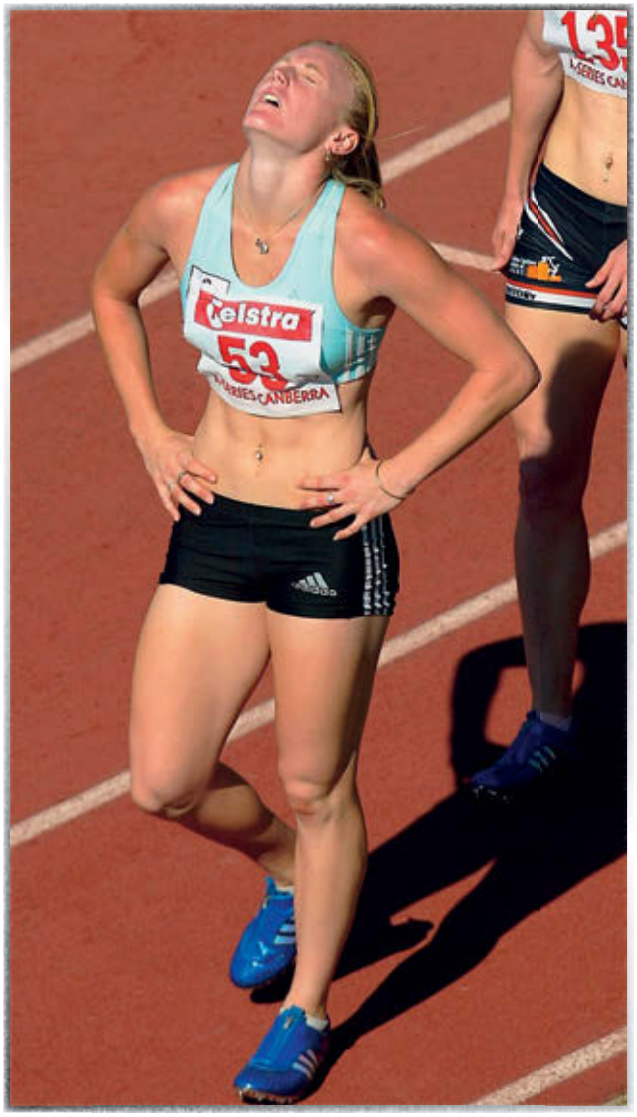


Figure 5.11 An active recovery is recommended after an exhausting effort

Lactic acid accumulation in the muscles and blood is often blamed for the onset of fatigue in short, intense activities. However, the lactic acid does not cause the fatigue. Rather, the fatigue is caused by a change in pH (a measure of overall acidity), which is brought about by the breakdown of lactic acid. The change in pH (in this case, a decrease) affects cell functions, and causes sensations of pain. Fatigue can also be caused by psychological and environmental factors.

Table 5.5 Recovery times for various physiological functions

Function	With active recovery	With rest only
Restoration of ATP-PC	2 minutes	5 minutes
Increase in oxygen consumption	3 minutes	6 minutes
Replenishment of muscle glycogen	10 hours (continuous exercise)	46 hours
Replenishment of liver glycogen	5 hours	24 hours
Reduction of lactic acid in muscles and blood	30–60 minutes	1–2 hours
Restoration of oxygen stores	10–15 seconds	1 minute

Adapted from ML Foss & SJ Keteyian, *Physiological Basis for Exercise and Sport*, 6th edn, WCB McGraw-Hill, USA

Recovery

The processes that are involved in **recovery** from exercise are designed to restore the body to its pre-exercise state. The time to fully recover will depend on the type, intensity and duration of the exercise or activity. Table 5.5 suggests some recovery processes and rates.

In general, after an all-out exhaustive effort, an active recovery is recommended to restore ATP-PC stores and to remove lactic acid. Active recovery includes performing light tasks, such as slow running, walking, stretching and minor games. Post-activity ingestion of complex carbohydrates aids muscle and liver glycogen replenishment. Even athletes who do not exercise to exhaustion should still engage in active recovery, and in food and fluid replacement.

Excess post-exercise oxygen consumption (EPOC)

Have you noticed that at the end of a run you seem to be breathing in more air than you were during the actual run? Does your breathing return to its normal resting levels straight away? Most people have experienced these phenomena. With knowledge of energy systems, these physiological changes can be explained.

As we know from experience, our bodily functions do not return to normal immediately after exercise. Heart rate, body temperature and breathing all remain elevated following the completion of exercise. This is especially true after maximal exercise—in which case the body requires quite some time to return to resting levels. During sub-maximal effort, recovery occurs much more quickly.

The elevated physiological effects of exercise upon completion of exercise allow body temperature to return to normal, to assist in removal of lactate, and help in the replenishment of ATP-PC and glycogen stores to the muscles. Oxygen stores are also replenished during this time.

The amount of oxygen that is consumed above resting levels (once exercise has stopped) has traditionally been called the 'oxygen debt'. More recently, it has been described as 'recovery oxygen' or 'excess post-exercise oxygen consumption' (EPOC).

Research and Review

1. **Outline** the reasons that exhaled air contains more carbon dioxide than does inhaled air.
2. a **Identify** recovery activities and recovery times after each of the following:
   - a 50-metre swim sprint
   - a 10-kilometre cross-country skiing event
   - a basketball game.

   b For each of the sports listed in task 2a above, **identify** which physiological functions need to be most carefully observed during recovery.
3. **Explain** the difference between rest recovery and active recovery.
4. **Predict** the way the body will respond during recovery following a 20-minute jog.



Figure 5.12 An active recovery can include food and fluid replacement

Types of training and training methods

For athletes to be prepared to perform they need to train. Coaches and athletes need to understand that there are various types of training that are specifically designed to develop aerobic capacity, strength and flexibility, and that each is closely linked to the energy systems and principles of training.

practical application

Training programs

Over the course of this topic create a resource file of different training programs written for athletes in specific team and individual sports. You will find this useful in answering various questions as they occur in the rest of this chapter.

Aerobic training

The two most common training methods used for developing aerobic fitness are **continuous training** and **aerobic interval training**. There are a number of popular modifications of these two techniques.

Continuous training

The most common form of aerobic training is called continuous training. In this form of training, the heart rate is elevated and maintained by using jogging, power walking, cycling, swimming, aerobic floor classes, or any other form of exercise that elevates the heart rate. It should be performed continuously for a minimum of 20 minutes. Continuous training is generally of a long duration and moderate intensity: 70–85 per cent of maximum heart rate for 30 minutes to 2 hours.

Although continuous training is effective in producing a training effect, it might not necessarily replicate the performance requirements. In other words, it might not be specific enough for the requirements of some sports or positions, or it might be too difficult to train at the same level as the competition requires. Consequently, other forms of aerobic endurance training have been developed.

Aerobic interval training

Interval training involves the breakdown of the training period into intervals of exercise or work, followed by intervals of rest or relief. Two basic rationales underpin interval training. These are that such training:

- is better for adapting the nervous system to the movement patterns experienced in competition
- allows the athlete to exercise for a longer period of time at high intensity, thereby aiding adaptations in the aerobic metabolic systems in the muscle.



Figure 5.13 During continuous training, the heart rate is elevated and maintained by exercises such as running

The major variables that are manipulated in interval training are time (duration) and intensity. These can be adjusted to provide improvements in both aerobic and anaerobic training.

In aerobic training, the **duration** of the exercise interval needs to be long enough to allow athletes to reach their maximal oxygen uptake (**max VO2**), but be short enough not to bring on fatigue. It is usually suggested that both brief and longer periods of exercise be included in interval training programs.

The **intensity** should allow athletes to reach their max VO2, but the rest intervals should usually be active, such as walking or jogging slowly. This helps to remove accumulated lactic acid from the blood, and allows athletes to train longer. Two factors that are important here are *training time* and *training distance*. Training time is the rate at which the work is to be completed.

The major variables that are manipulated in interval training are time (duration) and intensity.

Aerobic interval training involves moderate-duration and high-intensity 'pace or tempo' training: 85–90 per cent of maximum heart rate, very near to lactate threshold for 30–60 minutes in bouts of 4–10 minutes. Swimmers use this type of training regularly when they complete a series of sets while training; for example, completing five sets of 400 metres every 7–8 minutes. Runners might run 1200 metres then walk for half a lap then repeat the process four to five times.

Although interval training is highly regarded, it is only one of many forms of training. The application of intervals to a training program greatly benefits both athletes and non-athletes, but close attention needs to be paid to the methodology employed.

WEB A website that explains how different intervals can be applied may be accessed via www.oup.com.au/pdhpe12

practical application

Aerobic interval training

1 a In pairs, choose a sport with a largely aerobic fitness component. **Propose** an interval training session for the chosen sport.

b Swap your program with another pair and perform the interval training program you have received.

c **Evaluate** how effective the interval training program would be for the chosen sport.

Fartlek

Fartlek training is the Swedish name for *Speed Play*. Speed Play is a combination of continuous training and interval training in that it involves continuous effort with periods of high intensity, followed by a recovery period. Generally speaking, the bursts of speed are usually of 5–10 seconds duration, and are repeated every 2–3 minutes. Speed Play is usually performed over undulating terrain (such as up and down hills) and is less formalised than interval training. The degree of aerobic versus anaerobic work is dependent on the athletes, and how they feel during the workout. The predominant improvement is seen in aerobic capacity. Speed Play can be easily adjusted to meet the needs of most athletes, and the needs of both interval and continuous systems.

An example of a Fartlek training session is:

1. Jog for 10 minutes to warm up, then stretch.
2. Run for 800–1500 metres at a fast, steady speed.
3. Walk rapidly for 3 minutes.
4. Run continuously for 2000 metres, interspersing with a 50-metre sprint every 300 metres.
5. Run three lots of 400 metres at a fast pace, with a 400-metre jog between each fast run.
6. Run slowly for 2 minutes.
7. Cool down and stretch.

practical application

Fartlek training

1 a As a class, participate in the Fartlek training session above.

b **Explain** how you felt during and after the session and why you felt that way.

Circuit training

Circuit training is an arrangement of exercises that requires the athlete to spend some time completing each exercise before moving on. It is an excellent way to improve mobility and, at the same time, build strength and stamina. Depending on the equipment available, circuits can be developed to improve general fitness or can be highly specialised to meet the specific needs of certain athletes. Circuit training usually consists of 6–10 strength-type exercises that are completed one after the other. Body parts are also alternated so that consecutive exercises don't work the same muscle groups. The strength-type exercises can be interspersed with more aerobic-type activities, or with rest. A simple circuit can be performed up to three times in a training session, depending on time constraints.

There are two types of circuits: fixed resistance circuits and individual resistance circuits.

Fixed resistance circuits

In fixed resistance circuits, the resistance and the number of repetitions are fixed. The main advantage of this system is that the time taken to perform the circuit can be recorded to measure progress. For example, a person may perform 20 sit-ups, 20 push-ups, 100 skips, and so on, and time how long it takes to complete each circuit. As the time to complete the circuit falls the person may begin to increase the number of repetitions performed.

Individual resistance circuits

In individual resistance circuits, each exercise is carried out with a fixed resistance for as many repetitions as possible in a given period of time; usually 30 seconds. In some cases, athletes also count the number of repetitions that they perform in the fixed time period. This method allows individual athletes to work at their own pace, and is consequently very popular in commercial fitness centres.

Individual resistance circuits are very popular in commercial fitness centres as they allow individuals to work at their own pace

Where gym equipment is not available to provide resistance, suitable exercises for a circuit training session include sit-ups, push-ups, squat jumps, step-ups, skipping, chin-ups, dips, lateral jumps and 'burpees'. Any other running, jumping, cycling, trampolining, jogging or body-weight lifting activities are also suitable. For variety (or for practice or fun), skills used in the athlete's sport can be added to one of the stations. Fitness centres provide machines that offer resistance to a variety of major muscle groups. The resistance can be varied. Exercises using these machines can be interspersed with some of the other exercises listed above. Individual resistance circuits at gymnasiums are usually performed to music, and a buzzer signifies when it is time to move on to the next station.

practical application

Circuit training

1 a In small groups, design a circuit training course with six to eight stations. The stations should develop aerobic endurance, strength and skills to perform the following physical activities:
- soccer
- dance
- tennis
- cricket.

Design one circuit for each physical activity listed above.

b Perform each of the circuits.

c For each circuit, **analyse** the relevance of the circuit activities to the physical activity for which it was designed.

2 Attend a circuit training session at a local fitness centre or club. **Evaluate** the session with regard to the exercises used, the systems being trained, the principles of training and your general feelings after participating. Who would benefit from circuit training? Why?

Research and Review

1 **Describe** how continuous training can be used in swimming, running and cycling.

2 **Define** the following terms as they relate to interval training:
- a set
- b repetition
- c work–rest ratio.

3 **Outline** the advantages and disadvantages of Fartlek training.

Anaerobic training

Anaerobic training involves activities requiring the use of the two anaerobic energy pathways as the major supply of energy. This means that the activities undertaken need to have a very high intensity, with most activities being undertaken with a heart rate in excess of 85 per cent of its maximum level.

One of the most effective ways to train for the development of the anaerobic system is the use of short intervals (**anaerobic intervals**). As shown earlier, to develop aerobic endurance, intervals are designed to last for at least 4 minutes and rest periods are relatively short. Anaerobic intervals generally range between 10 seconds and 2 minutes, with a work to rest ratio of 1:3, meaning for every 10 seconds you work you rest for 30 seconds. The rest component of interval training, also known as the relief interval, may mean just that (sitting and stretching following the activity) or it may involve some gentle work (such as walking or slow jogging). These ratios can be seen in Table 5.6.

The intervals are performed in sets of repetitions that are designed to overload the anaerobic energy systems. Maximal effort repetitions (those lasting for 10 seconds or less) are designed to improve the ATP-PC stores within the muscles. Slightly longer efforts (those lasting up to 2 minutes) aim to improve the body's tolerance to lactic acid within the blood stream. There is not enough time for all the lactic acid to be removed from the body between repetitions and sets. Therefore, the body will be working with higher levels of lactate in the blood, which will lead to improved tolerance over time.



Figure 5.14 Many teams use anaerobic intervals in their training to develop the speed component their sport requires

Many teams use anaerobic intervals in their training to develop the speed component required by their sport. For example, football teams will spend the early part of preseason training developing an aerobic base within the players and will then design and employ an anaerobic interval program in the weeks leading up to the start of the season to increase the speed and anaerobic endurance of the players before the first game. Table 5.6 outlines the way running and swimming can be used to design anaerobic interval training programs.

More information on anaerobic training can be found in Option 4 (Improving Performance) in this book.

Table 5.6 Pertinent information for writing interval training prescriptions based on training distances

Major energy system	Training distances (m)		Approximate training time (min:sec)	Sets per workout	Repetitions per set	Work–relief ratio	Type of relief interval
	Run	Swim					
Alactacid	50 100	– 25	0:10 <:20	5 3	10 8	1:4 1:3	Rest–relief (e.g. walking, flexing)
Alactacid or lactic acid	200 400	50 100	0:30–0:45 1:20–1:30	4 2	4 4	1:3 1:2	Work–relief (e.g. light to mild exercise, jogging)
Anaerobic: glycolysis or aerobic	600 800	125–150 200	1:45–2:15 2:30–3:00	1 2	5 2	1.2 1:1	Work–relief Rest–relief or work–relief

Data from EL Fox and Donald K Mathews, *Interval Training: Conditioning for Sports and General Fitness*, WB Saunders, Philadelphia

practical application

Anaerobic interval training

Outline an anaerobic interval training program for a sprinter and another for an 800-metre runner.

WEB A website that explains anaerobic intervals can be accessed via www.oup.com.au/pdhpe12

Flexibility training

Flexibility is the ability of joints to bend, stretch and twist through a range of motion without injury. Each joint has a specific range of motion. This range varies from person to person—with elite performers displaying better flexibility than those who are inactive. Thus, the degree of flexibility depends on the person, the joint and the form of exercise in which the person engages (specificity).

Flexibility is important in:

- preventing injuries and muscle soreness
- improving the body's mechanical efficiency
- increasing the ability of muscles to stretch
- improving coordination among muscle groups
- improving the relaxation of muscles
- reducing the tightening of muscles after performance
- counteracting the restricting effects of muscle growth resulting from resistance training.

Within each muscle there exist sensory nerve endings called 'muscle spindles'. The main function of the muscle spindles is to send messages back from the muscle to the brain about the state of the stretch. When a muscle is stretched, the muscle spindles automatically protect the muscle from over-stretching. They do this by counteracting the stretch—a so-called **stretch reflex**. The degree of force exerted by the stretch-reflex mechanism is proportional to the force and speed of the stretch. When these two forces work against each other, the likelihood of muscle tearing increases. To avoid this, muscles must be stretched slowly, and stretches must be held in a pain-free position after a suitable warm-up.



Figure 5.15 Stretches must be held in a pain-free position for 10–30 seconds after a suitable warm-up

Types of stretching

There are four types of stretching: static, dynamic, ballistic and proprioceptive neuromuscular facilitation (PNF).

Static stretching

Static stretching is also called 'passive stretching'. This involves the gradual lengthening of the muscle to a point where it is held for 10–30 seconds. The point at which it is held should elicit a stretched feeling within the muscle. Static stretching is a safe and effective method of stretching muscles and joints because it is slow and sustained, and because it overcomes the stretch-reflex mechanism and allows the muscle to be stretched to its fullest possible length.

Dynamic stretching

Dynamic stretching is also called 'active' or 'range-of-motion' (ROM) stretching. It stretches muscle groups that cross over joints. Dynamic stretching involves the gentle repetition of the types of movements that will be experienced in a performance. It is usually very specific to the performance. Such stretching is commonly carried out in an exercise class to music. First the body is warmed up using rhythmic movements of the large muscle groups. Following the warm-up, the body is stretched to gently take the major joints through their full range of motion before increasing the intensity. An example of this type of stretching is a full lunge where the back knee touches the ground before the next leg is moved forward.

WEB

Websites that display a range of stretching techniques can be accessed via www.oup.com.au/pdhpe12

Ballistic stretching

Ballistic stretching is generally known as 'bounce stretching'. It was very popular in the 1950s and 1960s but has since been discredited because of the damage it causes to muscles. Due to the force of the stretch, the stretch reflex comes into play and places great pressure on the muscle fibres. Extended use of ballistic stretching will, in fact, decrease flexibility. This is because it leaves muscles in a state of contraction and the repair of the micro tears (and, in some cases, macro tears) leads to a further reduction in flexibility. However, ballistic stretching can be useful in some performances where ballistic and explosive actions are required. In these cases it should form part of the third stage of warm-up after a general warm-up, a static stretch period and an active stretch period.

Proprioceptive neuromuscular facilitation (PNF) stretching

Another form of stretch is known as **proprioceptive neuromuscular facilitation (PNF)**. This has emerged from the field of rehabilitation, and is one of the most effective forms of stretching. It is based on two guiding principles:

- A muscle can relax better after it has undergone a maximum isometric contraction as its resistance to stretching is reduced.
- A muscle becomes stronger if its antagonist is isometrically contracted immediately beforehand.

PNF stretching involves:

- a static stretch
- an isometric contraction that is held for 6 seconds
- a further static stretch, which may be assisted.

Due to the nature of the stretch, over-stretching is a possibility. A person performing this form of stretching should therefore watch for a feeling of tension, mild pain or quivering muscles.

The term 'antagonist' refers to a muscle that acts in the opposite direction from the muscle being stretched.

Critical inquiry

Outline why a high degree of flexibility is not desired for all sports.

practical application

Stretching

1 a In small groups, develop one of each of the following types of stretches for each of the major muscle groups in the body:
   - static
   - dynamic
   - ballistic
   - PNF.

   b Demonstrate your stretches to the class after a suitable warm-up.

Strength training

The term 'strength training' implies that **strength** can be improved through training. Strength can be defined as the ability of muscles to exert force. The greatest force that muscles can exert in a single maximal effort is said to be the performer's absolute strength. There is a close relationship between strength and sports performance.

To develop strength, **resistance** must be applied to muscles as they contract. Often strength training is called *resistance training*. This resistance can take the form of:

- the person's own body weight
- barbells or dumb-bells
- weight machine systems
- hydraulic resistance machines
- elastic bands
- water (such as swimming or aquarobics)
- pulleys or levers.

Different sporting activities involve different forms of resistance and require different types of resistance training. A swimmer encounters resistance in the water while swimming, but this type of strength training is vastly different from the training undertaken by a shot putter who needs to lift very heavy weights in a fast, explosive manner.

It is helpful to know some of the jargon associated with strength training:

- **repetitions (reps)**—the number of times an exercise is repeated without rest
- **sets**—the number of groups of repetitions of a particular exercise
- **resistance**—the amount of weight used as a load
- **repetition maximum (RM)**—the maximum number of repetitions that can be completed with a given resistance before fatigue becomes apparent; for example, '6 RM' is performed when only six repetitions can be completed, and not seven
- **rest**—the time necessary for the muscle to recover after periods of overload.

Why do improvements occur after strength training? Strength improves because there is an increase in the size of muscle fibres (**hypertrophy**). This allows for a greater force to be produced during a maximal contraction. In addition to this increase in the size of muscle fibres, connective tissues (such as tendons and ligaments) are strengthened, which makes the athlete more able to resist injury. Another factor in strength training—particularly in explosive-type activities—is the ability to maximise the number of muscle fibres working to produce a movement and to coordinate the timing of their contraction. This allows the muscle to produce greater force. Therefore, strength can be enhanced through adaptations within the muscle and within the nervous system.



Fig 5.16 Gym equipment is often used for strength training

Resistance training can be used in numerous ways to obtain gains in the following:

- *strength*—the ability to exert force
- ***power***—the ability to exert force in a short period of time
- ***endurance***—the ability of the muscle to repeatedly contract against a resistance
- ***muscular bulk***—an increase in muscle tissue leading to an increase in muscle size
- *aerobic conditioning*—the capacity of the heart and lungs to pump blood to working muscles.

Table 5.7 highlights how resistance training can be used to develop different forms of strength.

Table 5.7 Guidelines for an effective resistance training program

Purpose	Weight	Repetitions	Sets	Exercise/speed	Rest
Strength	Advanced: 2–6 RM Beginner: 8–12 RM	2–6 8–12	3–6 2–3	Slow/medium Slow/medium	3–5 mins 2–3 mins
Power	Medium/heavy 6–12 RM	2–10	3–6	Fast	3–5 mins
Endurance	15+ RM	15–30	2–3	Medium	1–3 mins
Lean body mass	4–10 RM	6–20	3–10	Slow/medium	1–3 mins

Adapted from ML Foss & SJ Keteyian, *Physiological Basis for Exercise and Sport*, 6th edn, WCB McGraw-Hill, USA and ‹www.brianmac.demon.co.uk/strength.htm›

The variations in training for each type of strength are dependent on a number of factors. Basically, however, a muscle or muscle group will strengthen only if it has been stressed beyond normal. Therefore, the principle of progressive overload is very important in strength training, as is the principle of specificity.

When a muscle contracts it will tend to shorten. If a force is applied in the opposite direction to the contraction, however, the muscle might stay at the same length or even be lengthened. This other force might come, for example, from other muscles, an immovable object or another person.

WEB

Websites that show the application of strength training programs can be accessed via www.oup.com.au/pdhpe12

Types of contractions

Two types of contractions play a major role in muscle development: static (**isometric**) and dynamic (**isotonic** and **isokinetic**) contractions. Isotonic contractions may be either eccentric or concentric.

Isometric contractions

Isometric contractions occur when tension is developed within the muscle but there is no change in muscle length during the contraction. An example is gripping a squash racquet. There is little or no joint movement as tension is developed in muscles when gripping the racquet. Some other examples include pushing against a wall, pulling against an immovable object and holding a heavy shopping bag.

Because there is no change in muscle length, isometric contractions are specific to particular joint angles. Isometric strength training is useful for developing strength in specific areas. Therefore, coaches need to select angles that are specific to the sport for which the person is training. Sports that require the same position to be held for some time (such as downhill skiing, judo and gymnastics) will particularly benefit from isometric training.

Isotonic contractions

Isotonic contractions are those that cause the muscle length to change as tension is developed within the muscle. These contractions are also known as dynamic contractions. In isotonic contractions the weight is a constant load; that is, the weight does not change as it is moved through a range of motion. But the tension developed within the muscle changes as it moves through the range of motion; for example, doing a biceps curl with a bar bell. Isotonic contractions can be eccentric or concentric.

Eccentric contractions occur when tension is developed in the muscle while the muscle is lengthening. Consider the example of a flexed elbow being pushed down by external force while this action is being resisted by the arm muscles trying to flex the elbow and bring the forearm towards the shoulder. In this example, the resisting muscle will lengthen while contracting.

Concentric contractions occur when tension is developed within the muscle as the muscle shortens during contraction. For example, in the first stage of a biceps curl the biceps shorten. This causes tension to develop in the muscle, allowing the weight to be lifted.

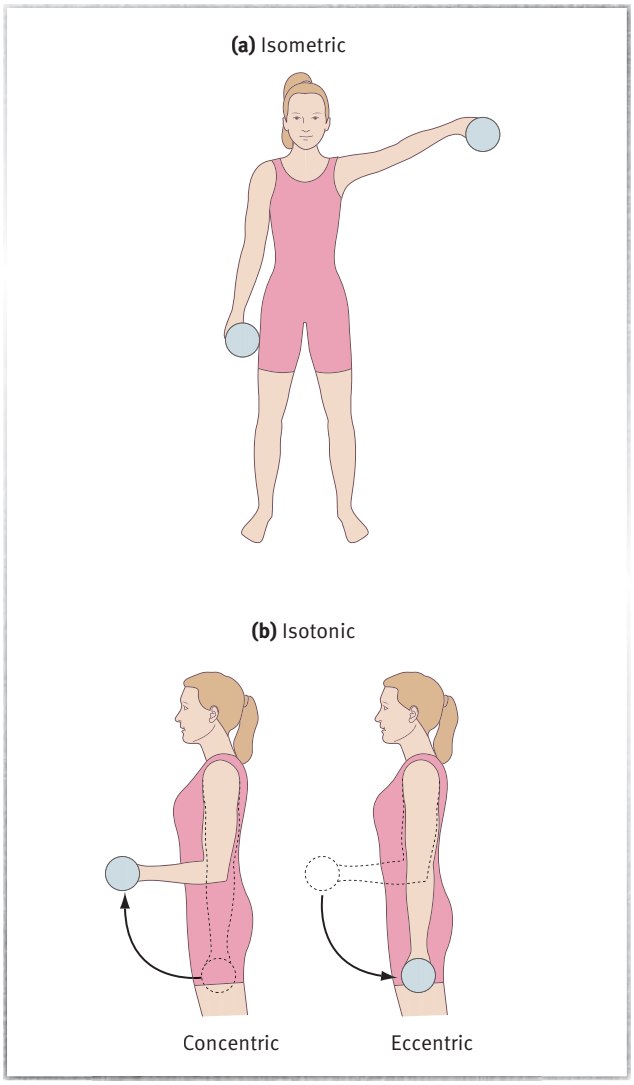


Figure 5.17 Types of contraction: (a) isometric and (b) isotonic (concentric and eccentric)

Isotonic strength training is often called 'traditional' weight training. It uses the body or weight resistance to improve strength. Although the weight is fixed, the tension developed within the muscle varies with the joint angle, and with the efficiency of the lever at the joint. Therefore, although isotonic training is effective, it cannot create the same tension within a muscle through its entire range of motion. This makes it only partially effective.



Isotonic weight training is based on the performance of repetition maximum (RM). As noted earlier, RM is the maximum number of repetitions that can be completed before the muscle is fatigued. The key issue here is fatigue. If the muscle is fatigued it cannot lift the weight. As emphasised earlier, the greatest tension developed within a muscle (when it contracts isotonically) occurs when the muscle is in a lengthened state. Therefore, fatigue is proportional to the degree of tension developed in the muscle in its lengthened state. This limits the effectiveness of training because fatigue is a measure of the muscle's weakest point.

Isokinetic contractions

Isokinetic contractions occur when tension is developed in a muscle throughout its entire range of motion. As the muscle shortens, the resistance is increased to maintain constant tension at all joint angles, and all speeds of movement. Because maximal tension is developed throughout the entire range of motion, a muscle contracted isokinetically is comprehensively fatigued. For this reason, it is the most effective form of training for the development of muscular strength.

Unfortunately, specialised equipment produced by companies such as Cybex and Nautilus is required for isokinetic training. Other machines using the concept of variable resistance have been developed in an attempt to maximise training by providing a variable tension throughout the entire range of motion. Although effective, these machines fail to control the speed of movement. These machines are better known as 'variable resistance machines' rather than as 'isokinetic machines'.



Figure 5.18 Isokinetic contractions require the use of specialised machines that maintain a constant speed of contraction

practical application

Strength training

1 **Propose** an appropriate strength-training program for each of the following athletes:

a a weightlifter
b a sailboarder
c an artistic gymnast
d a boxer
e a 50-metres swimmer.

Each program should include isotonic, isometric and isokinetic exercises.

2 a Undertake a resistance training session at a local fitness centre or within the school using a variety of machines and free weights.

b **Analyse** the way each machine could be used to develop strength.



Research and Review

1 **Distinguish** between static stretching and ballistic stretching.
2 **Describe** proprioceptive neuromuscular facilitation.
3 **Explain** the differences between strength training, power training and muscular endurance training.
4 **Discuss** the uses of static stretching and dynamic stretching to improve flexibility in rhythmic gymnastics, hockey goal-keeping and javelin throwing.

Principles of training

A major objective of training is to improve performance. The body has the ability to respond to physiological and environmental stressors and to adapt to them. This adaptation occurs over time and with practice and often leads to improved performance. Training programs are designed to challenge athletes mentally and physically in the pursuit of improving their exercise capacity and efficiency. The following principles can be applied to all types of training to improve performance:

- progressive overload
- specificity
- reversibility
- variety
- training thresholds
- warm-up and cool-down techniques.

Each of these will be considered in the coming pages. Two other terms you will need to understand are *maximal effort* (or work) and *sub-maximal effort*. These terms are used at various times throughout this text:

- Maximal effort refers to exercise at the highest intensity possible, which can only be maintained for a short period of time (such as sprinting).
- Sub-maximal effort refers to exercise at a rate less than maximal intensity, which can be maintained for a longer period of time (such as jogging).

It is often impossible to make an all-out effort for an extended period of time. Therefore, it is useful to use tests of sub-maximal intensity in order to predict maximal intensity.

Progressive overload

Every cell in the body is sensitive to various forms of stress, and is able to make a response. As you sit there reading, 2–3 million of your red blood cells are dying (and being replaced) and your muscle cells are repairing themselves. When you train or exercise, your cells are being damaged and your body's resources are being used up; for example, ATP-PC, water and salts. That is why you feel weaker and more tired (rather than stronger) after a work-out, run, game or swim. How much weaker you feel after exercise depends on the intensity and duration of the exercise.

The cells of the body work to maintain **homeostasis**, which is the tendency of the body to maintain its internal environment at normal levels. Two responses occur: a repair response and an adaptation response. The second of these is a response that helps the body to adapt and respond better next time. This will minimise future damage and ensure that next time you do not feel as weak and tired.

The basic principle of **progressive overload** is that a training effect is produced when the system (for example, the cardiovascular system) or tissue (for example, muscle tissue) is worked harder than it is accustomed to working (that is, when it is 'overloaded'). As the body adapts to the new levels, training should continue to be progressively increased. This progressive overloading, over time, will produce greater maximal efforts in the system or tissues being trained.

Considerable stress must be placed on the system or tissue so that improvements can occur. Light, regular training will not achieve this. If gains are to be made, weights must become progressively heavier, running must become longer and training sessions must be harder. If there is too much overload, injuries can result; if there is too little, the training effect will decrease.

Specificity

The principle of **specificity** states that the type of exercise being used in training should be specific to the:

- task requirements
- energy systems required in the task
- muscle groups required in the task
- components of fitness involved in the task.

For example, to be competitive in their chosen sport, marathon runners need to develop the aerobic energy system—using leg muscles (not shoulders). A discus thrower needs to develop the ATP-PC system to throw while, at the same time, developing the shoulder, back and arm muscles specific for throwing and power. To put it simply—cycling isn't running, and rowing isn't swimming.

There is a place for cross-training; that is, training that is not specifically designed for the primary sport being pursued. Cross-training helps with:

- motivation
- maintaining an aerobic base
- avoiding or recovering from injury
- assisting with muscular balance.

Cross-training is a supplement to specific energy system training, however, and not a substitute for it.



Figure 5.19 Discus throwers need to develop the ATP-PC system to throw and also develop the shoulder, back and arm muscles specific for throwing and power

Reversibility

The effects of training are reversible. That is, if a person stops exercising (or fails to exercise often enough or hard enough), the training effects will be quickly lost, and the person's performance will decline. **Reversibility** is evident in aerobic and anaerobic fitness, power, strength, muscular endurance and flexibility. After only one to two weeks of stopping or reducing training, significant physiological reductions can occur. Developing a maintenance program that is designed to maintain (but not improve) training levels can halt (or reduce) the degree of fitness lost. Many athletes engage in such a program during the off-season to maintain their fitness until the next season begins.

Variety

To become proficient at most sports, athletes need to train for many hours every week and over a number of years. This training can often become repetitious and boring, especially if the training is for endurance-type events or for activities involving few technical skills; for example, swimming, running or cross-country skiing. Astute coaches and athletes will vary training sessions to minimise the boredom. Unlike overload, **variety** of training is not absolutely necessary to improve performance. Variety does make training more interesting and fun, however, while achieving training goals.

Training programs should take into account the individual athlete's current fitness level, injuries, interests, needs and skill level. Different training methods will be appropriate for different circumstances; for example, for an athlete recovering from an injury or for a young performer.

Some examples of variety in training include:

- warm-ups using similar sports; for example, netball at touch football training
- group or paired training sessions to provide a change in routine.

The key is to achieve the original training goals while maintaining interest.

Training thresholds

Training thresholds offer an explanation for the complex physiological changes that occur in the body in producing or maximising the training effect. Training thresholds are usually explained in terms of the maximum heart rate in relation to the volume of oxygen uptake (VO_2). During exercise, the following three factors become important in relation to training thresholds:

A threshold is a starting point for a new state or experience.

- *heart rate*—the rate at which the heart beats is usually measured in beats per minute (bpm)
- *ventilation*—the amount of air breathed in one minute
- *blood lactate*—the by-product of the lactic acid system.

All these increase in proportion to the intensity of exercise.

It was thought that when athletes exercise at a steady state, or with slightly increasing intensity, most of the ATP produced comes from aerobic sources. However, scientists found that as exercise increases there is an even increase in the amount of lactic acid in the blood. This appears to be related to *maximum oxygen consumption* (max VO_2), which is the greatest volume of oxygen used by the cells of the body per unit of time.



Figure 5.20 Varied training programs incorporating different sporting activities makes training more interesting

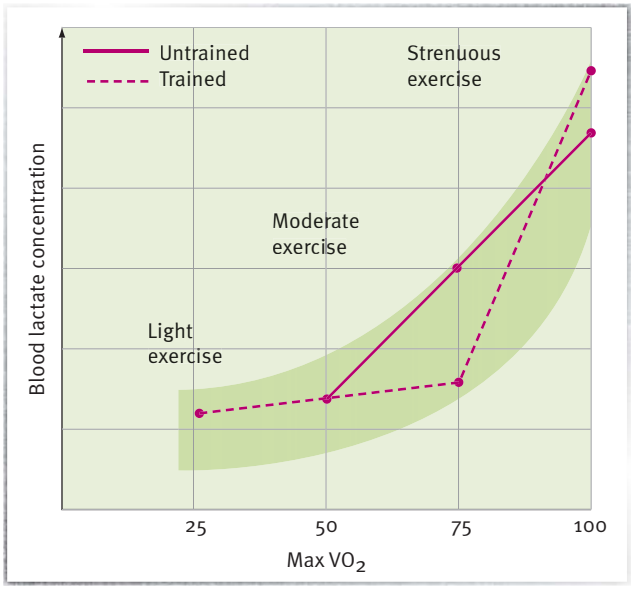


Figure 5.21 Changes in lactate concentration with increasing exercise for trained and untrained subjects

This increase in lactic acid occurs in untrained athletes at around 50–60 per cent of max VO2, and in trained athletes at about 60–85 per cent of max VO2. This sudden rise in lactic acid represents an increasing reliance on the anaerobic energy system. Figure 5.21 shows the inflection point at which this occurs for trained and untrained athletes.

The point where lactic acid begins to accumulate can be described as the **anaerobic threshold**. The anaerobic threshold can be defined as that workload intensity (or level of oxygen consumption) at which anaerobic metabolism is increased; that is, when lactic acid starts to accumulate in the blood and muscles. The threshold is the maximum speed or effort that an athlete can maintain and still have no increase in lactic acid. Activity over this limit produces deterioration in performance.

The topic of anaerobic threshold is greatly studied and discussed in exercise physiology. There is argument over the accuracy of the name. Many suggest that *lactate threshold (LT)* or *onset of blood lactate accumulation (OBLA)* is a more precise term because anaerobic energy is produced even at rest, meaning that lactic acid is formed and removed continuously. The basic argument against the term 'anaerobic threshold' is that there is uncertainty as to whether the rise in blood lactic acid is due to lack of oxygen in the muscles or a result of other causes. These other causes have been measured, and are valid for describing the inflection point. They include:

- accelerated glycolysis (that is, the conversion of glucose and glycogen to pyruvic acid in the lactic acid system)
- increased use of fast-twitch muscle fibres (more fast-twitch activity leads to more lactic acid production)
- reduced rate of lactic acid removal (that is, lactic acid is produced and removed from the body, but when production exceeds the rate of disappearance, lactic acid accumulates in the blood).

It is possible that any one of the above, or a combination of factors (including lack of oxygen), might explain the LT or OBLA.

It is useful for athletes and coaches to know the inflection point at which LT/OBLA occurs. This information can help to place athletes in specific endurance events. It is a better indicator of aerobic endurance performance than is max VO2, and it can determine training intensities for optimal improvements in aerobic endurance. The major limitations of using LT to improve performance are:

- It is difficult to measure.
- It requires blood tests and takes a long time.
- There is no real proven benefit in training at this level.
- Athletes differ in their rates of reaching LT.

The **aerobic training threshold** is the intensity at which an athlete needs to work to produce an aerobic training effect or a physiological improvement in performance; that is, an improvement in the body's ability to use oxygen during exercise. This occurs at about 70 per cent of the person's maximum heart rate, or at approximately 50–60 per cent of that person's max VO2. As exercise intensity increases, so do heart rate, ventilation and blood lactate. In fact, aerobic threshold can be defined as the training rate at which the baseline lactic acid level starts to rise. At this level of exercise, the person can conduct a conversation comfortably. Therefore, as Figure 5.22 shows, to obtain an aerobic training effect an individual should exercise in the aerobic training zone; that is, between the aerobic and lactate thresholds.

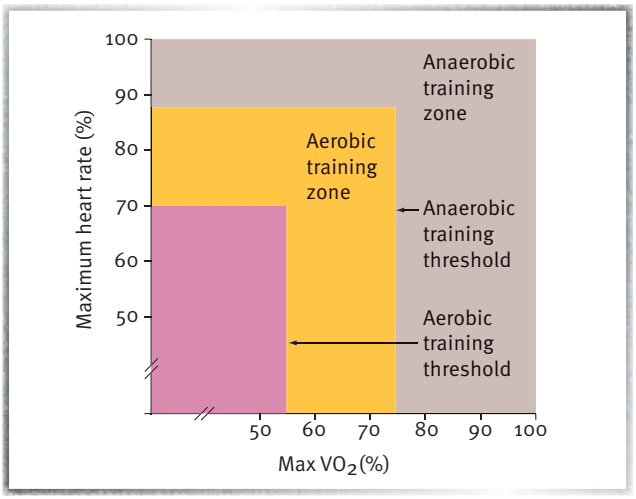


Figure 5.22 Aerobic and anaerobic threshold training zones

Critical inquiry

1 **Discuss** the term 'anaerobic threshold'. Use the answers to the following questions to help formulate your response:

- **a** What are the main issues surrounding the use of the term 'anaerobic threshold'?
- **b** Why is this term not totally acceptable to all?
- **c** Which term do you prefer, and why?

Warm-up and cool-down techniques

Warming up and cooling down are important components of all training and performance sessions.

Warm-up

The **warm-up** involves warming up the body to prepare for the activity that is to follow. The warm-up increases blood flow to working muscles. This causes an increase in body temperature, which makes the muscles, ligaments and tendons more supple and elastic. The increase in elasticity within body tissues reduces the possibility of a muscular tear causing injury. The warm-up should also provide an opportunity to activate the motor neurons that may be required during the performance. A warm-up and cool-down is necessary for all types of training and performance.

A warm-up should include three stages:

- a general warm-up
- stretching
- a specific warm-up.

General warm-up

The general warm-up involves a gentle use of the large muscle groups in a rhythmic manner. This will raise the heart rate, and should involve a progressive increase in intensity. A good indication that the body is adequately warm is the appearance of sweat on the forehead.

Stretching

The stretching stage of the warm-up involves stretching the major muscle groups in a slow manner. Each stretch should be held (without bouncing) for a period of 10–30 seconds. This is followed by a similar routine in which the specific muscles that will be used are also stretched, and then also held (without bouncing) for a period of 10–30 seconds. Some dynamic stretching has also been shown to be useful in preparing muscles for training or performance.

Specific warm-up

The specific warm-up stage involves practising performance-like activities that progressively increase the heart rate and use the muscles and ligaments involved. It should also incorporate the skills that will need to be used. This will help to activate the motor neurons required for the performance.

Cool-down

The **cool-down** is effectively the same as the warm-up, but in reverse. The cool-down allows for the active recovery mentioned earlier in this chapter and gives the body time to return blood to the heart, rather than letting the blood pool in the muscles. This allows the oxygenated blood to 'flush out' the waste products that form during activity and begin to rebuild the energy stores required for the next performance.

The cool-down should include a period of stretching that enables working muscles to be stretched to their original length, thereby reducing muscle soreness and aiding recovery.

practical application

Flexibility

1 Working in pairs, perform the following in order:
   - a Measure your lower back and hamstring flexibility by using the sit-and-reach test. Hold the stretch for 5 seconds, after no warm-up.
   - b Jog slowly around an oval, progressively increasing the intensity until sweat begins to appear on your forehead.
   - c Measure your lower back and hamstring flexibility again.
   - d Perform a series of lower back and hamstring stretches. Perform at least four stretches, holding each one for 30 seconds.
   - e Measure your lower back and hamstring flexibility again.

2 Compile your results from task 1 in a table and graph, and then complete the following tasks:
   - a **Explain** the reasons for the differences in the three scores.
   - b **Propose** strategies to improve the final score.

Critical inquiry

Examine what would happen if we had no elasticity in our joints or muscles.

Research and Review

1 **Explain** each of the following principles in your own words:
   - a progressive overload
   - b training thresholds
   - c variety
   - d specificity
   - e reversibility.

2 **Investigate** the way in which a team or individual conducts a cool-down following a sporting activity. Discuss the benefits the team or athlete gains from the cool-down undertaken.

3 **Propose** a warm-up for a team sport you have experienced.

Application of training principles

The basic principles of training can be applied, in varying degrees, to all types of training, including aerobic, anaerobic, strength or flexibility. When designing training programs for various sports or activities it is useful to know the predominant energy system that is involved. This will help to determine the type of training that will best improve performance.

As noted earlier, length and intensity of performance are the main factors that determine the energy system used. A number of sports have periods of intense all-out activity interspersed with long periods of relatively low activity. For example, running to make a tackle in hockey involves intense all-out exertion, whereas waiting for a short corner to be played involves relatively low activity. Hockey players therefore need a good aerobic base and so should not spend 80 per cent of their time in anaerobic training.

To train the body *anaerobically*, training needs to be of near maximum intensity and of short duration. To overload the anaerobic system you could increase the length of the sprints being undertaken or include more repetitions of sprints. Intensity can be determined by heart rate, pace or lactate threshold, or any combination of these. Frequent training sessions—perhaps four times per week—for a duration of 8–10 weeks are suggested.

Developing *aerobic* conditioning relies on similar principles to those of anaerobic conditioning. The main differences lie in the intensity of training and the duration of the work sessions. Increasing the distance or lowering the time to complete a set distance is an effective way to overload the aerobic energy system.

The overload and specificity principles are easily applied to strength training too. Strength exercises should be specific to the predominant energy systems involved and to the specific muscles and movement patterns required. Gains in strength are more pronounced if the muscles are progressively overloaded. This may be done by increasing the number of times a single weight is lifted and then, over time, increasing the weight—and then repeating this program. There are many more ways by which this can be done and they are discussed in more detail in Option 4 Improving Performance.

Stretching should be carried out on the specific muscles, tendons and ligaments that will be used in the sport or activity. Such activity should use a variety of techniques that stress these structures comfortably through the full range of movement needed. Improvements in flexibility do occur with practice and overload, but they are also reversible, as for all types of training effects.



Figure 5.23 Hockey players need a good aerobic base as their sport has periods of intense activity interspersed with periods of relatively low activity

Critical inquiry

1 a Using a table such as the one below, **propose** ways in which the principles of training can be applied to aerobic and strength training. Suggest one sporting activity that relies heavily on aerobic training and then one that requires strength training.

	Overload	Variety	Specificity	Thresholds	Warm-up	Sport
Aerobic						
Strength						

b **Describe** a basic exercise that might be used to improve performance and shows how the principle of training can be applied to the sport.

Physiological adaptations in response to training

When people undertake any type of training their main aim is to change some aspect of their body so that their performance improves. Whether they are undertaking strength training, aerobic training or anaerobic training or attempting to increase their flexibility, the process of training leads to changes in the body. These changes can influence future performances.

Many of the changes occur to the **cardiorespiratory system** and lead to an improved ability to deliver oxygen to working muscles, more efficient energy production and a greater ability to remove waste products. Other changes relate to the size and recruitment of the muscle fibres that produce the movements required when performing physical activity.

This section of the chapter will look at a series of **adaptations** that are experienced by the body following specific types of training and how these adaptations can lead to improved performance.

Before we begin to examine these changes, a number of terms need to be explained. These are rest, sub-maximal exercise and maximal exercise.

Rest is a state where no extra demands are placed on the body. Energy requirements are for the maintenance of normal bodily functions, such as breathing, heartbeat and digestion. This minimal level of energy is known as our **basal metabolic rate.**

Sub-maximal exercise is exercise performed at a level that leaves the heart rate in a plateau (a consistent rate for an extended period of time) below its maximum number of beats per minute. Generally, this level of exercise can be maintained for more than 20 minutes at a time. Jogging, lap swimming and road cycling are all examples of sub-maximal exercise. Tests such as the Queens College Step Test (see page 111) are also undertaken at a sub-maximal level so that improvements in fitness can be measured using a reliable test.

Maximal exercise is activity that leads to a heart rate that approaches its maximal level; that is, 220 BPM – age. Sprinting (100 to 400-metre running) and 100-metre swimming are examples of maximal exercise.



Figure 5.24 Jogging is an example of sub-maximal exercise



Figure 5.25 Sprinting is an example of maximal exercise

Resting heart rate

Heart rate is measured in beats per minutes and at rest will beat enough times per minute to deliver oxygen via the blood stream to all the cells of the body. This minimum requirement for oxygen is reflected by the resting heart rate. The amount of oxygen required at rest is determined by your basal metabolic rate. Your level of fitness does not have a significant influence on this requirement.

When you undertake an aerobic training program your heart will undergo a significant change and this can lead to a reduction in the number of beats required to meet the needs of the body at rest. In other words, your resting heart rate will fall as your body adapts to the training program being undertaken. Your heart rate will also be lower while undertaking sub-maximal work, such as a step test or other exercises where the same amount of work needs to be performed.

The main reason for the fall in resting heart is the increase in stroke volume (see Fig 5.26). This increase allows more blood to be pumped out for every beat the heart makes. Therefore, to deliver the same amount of oxygen to the body, fewer beats will be made. For example, an individual who has a resting heart rate of 72 beats per minute prior to a training program and a stroke volume of 70 mm per beat will have a cardiac output (see Fig 5.26) of 5.04 litres per minute. This amount of blood represents the basal metabolic rate for the individual. Following an aerobic training program, the individual's stroke volume may rise to 80 mm per beat. This would lead to a resting heart rate of 63 bpm, which is a fall of nine beats per minute (even though the person's cardiac output remains at 5.04 litres per minute).

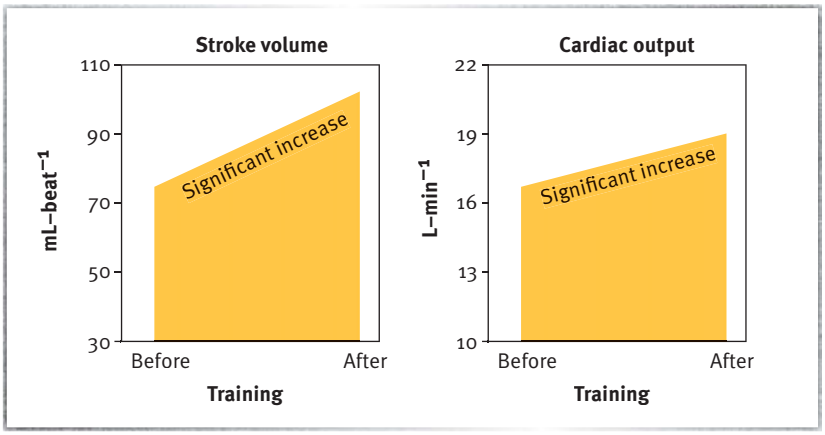


Figure 5.26 Changes to stroke volume and cardiac output during maximal work as a result of aerobic training

Resting heart rate and heart rate during sub-maximal work both fall as a result of aerobic training. However, heart rate during maximal exercise will be the same for both trained and untrained individuals. The difference is that the trained person is capable of doing a lot more work at a maximal level than is the untrained person.

Stroke volume and cardiac output

The total amount of blood to leave the heart has a direct effect on the individual's performance. The stroke volume of the heart and its cardiac output will determine the amount of blood being circulated and how much oxygen will reach working muscles.

Stroke volume

Stroke volume is the amount of blood that leaves the left ventricle each time the heart beats. The ability of the heart to push oxygen-rich blood into the arteries and towards working muscles is the biggest factor affecting an aerobic-based performance. The more blood that the heart can push out, the more work an individual will be able to do. The person will be able to exercise longer and faster.

Stroke volume is determined by a number of factors associated with the heart. These include the:

- size of the ventricles
- thickness of the ventricle walls
- flow of blood through the veins back to the heart
- volume of blood in the body.

Aerobic training has a positive effect on stroke volume and, therefore, on an individual's potential to perform aerobically. Training causes the physical size of the heart and ventricles to increase. Additionally, the walls of the ventricles will become thicker and therefore stronger. These two factors allow more blood to enter the heart as it is now bigger and the stronger walls allow much more of the blood to be ejected each time a beat occurs.

When combined with an increase in blood volume, lower blood pressure and an improved ability to move blood through the veins back to the heart, a rise of 25 per cent in stroke volume can be achieved through aerobic training. That is, if stroke volume was 72 millimetres per beat prior to undertaking an aerobic training program this could be increased to 90 millimetres following a program. This increased stroke volume leads to higher cardiac output, more blood going to working muscles and improved performance in endurance events.

Stroke volume will increase regardless of whether exercise is being undertaken. At rest, stroke volume increases and this leads to the resting heart rate falling and cardiac output remaining steady. During sub-maximal exercise, stroke volume will have increased, resulting in a lower heart rate (again, cardiac output will remain steady). At maximum levels the increased stroke volume will lead to a large increase in cardiac output. It is this ability to deliver more blood to working muscles that improves performance for an individual following training.

Cardiac output

Cardiac output is the amount of blood leaving the heart each minute. To determine cardiac output (Q), multiply stroke volume (SV) by the number of times the heart beats (HR) per minute (Q = HR x SV). Cardiac output reflects the ability of the heart to deliver oxygen-rich blood to working muscles. This oxygen enables the aerobic energy system to produce ATP and therefore to maintain movement.

As discussed above, during rest and sub-maximal work, undertaking an aerobic training program does not change cardiac output results. This is because the energy demands are unchanged and the same amount of blood (oxygen) is required. The biggest change occurs during maximal exercise. As the maximum heart rate will be the same for a trained or untrained individual (that is, 220 – age), the greater stroke volume will lead to an increase in the cardiac output.

Table 5.8 shows us how a trained individual is able to deliver more blood to the working muscles: 19 litres per minute after training compared with 16.5 litres per minute before. This change is what has improved the individual's potential following a training program.

Table 5.8 Cardiac output for trained and untrained individuals

	Volume of blood (L/min)	
Exercise level	**Untrained**	**Trained**
Rest	5.04	5.04
Sub-maximal	13.3	13.3
Maximal	16.5	19.0

Oxygen uptake and lung capacity

The ability of the body to move oxygen into the blood stream and remove carbon dioxide from it is not only determined by the heart and its functioning. The size of the lungs and the ability of the blood to absorb and carry the oxygen to the working muscles are also important aspects of performance.

Oxygen uptake

Oxygen uptake is the amount of oxygen absorbed into the blood stream during exercise. As discussed earlier, if more oxygen reaches working muscles then they will be able to work for longer at a higher level. Improving this capacity is one of the goals of aerobic training.

Oxygen uptake is measured in litres per minute. Over many years, exercise physiologists (those who study the effects of exercise on the body) have determined how much oxygen is required to perform various activities. By using standard tests, such as the Queens College Step Test (see the Practical Application task on page 111) you can work out what your maximum oxygen uptake is. This figure is known as your max VO2 (maximum volume of oxygen).

The higher your max VO2 becomes the better your aerobic system is functioning, and this will lead to an improved performance in aerobic events.

For reasons shown earlier, the demands placed on the body during rest and sub-maximal exercise are unchanged as a result of aerobic training. During maximal efforts, the difference in oxygen uptake can be shown. Before training an individual may have a max VO2 of 2.5 litres per minute. After training this figure may rise to 3.2 litres per minute. Once again, the rise in the ability to deliver oxygen to the working muscles causes the improvement in performance after training.

Oxygen uptake improves following a training program for a number of reasons. These include the factors already discussed (such as improved stroke volume and cardiac output) as well as greater lung capacity and higher haemoglobin levels within the blood. All these capacities, when combined, allow the increased flow of oxygen-rich blood to working muscles.

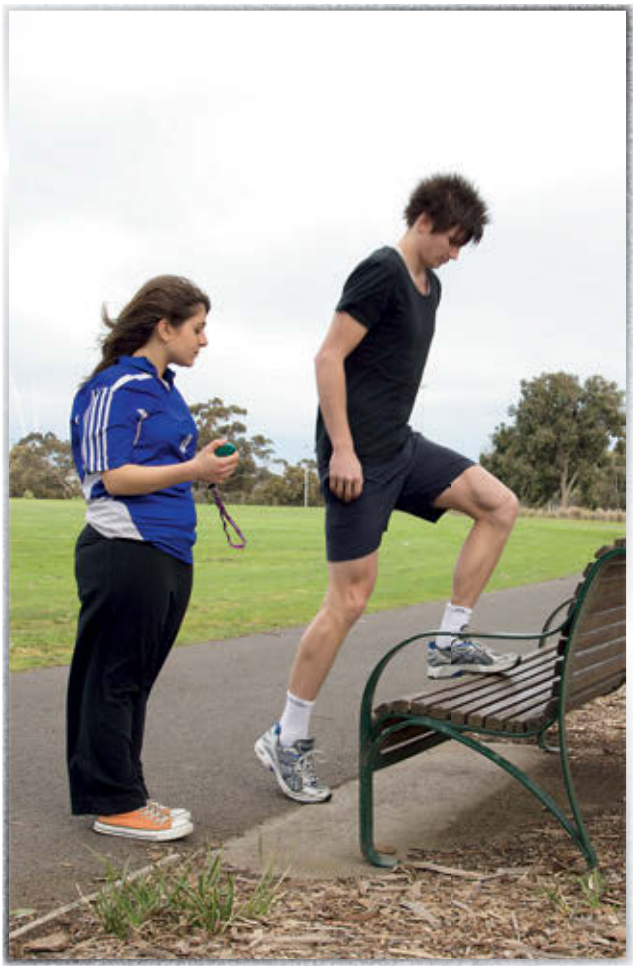


Figure 5.27 The Queens College Step Test is used to measure oxygen uptake

Lung capacity

Lung capacity is the amount of air that can move in and out of the lungs during a breath. Many measures can be made of lung function, including tidal volume and vital capacity. The basic principle that needs to be understood is that the greater the volume of air that can be inhaled and exhaled during exercise the greater the amount of oxygen that can be absorbed into the blood stream. More oxygen leads to improved performance during aerobic work.

A number of adaptations associated with lung function occur as a result of aerobic training. Four of these are described below.

The number of breaths that can be taken during maximal exercise can be increased. As the muscles around the lungs become larger and stronger they can work faster. Maximal breathing rates can increase from 40 to 50 breaths per second as fitness develops.

The size of the lungs increases slightly, which allows for a greater volume of oxygen to be inhaled and carbon dioxide to be exhaled per breath. As the muscles are stronger a greater amount of the air inside the lungs can be exhaled each breath, leading to a greater turnover of the air as well.

The total amount of air breathed during exercise can increase as a result of training. The increase in lung size and the ability to breathe faster and more fully, allows pulmonary ventilation (the total volume of air moving through the lungs) to increase by up to 15 litres per minute.

The number of **capillaries** in the lungs will increase with training, allowing more oxygen to be absorbed with each breath taken in. In fact, with training, the volume of blood held within the capillaries of the lungs can rise by up to 80 per cent.



With training, the volume of blood held within the capillaries of the lungs can rise by up to 80 per cent.

Table 5.9 Predicting max VO2 from recovery heart rate

Percentile ranking	Recovery HR, female	Predicted max VO2 (mL/kg min)	Recovery HR, male	Predicted max VO2 (mL/kg min)
100	128	42.2	120	60.9
95	140	40.0	124	59.3
90	148	38.5	128	57.6
85	152	37.7	136	54.2
80	156	37.0	140	52.5
75	158	36.6	144	50.9
70	160	36.3	148	49.2
65	162	35.9	149	48.8
60	163	35.7	152	47.5
55	164	35.5	154	46.7
50	166	35.1	156	45.8
45	168	34.8	160	44.1
40	170	34.4	162	43.3
35	171	34.2	164	42.5
30	172	34.0	166	41.6
25	176	33.3	168	40.8
20	180	32.6	172	39.1
15	182	32.2	176	37.4
10	184	31.8	178	36.6
5	196	29.6	184	34.1

FI Katch, VL Katch and WD McArdle, *Nutrition, Weight Control and Exercise*, Philadelphia

Queens College Step Test

The Queens College Step Test can be performed to experience some of the physiological responses to aerobic exercise.

Equipment

- Steps or bench with a height of 40 centimetres
- Metronome
- Stopwatch

Procedure

1. Set the metronome to a cadence of 88 steps per minute (22 complete step-ups) for women and 96 steps per minute (24 complete step-ups) for men. (A complete step-up is up with one foot, then the other, then one down, then the other.)
2. Subjects take their pulse rates before a warm-up. Have a 15-second step-up warm-up, then commence the test, which will be performed for 3 minutes.
3. At the end of 3 minutes, subjects stop and measure their pulse. Take the pulse for 10 seconds then multiply it by 6. Find the corresponding pulse rate in Table 5.9 and determine the predicted max VO2 for males and females.

practical application

Queens College Step Test

1 Perform the Queens College Step Test, then complete the following tasks:

- a **Outline** the advantages and disadvantages of the Queens College Step Test.
- b **Discuss** whether this test is a reliable way to measure max VO2.

2 a Research and participate in another sub-maximal exercise test.

- b Analyse the similarities and differences between the above test and the Queens College Step Test.

Haemoglobin level

Haemoglobin is a protein found within red blood cells. Its main function is to absorb oxygen at the lungs and carry this oxygen to the working muscles via the blood stream. The make-up of haemoglobin allows it to absorb oxygen at a very fast rate and this leads to an efficient transportation system for oxygen within the body. It also plays some role in the removal of carbon dioxide from working muscles, but this function is not as important as its role in the delivery of oxygen.

When training takes place, cells within the body become short of oxygen. One of the ways the body adapts to this is to produce more red blood cells and haemoglobin. This allows the needs of these cells to be more easily met. While it is not a large increase, it will improve the ability of the individual to absorb and deliver oxygen to working muscles and this will improve performance in aerobic events.

Many athletes try to boost their haemoglobin level through altitude training. The greater the distance from sea level the lower the amount of oxygen in the air. As a result, the cells in the body receive less oxygen. This causes the body to produce more haemoglobin so that the body can absorb any oxygen breathed. The same effect has been achieved by some athletes who spend time in tents that limit the supply of oxygen and produce the same effect as climbing in altitude.

Muscle hypertrophy

Muscle hypertrophy refers to the increase in the diameter of a muscle; that is, 'bulking up'. This occurs as a result of strength or resistance training and, unlike the adaptations discussed above, not as a result of aerobic training.

Muscles fibres enlarge after training due to a number of reasons. These include the production of more myofibrils (the contractile part of the muscle). The fibres also enlarge due to the increased stores of glycogen and the energy-supplying compounds of ATP and phosphocreatine (PC).

Muscle hypertrophy will occur if an athlete lifts medium to heavy weights during training, such as training for strength, power or a lean body mass (see Table 5.7, page 99). The heavier weights being lifted will cause the muscles to undergo a significant amount of stress. This enlarges them so that the next time they work they are better prepared for the task; that is, they have adapted.



Figure 5.28 Muscular hypertrophy is the result of body building

As with other adaptations that occur as a result of training, hypertrophy takes time to develop, and reversibility (muscular **atrophy**) will occur when training ceases. Muscular endurance training (lifting light weights a large number of times) will assist in reducing the level of fat around the muscle and this will lead to muscular definition but not muscular hypertrophy.

After undertaking a resistance training program, muscles are capable of contracting with a greater force as more myofibrils are contributing to the contraction. This will improve performance in strength-related and power-related sports, such as throwing and sprinting.

Effect on fast-twitch and slow-twitch muscle fibres

Muscle fibres can be classified in three ways:

- red slow-twitch fibres—contain a large number of capillaries and produce a large amount of ATP slowly
- red fast-twitch fibres—contain some capillaries and can rapidly produce ATP but fatigue faster than slow-twitch fibres
- white fast-twitch fibres—contain few capillaries and rapidly generate ATP anaerobically.

The amount of each type of fibre in a muscle will depend on the normal function and use of the muscle. A long-distance runner may have up to 75 per cent of muscles as **slow-twitch muscle fibre**, while sprinters may have up to 80 per cent fast-twitch muscle fibre. Undertaking training that is specific to the requirements of your sport will assist in the development and adaptation of each of the muscle fibre types.

The development of slow-twitch muscle fibres is enhanced through participation in endurance-type activities, such as running, swimming and cycling. These activities encourage the creation of capillaries inside the muscle cells. This allows a greater transfer of oxygen into these muscles when they are working. This type of activity can also result in some fast-twitch muscle fibres being transformed into fibres that utilise oxygen to provide energy. The development of these muscle cells leads to improvements in aerobic endurance and higher levels of performance in events such as triathlon and road cycling.

Sports such as weightlifting and other power events, including jumping and sprinting, require the development of **fast-twitch muscle fibres**. These fibres can be trained by undertaking the same type of training that creates muscular power; that is, lifting medium to heavy weights quickly. For example, 100-metre sprinters will train the fast-twitch muscle fibres in their legs by undertaking power squats in which they jump off the ground at the conclusion. This type of training will not only increase the capacity of the fast-twitch cells already present in the muscle but will cause some of the red muscle fibres to transform into white fast-twitch fibre. By increasing the volume of this type of muscle fibre, future contractions can be made more quickly and anaerobic sources of energy will be utilised for longer.

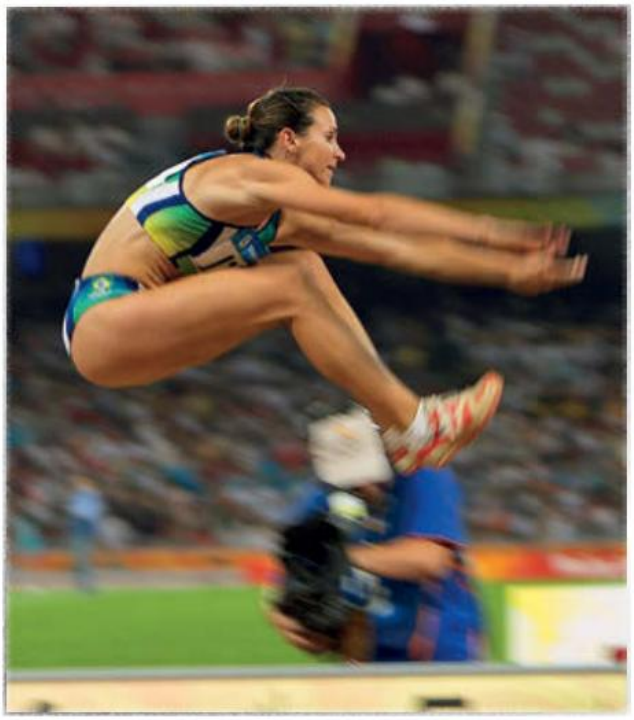


Figure 5.29 Long jumping requires the development of fast-twitch muscle fibres

practical application

Fast-twitch muscle training

Working in pairs, design a weight training program for sprinters that will lead to the development of fast-twitch muscle fibres in their legs. Be specific with the types of exercises they should undertake and the way in which they should be completed.

Research and Review

1 **Explain** the link between the development of the cardiovascular system and the improvement in endurance activities. In your explanation, include a paragraph on each of the following:
   - a stroke volume
   - b cardiac output
   - c oxygen uptake
   - d lung capacity.

2 **Analyse** the application of the principles of training to a training program designed to create muscular hypertrophy.

3 **Examine** the need for an endurance athlete to undertake short-interval training.

4 **Evaluate** the effect of aerobic training on the ability of the body to deliver oxygen to working muscles.

how does training affect performance?

chapter summary

- The source of energy for muscle contraction is adenosine triphosphate (ATP).
- Three energy systems are used to resynthesise ATP: ATP-PC, lactic acid and aerobic.
- Each energy system provides energy and recovers at different rates, creates a range of by-products and can contribute to energy production for different periods of time.
- Aerobic training can include continuous activities, such as running, swimming, circuit training and long-interval training. It is designed to improve the ability of the cardiovascular system to deliver oxygen to working muscles.
- Anaerobic training involves high-intensity, short-duration exercise (such as interval training) designed to improve the two anaerobic energy pathways.
- Flexibility training includes techniques such as static, ballistic, dynamic and proprioceptive neuromuscular facilitation (PNF).
- Strength training utilises weight and hydraulic machines or other devices, such as elastic bands, to provide a resistance against which a muscle can contract. It is designed to improve the amount of force that can be exerted by the muscle during a contraction.
- The design of a training program needs to include the principles of training, which are progressive overload, specificity, reversibility, variety, training thresholds and a warm-up and cool-down.
- All training is undertaken with the goal of causing the body to adapt in some way so that an improvement in performance can be achieved at a later time.

revision activities

1. **Predict** the changes to muscle fibre composition of continuous training.
2. **Explain** how ATP provides energy for muscular contractions.
3. **Construct** a list of sports that would benefit from isometric, isotonic and isokinetic training.
4. **Describe** the process of muscle hypertrophy.

extension activities

1. **Identify** aerobic training activities that will benefit a 100-metre swimmer.
2. Imagine you have been approached by a friend who is going to open a new gym in your town or suburb. **Recommend** a range of equipment that would benefit the development of strength for the gym's customers.
3. **Analyse** the use of flexibility training to improve performance in a team sport of your choice.
4. Observe the table below showing an interval training program. **Evaluate** its effectiveness for a 1500-metre runner.

Interval	Rest
10 x 40 m	30 secs
5 x 80 m	1 min
4 x 100 m	1.5 mins

exam-style questions

1. **Identify** the by-products of energy production for the lactic acid and aerobic energy systems. (3 marks)
2. **Distinguish** the roles that interval training can play for aerobic and anaerobic performance. (8 marks)
3. a **Describe** four principles of training. (4 marks)
   b **Analyse** how these can be applied to a program designed to develop muscular hypertrophy. (8 marks)
4. a **Outline** the adaptations that can occur as a result of aerobic training. (4 marks)
   b **Explain** how these adaptations lead to an improvement in performance. (6 marks)

chapter 6

how can PSYCHOLOGY affect performance?

It is commonly accepted that mental preparation for athletic pursuits is essential for best performance, and that athletes generally perform better with knowledge and application of psychological principles and strategies. The primary goals of sports psychology are to describe, explain and predict the attitudes, feelings and behaviour of sports participants, including athletes, coaches and even spectators. This chapter explores how sports psychology has been used to:

- prepare athletes for major competitions
- help reduce tension and stress that has caused a decline in performance
- help an athlete maintain high-level performances over a long period of time.

In developing a positive state of mind, the critical factors are:

- motivation
- personality
- aspiration
- anxiety and arousal.





Motivation

Motivation can be defined as that which induces a person to behave in a particular way. This behaviour can be either positive or negative. Motivation is the drive towards a goal. It is what keeps a person striving for success.

Motivation is very important in both improving and maintaining athletic performance in an individual. Without motivation individuals will not be as disposed to attend all training sessions, will not train with full intensity at these training sessions and will not perform at the highest standard they are capable of during competitions. Consider swimmers who have to attend training sessions on most mornings of the week and then again after school or work in the afternoons. Without effective motivation they will train less often, miss training sessions or apply less effort during their training sessions. This will lead to lower levels of fitness and skill and a decrease in their performance at the upcoming swim meets.

Motivation can be categorised in different ways.

Positive and negative motivation

Positive motivation is the recognition, praise and (possibly) reward of good performances. It is an important aspect of training. The athlete is motivated to reproduce this performance to receive the rewards.

Negative motivation is the feedback athletes receive when coaches, parents or friends consider a certain aspect of their behaviour to be unacceptable or substandard. This causes athletes to avoid this type of behaviour for fear of



Figure 6.1 Motivation is an essential element of an athlete's performance

negative reactions by others. An example of this type of motivation can be seen when coaches drop players to a lower grade when they fail to perform.

Although both forms of motivation are used in sport, coaches need to carefully assess all players and treat each player individually. Because of personality differences, individual players respond differently to positive and negative motivation. If motivation techniques are used incorrectly, they can lead to a decline in performance. Positive motivation is usually more acceptable to most athletes and is a more sustainable technique than negative motivation. It is also more successful in improving and maintaining motivation than negative approaches.

Positive or negative behaviour of others can motivate an athlete to perform well.

Motivational influences on behaviour can come from internal (*intrinsic*) or external (*extrinsic*) sources.

Intrinsic and extrinsic motivation

Intrinsic forms of motivation come from within the individual; that is, the individual is personally concerned about his or her performance and is motivated to higher levels by a need for satisfaction. The satisfaction may come from greater fun, enjoyment or competence, and is not necessarily related to any external measuring factor, such as trophies or public recognition. Rather, it is the personal knowledge that the individual has done his or her best. Such intrinsic motivation is a powerful motivational tool. An example of intrinsic motivation is the athlete who continues to finish a race despite knowing that there is no chance of winning. The desire to finish satisfies a personal need. This self-satisfaction with the performance is often referred to as *internal reinforcement* and ensures that this type of behaviour will occur again.

Without some kind of **reinforcement** for effort the athlete will always find it difficult to maintain motivation. Reinforcement is the reward that encourages the athlete to continue to apply effort. There are two types of reinforcement: positive and negative. *Positive reinforcers* are occurrences that serve to produce the desired response; for example, receiving a trophy. *Negative reinforcers* serve as reinforcers when they are withdrawn; for example, the athletes' knowledge that they will not receive 100 push-ups if they refrain from talking during training.

Extrinsic forms of motivation are often associated with *material reinforcement*. These external forms of material reinforcement might include money, trophies and recognition. They serve to reinforce a particular behaviour. Examples of such extrinsic rewards are the financial payments given to professionals in return for their services.

Intrinsic and extrinsic motivation coexist for an athlete, and an important coaching skill is an understanding of what motivates athletes.

Social reinforcement means that the reinforcement occurs in front of others; for example, teammates, parents and/or the audience. An example of positive social reinforcement is recognition and approval from the coach in front of teammates at a game. Negative social reinforcement would be disapproval and rebuke in front of teammates at the game.



Figure 6.2 Negative social reinforcement can motivate players to perform at their best

WEB

Internet support concerning motivation and reinforcement can be accessed via www.oup.com.au/pdhpe12

practical application

Motivation and reinforcement

View the YouTube video featuring golfer Tiger Woods (see above). **Describe** the types of motivation and reinforcement he is receiving.

WEB

The YouTube video featuring golfer Tiger Woods that is required for the task can be accessed via www.oup.com.au/pdhpe12

Critical inquiry

1 **a** Read the case study below.

Sarah is a very talented hockey player and has received a scholarship to the Australian Institute of Sport. To retain her scholarship Sarah must train hard during the off-season to improve her strength and aerobic fitness. Her coach has also suggested that she plays in a summer league to maintain her skills. Upon her return at the start of the year Sarah has played quite well, but has not lived up to expectations. She seems lazy and disinterested at practice, and her school work also has deteriorated.

b **Propose** a range of motivational strategies that could be employed to improve Sarah's level of motivation.

Personality

Personality is a critical factor in performance. Different personality types deal with motivation, arousal, anxiety, goal-setting and psychological techniques in different ways. Consequently, personality traits are closely linked to arousal and performance. In recent years, much attention has been placed on identifying the specific personality traits that enable an athlete to function optimally, whether as an individual or in a team. Central to this is the **aspiration** of the athlete.

Aspiration

Aspiration is the athlete's ambition to succeed. It is therefore a critical factor in success. Not all personality types are well-suited to striving to achieve ambitions. In many instances, aspiration causes high levels of anxiety. The terms 'anxiety' and 'arousal' are often used interchangeably. However, they are not synonymous. They are measured differently, and different techniques are used to regulate each.

Research and Review

1 **Investigate** the type of motivation used by current professional athletes.

2 Imagine you are an under-10s soccer coach. **Describe** the type of reinforcement you would provide to your players.

Anxiety and arousal

Anxiety is an emotional response to a perceived threat. **Arousal**, on the other hand, can be defined as the emotional, mental or physiological activation required to produce a response.

Anxiety reflects a person's feelings and is a heightened level of emotion that causes physical and psychological discomfort. A person who is worried about an examination might have trouble sleeping. An athlete might have a fear of failing or a fear of being judged. In such circumstances, the athlete might:

- feel threatened
- be unable to think clearly
- exhibit physiological responses
- seize up
- suffer the 'choking phenomenon' (the inability to perform to previous standards or expectations because of pressure).

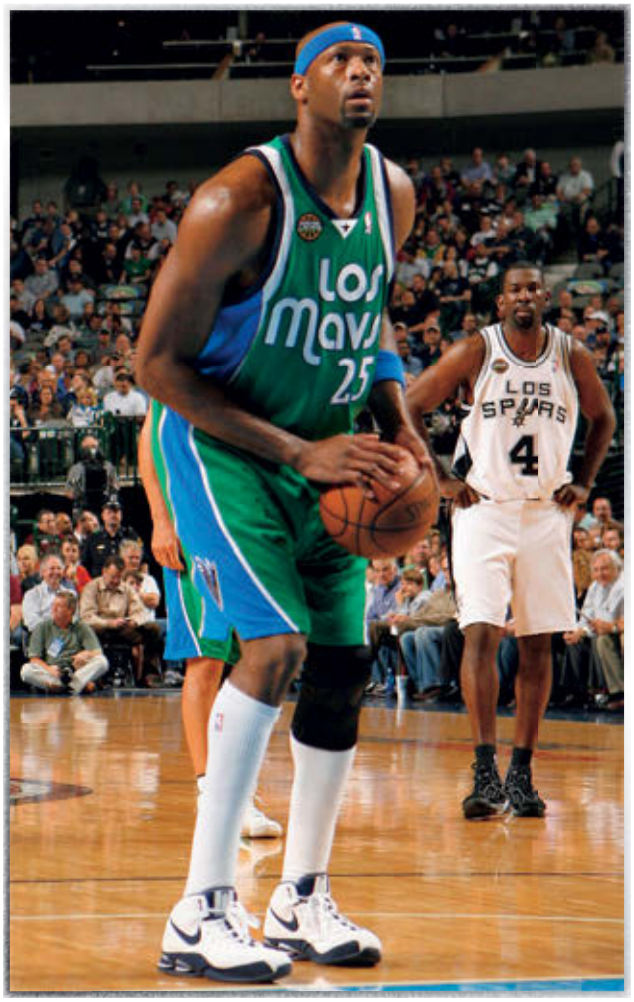


Figure 6.3 Anxiety will be felt by a basktball player before an important free throw

Trait and state anxiety

It is common to distinguish between 'trait anxiety' and 'state anxiety'.

Trait anxiety ('A-trait') is the athlete's *general predisposition* to perceive a situation as threatening or non-threatening. This is a personality trait. Those who display high levels of trait anxiety usually perceive more situations as threatening than those who have low levels of trait anxiety.

State anxiety ('A-state') refers to the emotional response of the athlete to *a particular situation*. This response might be fear, worry, tension, nervousness or apprehension.

A-state might be controlled by managing the athlete's situation, whereas A-trait must be controlled by the athlete as it is exists within the athlete.

Two important variables in performance are:

- the importance of the situation to the individual
- the uncertainty of the outcome of the situation.

Both these factors have a direct impact on state anxiety and trait anxiety. The relationship between the individual and the situation—and the effects of these on anxiety and performance—highlight the role and importance of personality and its impact on the aspiration of the performer.

Athletes with high A-trait have an underlying tendency to react in a certain way (with high levels of anxiety) when confronted with stressful information. In contrast, an athlete with low A-trait but high A-state will appraise the present situation first. The athlete will then make a judgment as to whether this particular situation is threatening. Athletes with high A-trait will probably become more anxious before a competition (and might experience acute illness) than will athletes with low A-trait. The athlete with high A-trait will also tend to demonstrate A-state reactions beyond that which is necessary, given the nature of the situation.

A-state and A-trait can be measured using inventories or questionnaires. Athletes are scored on a continuum for each, depending on their responses.

practical application

Anxiety and arousal

1 a Complete the sport competition anxiety test (SCAT) questionnaire (see above).

b **Analyse** the questions being asked and outline the reasons for their use.

WEB

The SCAT questionnaire that is required for the task can be accessed via www.oup.com.au/pdhpe12

Research and Review

1 **Define** the terms 'motivation' and 'anxiety'.

2 **Explain** the difference between intrinsic and extrinsic forms of motivation.

3 **Describe** the three major sources of reinforcement:

a social

b material

c internal.

4 **Identify** how aspiration can affect personality.

Sources of stress

Stress is the non-specific response that the body makes to demands placed upon it. Stress can be good or bad, but the physiological reactions in the body are basically the same. When athletes compete, they might experience too much stress (hyperstress), too little stress (hypostress), 'good' stress (eustress) or 'bad' stress (distress). Stress is very closely linked to state anxiety.

Stress can come from internal or external sources, which might or might not be under the direct control of the performer. Table 6.1 lists some of the sources of stress on performers. Because individuals vary, what one person finds stressful, another might not.

Table 6.1 Sources of stress

Under the athlete's control	
Internal stress	**External stress**
Self-esteem, self-confidence	Skills
Fear of success or failure	Reactions to opposition
A-state	Focus on event
Personal expectations	Aspects of environment
Mental rehearsal	Planning
Coping style	
Appraisal of situation	
Not under the athlete's control	
Internal stress	**External stress**
Injury	Audience, spectators
Illness	Media
A-trait	Expectations of others
Previous success/failure	Environment (weather, field, referee)
	The opposition

More experienced and skilled athletes use techniques to cope with stress before, during and after events. Methods used by performers to cope with sport-related stress include:

- practice
- planning
- refocusing
- blocking out
- concentration
- anxiety and arousal control
- mental rehearsal.

Some of these skills can also be transferred to everyday life.

Optimum arousal

Arousal levels and performance are directly linked to motivation. In terms of sports performance, arousal refers to the degree of energy release and the intensity of readiness of the performer. This varies on a continuum from deep sleep to high excitement. The arousal levels of athletes can be measured by heart rate, respiration, muscle tension, skin temperature and brain wave activity. Arousal has also been called drive, activation, readiness or excitation, and is a requisite for optimal sports performance. The level of arousal can be measured in relation to performance.

WEB

Internet support showing the ways that arousal affects performance can be accessed via www.oup.com.au/pdhpe12

Attempts have been made to explain, theoretically, the relationship of arousal to performance. The first theory was Clark Hull's (1943) drive theory. This theory assumed a direct relationship between arousal and sports performance. This meant that the possibility of the desired response occurring increased with higher arousal levels. This theory is not viable for all sports and can be applied only to simple motor tasks, not to complex ones.

Another theory, the **inverted U theory** was suggested. According to this theory, for optimal performance to occur, the individual must attain a moderate level of arousal. Optimal doesn't mean maximal; too little or too much arousal leads to a decline in performance. This theory takes into account the complexity of the task, and is useful in many situations. However, it fails to explain why, how or when arousal affects performance. An example is an athlete whose high anxiety affects performance but whose drop in anxiety does not bring about improved performance, as the inverted U would suggest. Many factors other than anxiety will inhibit performance, so decreasing anxiety will not always lead to a better performance.

Optimal arousal does not mean maximal arousal as too much arousal can cause a decline in performance.

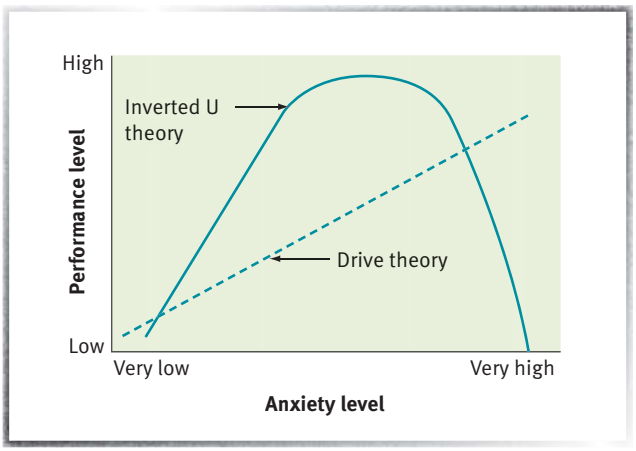


Figure 6.4 Inverted U theory and drive theory

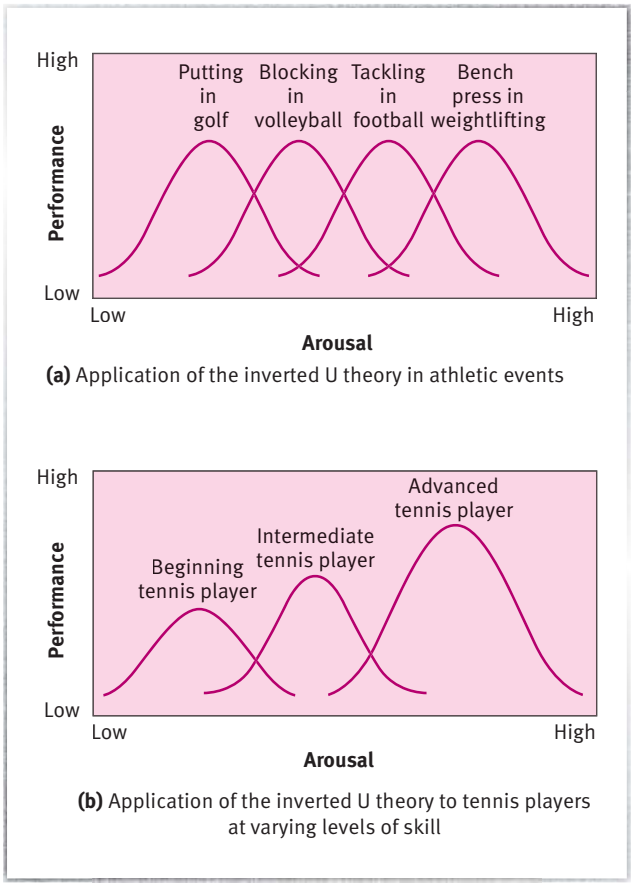


Figure 6.5 Applications of the inverted U theory

Critical inquiry

1 **Explain** why different sports require different levels of arousal for optimal performance to occur (see Figure 6.5).

2 A number of other theories predict a relationship between performance and arousal. **Distinguish** these from the inverted U theory.

Alternative theories

There are so many individual variations in anxiety level that measuring a performer's optimal level of arousal is almost impossible, especially using just one theory (such as the inverted U theory). Alternative theories need more research but might provide further explanation of optimal levels of arousal.

Zone of optimal functioning theory

The zone of optimal functioning (ZOF), which was proposed by Yari Hanin in 1980, is one alternative theory. It suggests that a simple formula can be applied to measure the optimal arousal level of performers.

Catastrophe theory

The catastrophe theory, proposed by John Fazey and Lou Hardy in 1988, also questions the inverted U theory by suggesting that the relationship between stress and performance is not symmetrical. That is, after an athlete reaches an optimal level of arousal, if the athlete continues to be anxious and aroused his or her performance will decline dramatically. The theory addresses how performance is influenced by physiological and cognitive factors of arousal. It also notes that performance in sport is rarely predictable.

Flow theory

The flow theory, put forward by Mihaly Csikszentmihalyi in 1975, suggests that an optimal performance can be achieved when the performer's mind is totally absorbed in the task being undertaken. The flow experience is an interaction between skill and the level of challenge. The flow experience is more likely to occur when a performer is highly skilled and personally challenged by the situation. Supporters of this theory use an inventory to determine the individual's flow state scale (FSS). Nine characteristics of the flow state, and also factors that facilitate its occurrence, have been identified.

Reversal theory

The last of the alternative theories is the reversal theory (Michael Apter 1982). This theory places the athlete's interpretation of arousal as central to explaining and predicting the effect of emotions on performance. The reversal theory contends that high arousal can be seen as either excitement (pleasant) or anxiety (unpleasant). Similarly, it contends that low arousal can be considered as relaxation (pleasant) or boredom (unpleasant). The quadrant illustrated in Figure 6.6 explains this in terms of a continuum. Consider the example of a task that initially is seen as dangerous or risky and causes heightened arousal (anxiety) but, upon being mastered, elicits excitement. There has been a reversal in the emotional response to the task.

It is ultimately the responsibility of the athlete and coach to determine the optimal arousal level for competing in a particular event because these theories might not provide full explanations. These theories might help to explain some responses, some of the time, but often individuals will need to determine for themselves the difference between feeling 'up' and feeling 'uptight'. Such responses will also vary from time to time, based on individual and environmental factors.

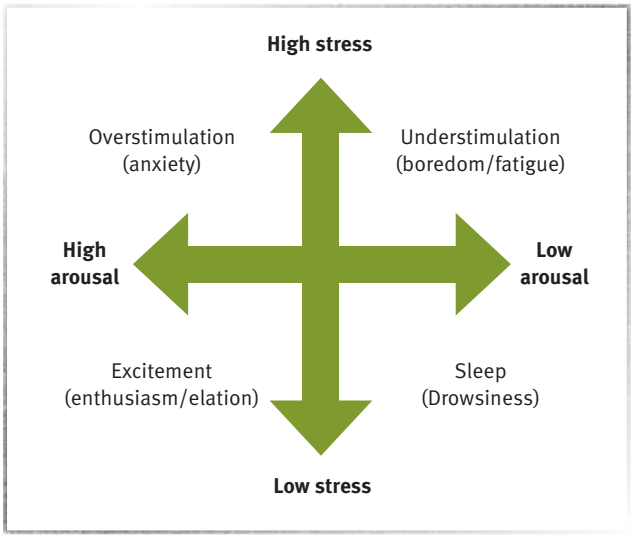


Figure 6.6 Arousal–stress continuum of the reversal theory

practical application

Optimum arousal

Construct a graph or diagram to explain each of the four alternative theories described here.

Research and Review

1. **Explain** how anxiety and arousal differ physiologically and psychologically.
2. **Identify** the limitations of the inverted U theory.
3. **Describe** the advice you would give to an under-aroused athlete and to an over-aroused athlete.
4. a **Identify** some causes of state anxiety in sport.
   b **Describe** four coaching strategies to reduce state anxiety.

Strategies to enhance motivation and manage anxiety

In the sporting arena today, there are only minute differences in the skills of top-class athletes, such as levels of strength, speed and endurance. Also, most athletes now have a sound knowledge of diets, training techniques and equipment, and this has eroded the advantage that some athletes used to have. So the edge given by psychological preparation might be the difference between winning and losing or the difference between gold and silver. The ability to manage anxiety and maintain motivation for training and performance is critical if the individual is to maximise his or her results in competition. All athletes can benefit from developing specific mental plans and from practising mental strategies and skills.

Concentration/attention skills

Often, during practice or competition, players will hear someone say to them: 'Keep your eyes on the ball', 'Watch the ball into your hands' or 'If it's not in the strike zone don't swing'. Such comments are intended to make the player focus attention on the task at hand. By improving the ability to focus on relevant cues and to ignore irrelevant ones the individual will be able to improve his or her performance.

Attention describes the process whereby individuals use their senses to perceive what is going on around them. Attention involves taking control of the mind and, with clarity, focusing on what is important. It might mean withdrawing concentration from one thing to focus on another. Terms commonly used when describing attention include 'alertness', 'focus', 'selectivity', 'arousal', 'consciousness', 'mental state' and 'concentration'.

Attention can be considered as a mental process that is:

- selective—can focus on some things, but not others
- shiftable—can change voluntarily or involuntarily
- divisible—can maintain more than one focus at the same time.

The ability of an athlete to attend to appropriate stimuli during competition is called attention, focus or concentration. It involves focusing attention on relevant environmental **cues**, and maintaining that attention. The performer will need to adjust focus at various stages during a competition. For example, what cues are relevant or irrelevant when a rugby union goal-kicker is taking a kick for goal? Relevant cues might be ensuring that the kicker goes through the usual pre-kick routine of take five steps back, take two steps to the side, look at the posts, look at the ball, tap the right boot twice on the ground, put the foot beside the ball, head over the ball, and so on. Irrelevant cues might be the crowd behind the goal posts, the players running towards the kicker to 'charge down', and the score. The ability of the kicker to focus on relevant cues and to filter out all extraneous noise and movement is critical to the execution of this skill. Attention involves the use of all senses: sight, sound, smell, touch and feel.

Attention involves taking control of the mind and, with clarity, focusing on what is important.



Figure 6.7 Maintaining focus is important when performing under pressure

Two different dimensions of style of attention were identified by Robert Nideffer in 1976. They are width and direction. As indicated in Figure 6.8, the width dimensions of attention range from narrow to broad, and the direction dimensions range from internal to external. Four types of attention are therefore possible, as shown in Figure 6.8. The amount of information and environmental field that an athlete tries to perceive can be broad (a lot) or narrow (a little). The athlete can focus either on stimuli from sources that are internal (one's own thoughts and cues) or on those that are external (such as environmental cues and one's opponent). Measures of attention and focus exist, but these are generally better able to measure width than direction. Measurement is also difficult because sports vary markedly. Listed in the Critical Inquiry task on page 124 are some particular attention and focus skills of a few sports and activities. A flexible style seems to be the predominant feature.

How does a marathon runner stay focused for two to three hours while competing? Surely the runner doesn't need to concentrate for the whole time? Elite marathon runners have two possible strategies to maintain concentration: associative and dissociative. Associative attention strategies involve the performer concentrating on bodily functions and feelings (for example, heart rate, breathing and muscle tension). Dissociative attention strategies, on the other hand, require the athlete to concentrate on external cues (for example, people, cars and the course) rather than those occurring in his or her body. Being a 'dissociator'—one who 'tunes out' to body cues—might cause problems later in the race when the athlete is extremely tired.

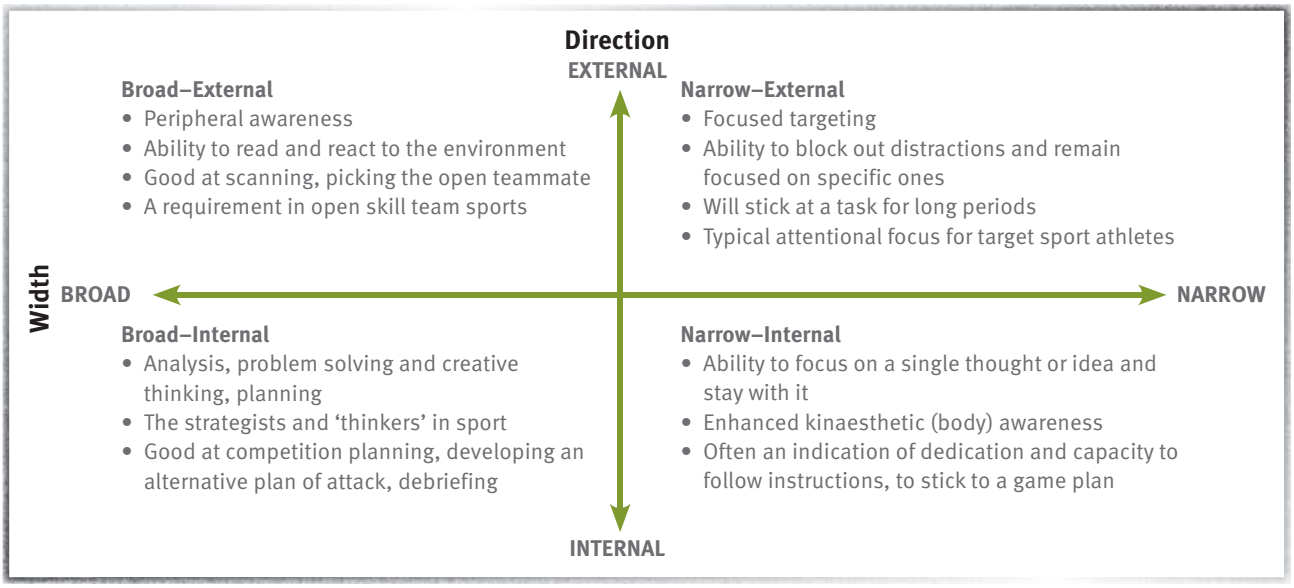


Figure 6.8 Characteristics of the four types of attention



Mental rehearsal/visualisation/imagery

Mental rehearsal

The ability to picture a performance or aspects of it is a skill that will enhance performance. **Mental rehearsal**, visualisation and imagery are used by athletes to manage and reduce anxiety during a performance.

Mental rehearsal occurs when a performer rehearses in his or her mind the physical skills that the performer wishes to practise. In this process, there is no visible physical movement. The process involves imagining the performance, and rehearsing the activity in the mind, in an attempt to prepare the mind and body for competition. Through extensive practice, performance can be enhanced. A key feature of mental rehearsal is that it can often replicate the feelings of anxiety the individual will experience during the performance while allowing the individual to visualise success. This provides the athlete with a positive frame of mind for competition.

Mental rehearsal has been found to be effective both in the acquisition of new sports skills and in the performance of well-learned skills. Many studies have found that a combination of mental and physical practice results in better performances than mental or physical practice alone. Mental rehearsal allows the athlete to:

- practise old skills
- learn new skills
- gain confidence
- feel the experience
- experience success
- control anxiety and arousal levels
- train in any conditions
- find motivation
- concentrate and refocus
- prepare for training or competition
- develop coping strategies
- change self-image.

It is believed that mental rehearsal works because imagining an action creates electrical activity in the muscles involved in the movement, and the muscle is thus actually contracting without visibly moving. Mental rehearsal also allows the brain to work out problems and propose alternative solutions and decisions. Good mental imagers not only see the image, they also feel it.

Guidelines for mental rehearsal include the following:

- Mental rehearsal should occur in the performance environment to include environmental cues in the imagery.
- The rehearsal should be of the total performance or of those sections that are particularly difficult for the athlete.
- The mental rehearsal of the performance should be successful in order to reinforce success.
- The rehearsal should occur immediately before performance in an attempt to focus the athlete.
- The actions and imagery should occur at the same rate as they do in the real performance to reinforce the specificity of the activity.
- The athlete should imagine the feelings in the muscles as the mental task is performed because this will provide the body with the correct pattern of functioning.

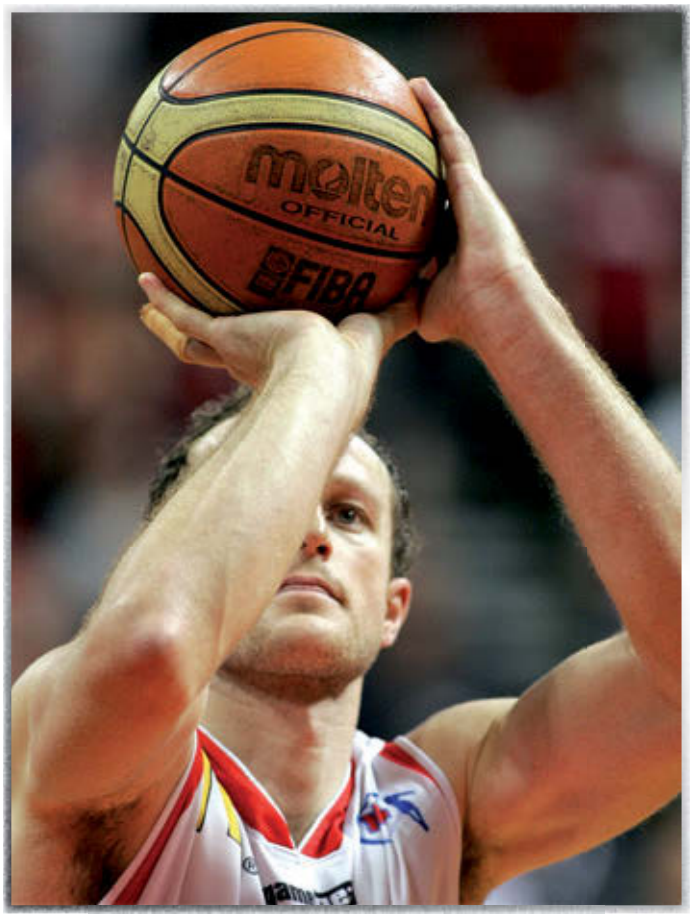


Figure 6.9 Mental rehearsal should occur immediately before performance in an attempt to focus the athlete

Critical inquiry

Copy Figure 6.10. Place the letter or number of each of the following sports and coaching skills in the appropriate quadrant of the diagram. Figure 6.8 (page 122) may help you in this task.

Sport skills

a Tackling in football

b Putting in golf

c Psyching up for the game

d Rebounding in basketball (when the ball has hit the rim)

e Listening to instructions

f Planning a gymnastics routine

g Executing a gymnastics routine

h Running a marathon

Coaching skills

1 Developing a game plan

2 Helping an athlete correct an error

3 Listening to a player

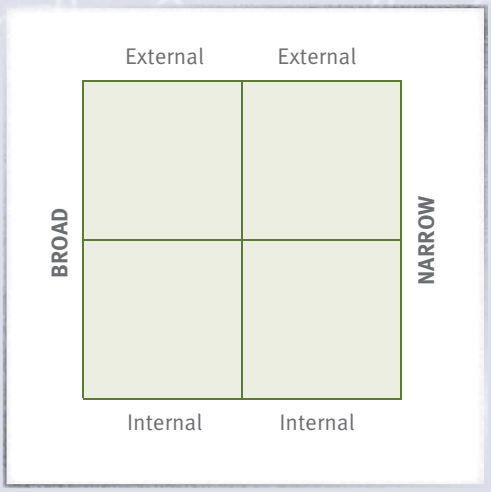
4 Deciding how to respond to an official's bad call

5 Delivering a speech

6 Analysing your competency as a coach

7 Giving directions at the beginning of practice

8 Resolving a conflict with a player



Source: American Coaching Effectiveness Program, *Sport Psychology Workbook*, Human Kinetics, Champaign, Illinois

Figure 6.10 Analysis of attention

Visualisation and imagery

Visualisation, or mental imagery, is a mental rehearsal technique that involves the participant creating a picture of one aspect of performance in his or her mind. This makes it different from mental rehearsal, which involves rehearsal of the whole performance. The picture might be an 'internal' picture (with the athlete imagining what it looks like from the athlete's perspective as the performance unfolds) or an 'external' picture (with the athlete imagining the crowd's perspective of the performance). It is also possible to visualise a picture other than one of the actual performance. The picture might be of the environment at the event, of a safe and secure place or of the moment of victory.

Visualisation may also involve the individual focusing on just one aspect of the skill, such as a diver seeing himself or herself leaving the board in a certain way. This process can happen immediately prior to the performance. It will improve the confidence of the diver because in his or her mind the dive has begun successfully. A high jumper may use mental imagery to focus on clearing the bar or planting the take-off foot before attempting the jump.

Anything can be visualised, but not all people find it easy to visualise. First, the person must believe that the strategy is effective. Second, it is a skill that requires practice, patience and time—and might require practice every day.

Imagery can be used to help athletes 'switch on' or 'switch off'; that is, to arouse or relax them. Clear, vivid imagery can assist a person to:

- see and experience success
- refocus (before or during an event)
- practise skills
- prepare for a performance
- motivate
- perfect skills
- familiarise.

As athletes develop and practise their mental rehearsal and visualisation skills their level of performance will improve. As their technique improves, so will their concentration and attention skills. They will gain greater confidence in their ability to perform well. In addition, the **neural** connections (nerves) between the brain and the muscles that are required to create the movement will improve.

Relaxation techniques

Relaxation techniques are often used by sports performers to calm themselves, thereby decreasing anxiety and controlling arousal. An astute and experienced performer will be able to relax in stressful situations and to respond with composure (control and calmness) without becoming under-aroused. Relaxation can be useful before, during or after an event and

practical application

Mental rehearsal and imagery

1 Perform this task as a class group.

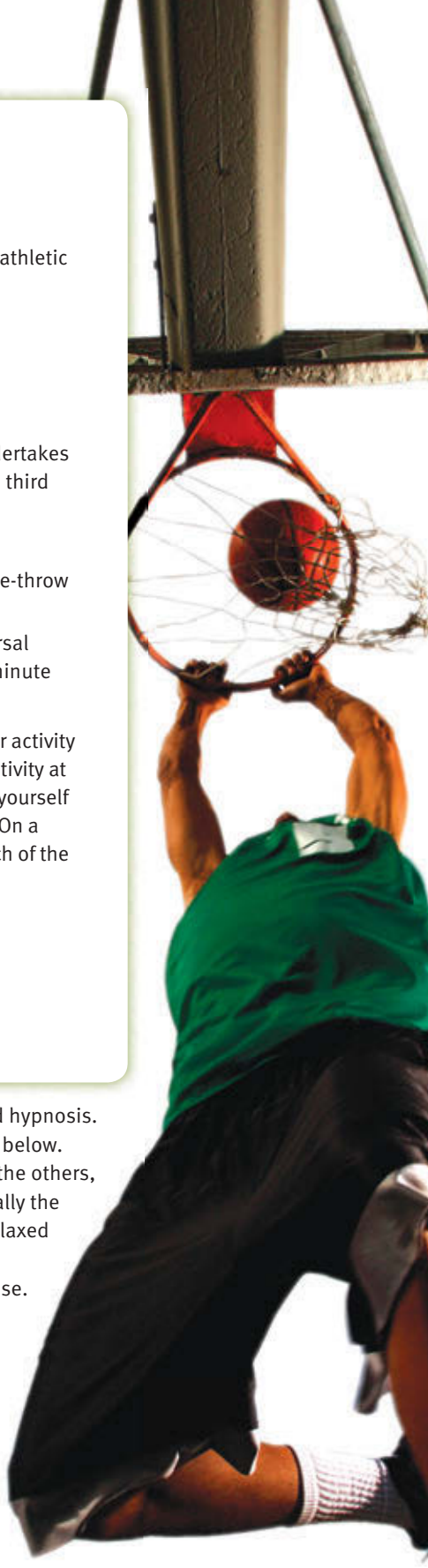
- **a** **Propose** a suitable practical experiment to test the effects of mental rehearsal on athletic performance.
- **b** Carry out the experiment, tabulating the scores.
- **c** After completion, **construct** a graph of the results.
- **d** **Discuss** any differences between the results.

Here is an example of a suitable experiment:

- Three groups perform a number of basketball free-throw trials. The first group undertakes physical practice only, the second group undertakes mental practice only and the third group uses a combination of physical and mental practice.
- Group 1 (physical practice) performs 50 free throws in a row.
- Group 2 (mental practice) engages in a 10-minute mental rehearsal session on free-throw shooting, and then shoots 50 free throws.
- Group 3 (mental and physical combination) engages in a 10-minute mental rehearsal session, and then shoots 25 free throws. The group then engages in another 10-minute mental rehearsal session, followed by the final 25 free throws.

2 **Assess** your own imagery skills by completing the following task. Select a specific skill or activity in a sport you play. With no one else present, imagine yourself performing the skill or activity at the place where you usually perform it. Close your eyes and, for 2–3 minutes, try to see yourself at this place. Hear the sounds, feel the body movements and be aware of how you feel. On a scale of 1–5 (with 1 being very poor and 5 being very good), **assess** how well you did each of the following:

- **a** saw yourself performing the activity
- **b** heard the sounds of performing the activity
- **c** felt yourself performing the activity
- **d** were aware of your mood
- **e** were able to control your image.



usually precedes a mental imagery session. As with mental rehearsal, visualisation and imagery, it must be practised so that it becomes a natural response.

There are a number of relaxation techniques and they usually have one or more of the following characteristics:

- procedures for tensing and then relaxing muscles
- a focus on breathing
- a focus on feelings of heaviness and warmth
- mental imagery.

For most sessions, the person needs to sit comfortably or lie down. Sessions should be performed regularly and frequently—two or three times per day. Four factors are necessary to elicit a relaxation response. They are:

- a quiet environment
- a positive attitude
- decreased muscle tension
- a relaxation device or procedure.

There is a number of relaxation devices and procedures, including progressive relaxation, autogenic training, meditation, biofeedback and hypnosis. Each procedure is explained below. Each procedure differs from the others, but they all produce essentially the same result: calmer, more relaxed performers who feel positive about the next bout of exercise. When athletes become relaxed they are better able to put their performances in training and competition into perspective. They will be less worried about the results and will be better able to focus on the performance. This will make them less anxious and more motivated, which ultimately will improve their performances.

Progressive relaxation

Progressive relaxation involves the systematic tensing and then releasing of muscles. If all muscles are relaxed, it is impossible to experience feelings of stress and tension.

The following is one progressive relaxation technique:

1. Make a fist with the right hand and squeeze tightly for 5–7 seconds.
2. Concentrate on being aware of the strain in the back of the hand and up the arm.
3. Let the hand relax completely, and feel the difference.
4. Continue the process using other individual muscle groups.

By concentrating on each muscle group in a similar manner, the person becomes progressively better at relaxing. Eventually the person is able to relax the muscles without first tensing them; sometimes a 'cue word' is enough to produce the feeling of relaxation. This technique is particularly useful for neck and shoulder tension, tension headaches and tight jaw muscles.

Autogenic training

Autogenic training relies on using self-suggestion to generate feelings of heaviness and warmth in the muscles. The limbs will feel heavy because of lack of muscle tension and they will feel warm because the blood vessels dilate. Autogenic training is composed of three basic parts:

- the creation of the feelings of heaviness and warmth—the most important part of the process
- the use of imagery of relaxing scenes accompanied with the feelings of heaviness and warmth
- the use of specific themes to assist in bringing about the relaxation response; for example, self-statements that the body is totally relaxed.

Meditation

Meditation involves total concentration on a word, phrase or image—often called a 'mantra'. This concentration frees the mind from distracting thoughts that might have caused stress. Meditation gives the body time to relax and recuperate after stress or physical activity.

Biofeedback

Biofeedback uses instruments that measure changes in bodily functions. These give athletes better control of these changes because it makes them aware that the changes have occurred. The instruments can measure changes in skin temperature, sweating, heart rate, breathing, muscle activity and brain waves.

For example, a heart rate monitor alerts the person to a fast heart rate, and the person then concentrates on lowering the heart rate by relaxation and similar means. Performers can use the instruments in training, and can develop skills to control feelings of anxiety or arousal.

The same strategies can be applied in the competitive environment to relax. Biofeedback is a very effective relaxation tool. The main drawback is the expense of the equipment.

Hypnosis

Hypnosis is the creation of a sleep-like condition in cooperation with another person. It is used to induce a state of deep relaxation, and has some similarities to autogenic training and meditation.



Figure 6.11 Meditation involves total concentration and can relieve stress

practical application

Relaxation

1 Conduct the following relaxation activity with your class. The activity should be conducted in a quiet place. The participants must believe that the relaxation will occur, and that it is useful.

- a Lie down comfortably on your back and close your eyes.
- b Deeply relax all the muscles in your body, beginning with your toes and progressing up to your face. Make all your muscles feel very heavy and totally relaxed.
- c Breathe through your nose and become aware of your breathing. As you breathe out say the word 'one' silently to yourself. Every time that you breathe out say 'one'. Continue for 20 minutes.
- d When you have finished, open your eyes slowly and lie still for a few more minutes.

After the activity, design a mental imagery activity to do as part of this relaxation session.

2 Read the case study below, then answer the questions that follow.

John had been in this situation a hundred times before. It is the final, and he is on the free throw line. The scores are equal, with one shot to come, and 15 seconds on the clock. Suddenly everything freezes. He hears the crowd, and sees the opposition. The hoop is far too small for what appears to be a beach ball that he is now holding. Everything is hazy. He cannot feel his hands. He has 10 seconds to make the match-winning shot.

- a **Explain** the physiological and psychological responses that are taking place in John's body.
- b **Identify** what might have caused this situation to arise.
- c **Propose** some psychological skills that John could put into action to make this shot successful.

Goal-setting

Goal-setting for performance can provide motivation, commitment and direction. By having short-term and long-term goals, an athlete is more likely to be motivated and aroused to strive for these goals. These goals will provide a clear aim and, if collectively 'owned' (by coach, parent, friend and athlete), will be more likely to elicit a higher level of commitment and direction.

Direction refers to what the athlete wishes to achieve and how the athlete might achieve this. Behavioural goals need to be specific, observable, modifiable, measurable and set in a supporting environment. The athlete needs to be able to assess the achievement of the goals over a period of time and be supported in the pursuit of those goals. It is important that goals be based on the athlete's own standards, not on those of others. The athlete must feel that he or she 'owns' the goals.

Goals serve a number of purposes. These include providing focus, motivation and direction, and helping to produce better results. Goals can be process-orientated (that is, related to the quality of the performance) or outcomes-orientated (that is, related to the result or outcome). They might be based on technical, tactical, psychological or physiological factors. They might be set in the short term or in the long term.

Short-term goals

Short-term goals are goals that can be achieved over a short period of time and that lead the athlete to certain points ('flags') that are intricately linked to long-term goals. Short-term goals should be realistic and appropriate and should provide feedback about immediate performance accomplishments. They can be set for a single training



Figure 6.12 Anna Meares won a silver medal at the 2008 Olympics after fighting her way back from injuries suffered in a cycling accident earlier that year

session or for days (or weeks) ahead. Short-term goals will often help to achieve long-term goals. Some examples of short-term goals are:

- Train four times per week for the next six weeks.
- Increase weights by 10 per cent every three weeks.
- Work on defence at training tonight.
- Get six rebounds in the game today.
- Engage in the mental rehearsal of a difficult task once a day.

Long-term goals

Long-term goals should reflect where the end-point of training might be. Such goals are focused on what might be possible in a few months time, or in one year or even in four years. Some examples of long-term goals are:

- Secure a top-five position at the competition.
- Represent Australia at the next Olympic Games.
- Represent the region in a chosen sport.
- Receive the Most Valuable Player award.

Successful goal-setting

There are a number of useful principles that can aid both coach and athlete in the formation of goals.

These principles include:

- Make goals specific not general.
- Set deadlines, write down the goals and set priorities.
- Provide clear and regular feedback about progress towards the goals.
- Ensure goals are challenging but achievable.
- Make goals flexible.
- Describe goals in behavioural terms.
- Use short-term goals to help achieve long-term goals.
- Make goals performance-orientated not outcomes-orientated.
- Ensure goals are accepted and 'owned' by the athlete or team.

As an athlete begins to achieve short-term goals his or her level of motivation will improve. The athlete is more likely to train harder, which will lead to the achievement of further goals. This increased motivation can lead to improved performances by the athlete. Additionally, the athlete will have less anxiety if he or she sets realistic goals. Rather than focusing on any one performance in particular, the athlete will be able to reflect on each performance in relation to achievement of the overall goals.

Research and Review

1. **Identify** how improved concentration and attention can improve performance.
2. **Discuss** ways in which mental rehearsal and imagery can be utilised by a golfer.
3. **Distinguish** between the terms 'outcomes-orientated goals' and 'performance-orientated goals'.

practical application

Goal-setting

1 a Determine a long-term performance goal towards which you can work.

b Determine your current level of achievement with regard to this goal.

c List three progressively more challenging short-term goals that will move you towards achieving your long-term goal. For each of these three short-term goals:

- Set a date by which you want to achieve the goal.
- **Describe** two actions you could take to help you reach that goal on time.

Critical inquiry

1 a Choose a famous sportsperson and gather information about that person's psychological preparation for competition. Research the following about the person:

- motivation
- goals
- psychological skills used.

b **Compare** your athlete with a classmate's chosen athlete:

- What similarities and differences are evident?
- Why are these evident?
- How does each athlete's psychological skills affect his or her performance?



how can psychology affect performance?

chapter summary

- Motivation can be positive (a reward for a good performance) or negative (a desire to avoid a consequence for a poor performance).
- Reinforcement sustains motivation and can include internal reinforcement (pride), extrinsic reinforcement (money) or social reinforcement (praise in front of others).
- Anxiety is the emotion felt by an individual when he or she is placed in a stressful situation. It can cause the individual to undergo both physical and psychological changes.
- Athletes can experience anxiety when they place themselves under pressure (trait anxiety) or when they are placed into a stressful situation (state anxiety).
- Arousal is a measure of how enthusiastic an individual is to perform during an event.
- The inverted U theory links under-arousal and over-arousal with a decline in performance. It sees the point between these extremes—where performance is at its peak—as the point of optimal arousal.
- A range of psychological strategies can be used to enhance motivation and manage anxiety.
- Concentration and attention skills allow the athlete to focus on the task at hand and not be put off by the surrounding events.
- Mental rehearsal and visualisation allow individuals to conduct perfect practice in their mind prior to performance, thereby enhancing their ability to physically perform the skills when required.
- Relaxation techniques allow the athlete time to calm the mind and focus on the important parts of a performance.
- Goal-setting provides the athlete with ongoing challenges regardless of particular results.

revision activities

1. **Distinguish** between mental rehearsal and visualisation.
2. **Explain** why a state of complete relaxation is not always beneficial for sports performance.
3. Develop a set of goals for a junior elite netball team that includes fitness, skill level and tactical considerations.
4. a **Identify** some causes of state anxiety in sport.
   b **Describe** four coaching strategies to reduce it.

extension activities

1. Research how athletes from different sports utilise psychological strategies to improve their motivation and control their anxiety.
2. **Propose** a plan to motivate the individuals in an under-10s soccer team.
3. Rank the following Olympic sports from the one that would benefit from the most arousal to perform to the one that would require the least arousal: archery, tae-kwon do, boxing, sailing, shooting, football, swimming and weightlifting. **Outline** the reasons for the ranking you used.
4. Undertake at least two of the relaxation techniques outlined in the chapter. **Explain** the benefits that could be gained by their use.

exam-style questions

1. **Outline** the difference between intrinsic and extrinsic motivation. (3 marks)
2. **Identify** the sources of stress an athlete may face prior to and during a performance. (3 marks)
3. **Describe** how optimal arousal can enhance performance. (5 marks)
4. **Discuss** the effect of motivation on performance. (6 marks)
5. a **Describe** the relaxation and goal-setting techniques that can be used to manage anxiety. (4 marks)
   b **Evaluate** their effect on performance. (6 marks)

chapter 7

how can NUTRITION AND RECOVERY strategies affect performance?

Undertaking physical activity alters a person's need for energy, **nutrients** and fluids. By understanding the dietary needs of athletes and planning eating strategies for before, during and after activity, individuals can enhance their recovery and maximise physiological responses from training, as well as improve their performance. Other strategies can also be employed to assist with recovery so that individuals can be at peak performance during the next event. This chapter explores the way **nutrition** and recovery affect the performance of an individual.

Nutritional considerations

Fuelling an active body with the correct balance and type of energy, nutrients and fluids will meet the demands of training, help to maximise training responses and ensure optimal health and performance. An individual's acute dietary intake affects the extent to which he or she adapts to the training stimulus and, together with the individual's long-term eating habits, affects endurance, power, speed, strength, recovery, concentration, body composition and general health. If nutrition is not included as an integral part of training and preparation for competition, even the most talented performer may never reach full potential. In addition, few people are professional or elite athletes forever, and many of the dietary guidelines that follow are the basis for long-term good health.





Common dietary aims of athletes include ensuring there is:

- adequate energy intake—to cope with training demands
- sufficient fluid intake— to maintain adequate hydration
- the correct balance of energy sources—avoiding excess fat and inadequate carbohydrate, which can lead to poor recovery and excess body fat
- adequate protein intake and correct timing—to optimise recovery, maximise strength gains and complement resistance training
- adequate intake of **vitamins** and **minerals**—to avoid deficiencies, which can lead to poor health, slow recovery and fatigue
- the ability to 'bulk up'—to provide the energy and protein required to increase muscle size
- sensible body mass/fat control—without losing required muscle mass or the ability to train.

The main aim of a good training diet is the provision of adequate energy, along with **macronutrients** and **micronutrients** to support the demands of training and promote good health. An individual's size, **metabolic rate** and energy expenditure will alter these requirements, highlighting the importance of an individualised approach to nutrition planning. Barriers to meeting these dietary goals include difficulties with scheduling meals and snacks to fit in around work, study, training and other commitments. In situations where energy needs are high, it is usually more practical to spread intake over five to six smaller meals per day, rather than two to three large ones.

Pre-performance nutritional considerations

Training diet

The training diet must provide adequate carbohydrate to meet the fuel demands of training, contain a moderate amount of protein and be low in fat. Community nutrition guidelines express goals for macronutrient intake in terms of the percentage of total energy they should provide. It is best, however, to set definite carbohydrate and protein intake goals for athletes, scaled to their body size and, therefore, their muscle mass and training demands. This is achieved by stating their requirements in grams per kilogram of body mass.

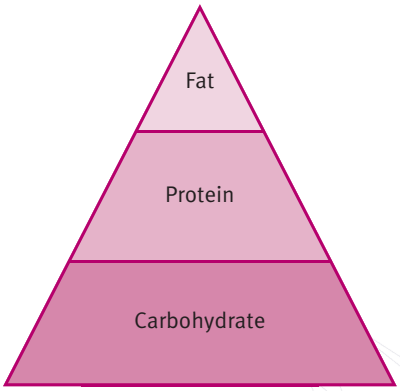


Figure 7.1 A balanced diet will assist in the increase of muscle mass

Carbohydrate

Carbohydrate is stored as glycogen in the body, more specifically in skeletal muscles and the liver. Muscle stores of glycogen are an energy source for training and competition, and the availability of carbohydrate plays a key role in the performance of moderate to high-intensity exercise lasting an hour or more. Depending on an athlete's muscle mass, nutritional state and training status, the level of glycogen stored in muscle is highly variable. Relative to fat, however, the body can store only a small amount of carbohydrate. It is important then that carbohydrates form the basis of each meal and 'in-between' snack to 'top up'



Figure 7.2 Carbohydrates provide fuel for muscle and are a good source of vitamins and minerals

energy stores in muscles for exercise. Compromised or reduced stores of glycogen may lead to early fatigue, loss of concentration and slower recovery after exercise.

For activities of short duration involving intense anaerobic work the most important fuel used for energy is **muscle glycogen**. As this supply declines with prolonged exercise, blood glucose is utilised as a carbohydrate fuel source.

The majority of carbohydrates consumed in an athlete's diet should be from nutritious sources, with refined carbohydrates only providing extra **kilojoules** where required. The following foods are nutritious carbohydrates that provide energy as well as a good source of vitamins, minerals, antioxidants and fibre:

- bread (including English muffins, crumpets, fruit bread and bagels)
- cereal (including wheat biscuits, 'flake cereals', porridge and muesli)
- pasta (including spaghetti, fettuccine, tagliatelle and ravioli)
- rice (including white, brown and wild rice)
- potato (including mashed, boiled, baked and in jackets), sweet potato and corn
- fruit (including fresh, canned, stewed, dried and fruit juice)
- low-fat dairy products (including plain milk, flavoured milk, yoghurt and custard)

In addition to the above, but not in place of them, foods containing refined carbohydrates may be included to 'top up' total energy intake where required or provide an easy-to-digest form of carbohydrate in and around training and competition. These include honey, jam, sugar, jelly, lollies, soft drinks and sports drinks. A list of suggested carbohydrate snacks can be found in the Appendix (page 160).

Table 7.1 shows the carbohydrate requirements for varying levels of activity.

Table 7.1 Daily carbohydrate requirements

Activity type	Carbohydrate intake goal (g CHO per kg BM)
Minimal physical activity	2–3
Light physical activity (3–5 hr/week)	4–5
Medium physical activity (10 hr/week)	6–7
Professional/elite athletes (20+ hr/week)	7+
Carbohydrate loading for endurance and ultra-endurance events	7–10

CHO = carbohydrate; BM = body mass

Current Concepts in Sports Nutrition, Australian Institute of Sport

Protein

Proteins are made of various combinations of more than 20 **amino acids**. Nine of these amino acids are called 'essential' amino acids because they cannot be manufactured by the body and must be supplied from the diet. The major function of amino acids is to make and repair the cells of the body and manufacture **enzymes** and hormones. The body breaks down food into amino acids from which it then makes its own protein as required. Another function of protein is to provide energy in extreme conditions, such as starvation.



Figure 7.3 Good sources of protein; dairy, nuts and legumes also provide protein

An athlete requires a slightly higher protein intake than does the average person, but this can easily be met if the athlete's overall energy intake is adequate. Amino acids are critical for growth and repair so many athletes attempt to increase their protein intake to improve muscle repair and increase their size. Large quantities of protein are not required to increase muscle mass. In fact, if protein intake is increased at the expense of carbohydrates, the opposite can occur; that is, muscle can be broken down to provide energy for work. Excessive protein intake can also dampen an athlete's appetite and may restrict his or her capacity to meet total energy needs. To increase muscle mass, athletes should:

- consume a high-energy diet
- follow the principles that ensure an adequate carbohydrate intake for their training needs and a moderate protein intake
- follow their specific strength training program.

Rather than consuming large amounts of protein all at once, it is most important to spread protein intake over the day, with a small amount in each meal or snack. Also important for an athlete is consuming protein within 30–60 minutes after completing a resistance-training session. Consuming a 'whole food' alternative, such as low-fat flavoured milk or a smoothie, is seen to be more effective than taking isolated amino acid supplements (discussed later in this chapter) and costs far less.

If the protein intake of an athlete is insufficient it can lead to early fatigue, inability to build and/or maintain muscle and slow recovery from injury. The **recommended daily intake (RDI)** of protein for active people is 0.8–1.2 grams of protein per 1 kilogram of body mass. Both for endurance athletes and those undertaking heavy resistance training, this can be increased to 1.6 grams per 1 kilogram of body mass. Protein intake in excess of these limits is generally utilised as a fuel source rather than for production of the various body proteins.

Some good sources of protein are:

- lean meat (including beef, lamb and veal)
- poultry (including chicken, turkey and eggs)
- fish (including fresh and canned)
- low-fat dairy products (including milk, yoghurt and cheese)
- legumes (such as lentils and baked beans) and nuts.

Table 7.2 shows the protein requirements of athletes.

Table 7.2 Estimated protein requirements of athletes

Group	Protein intake (g per kg/day)
Sedentary men and women	0.8–1.0
Elite male endurance athletes	1.6
Moderate-intensity endurance athletes*	1.2
Recreational endurance athletes†	0.8–1.0
Footballers, power sports athletes	1.4–1.7
Resistance athletes (early training)	1.5–1.7
Resistance athletes (steady state)	1.0–1.2
Female athletes	Approx. 15% lower than male athletes

*Exercising approximately four to five times per week for 45–60 min
†Exercising four to five times per week for 30 min at <55% VO_2 peak
Burke and Deakin, *Clinical Sports Nutrition*, 3rd edn, McGraw-Hill Australia, 2006

Fat

Fat is mobilised as an energy source when the activity is of low intensity and more aerobic and longer in nature. Fat supplies twice the kilojoules as the same amount of carbohydrate and protein, but as an energy source it is not as efficient as carbohydrate.

Fat is mobilised as an energy source when an activity's intensity is low, more aerobic and longer in nature.

Excess fat in the diet can lead to the storage of extra body fat and can also cause insufficient carbohydrate intake. This can result in decreased endurance, speed, agility and flexibility. A small amount of dietary fat is needed for normal body functions and there may be times where extra fat can be included in the diet to boost total energy intake (such as for a growing athlete who is struggling to eat enough). All athletes, no matter how lean, should manage their fat intake to allow room for more good quality carbohydrate and protein sources in their diet and prioritise the foods important for maximising performance.

Some examples of fats to avoid or limit are:

- butter, cream and full-cream dairy products
- animal fat (on meat)
- cakes, pastries and sweet biscuits
- chocolate.



Figure 7.4 Some examples of fats to avoid or limit to maximise performance

Fluid

Hydration is important for optimal exercise performance. The loss of excess fluid from the body via sweat can result in reduced exercise performance, fatigue, a higher heart rate and the potential for greater heat stress during exercise. Dehydration can also cause headaches and disruption to the ability to digest food and fluids during exercise. Starting every exercise session in a well-hydrated state is important for optimising performance. A 'pale straw' urine colour is indicative that an individual is well hydrated and this is therefore the goal for athletes throughout most of the day; a darker urine colour indicates dehydration. Note: Some medications and multivitamin and mineral supplements can darken the colour of a person's urine, which can make tracking hydration status inaccurate via the colour method.



Athletes should drink enough fluid during exercise to minimise weight loss to under 1 kilogram, where possible.

Sweat rates differ enormously between individuals, which makes it very difficult to set general fluid intake guidelines. It is important for athletes to become familiar with their own sweat rates during exercise. This can be done by weighing before and after an exercise session. The amount of weight lost in kilograms is equivalent to the amount of fluid lost in litres. Athletes should drink enough fluid during exercise to minimise this weight loss to under 1 kilogram, where possible. Such measures help to set up individualised fluid intake plans based on the rate of sweat loss over a session. This also helps to reduce the risk of hyponatraemia, a dangerous condition caused by drinking excessive amounts of fluid (that is, the athlete should not drink so much that he or she gains weight during exercise).

Water, juice, cordial, tea, coffee and milk are all useful sources of fluid (and hence for maintaining hydration) throughout the day. Athletes should be aware that some of these sources of fluid also contain calories and are therefore not necessarily the best option for 'quenching thirst'.

Critical inquiry

1 Use the Australian Institute of Sport (AIS) website to complete this task.

a Choose one of each of the following:

- an endurance activity
- a power-based activity
- a team sport.

b **Compare** the pre, during and post-performance dietary needs of the athletes in each of the three activities or sports you chose.



The AIS website can be accessed via www.oup.com.au/pdhpe12

Nutrition preparation for performance

The goal of any athlete during competition is to be able to perform at his or her best. Depending on the nature and demands of the sport, there are a range of factors that may impact on an athlete's performance. Athletes need to be able to identify the possible mechanisms or factors that may cause fatigue and/or poor performance during an event and undertake dietary strategies to try to negate these. Possible mechanisms for fatigue may include:

- depletion of muscle glycogen stores and/or hypoglycaemia (low blood glucose)
- dehydration
- gastrointestinal discomfort and upset.

Nutrition for competition is inclusive of dietary strategies undertaken during the week prior to the event and those undertaken just prior to, during and after the event itself. The relative importance of each time period depends on the demands of the event, as well as the opportunity the athlete has to consume the appropriate food and/or fluids during these time periods.

Fuel sources during exercise

The body will draw on a range of fuel sources during exercise. The relative contribution of each fuel source is determined by a number of factors, including the duration and intensity of the event, the training status of the athlete and the environmental conditions.

Muscle glycogen is the most important fuel source for short-term, high-intensity exercise (such as sprinting) as well as during prolonged exercise tasks (such as marathon running). As muscle levels of glycogen decline, the body will become increasingly reliant on blood glucose, which is derived from its limited stores in the liver. As exercise progresses beyond two hours, the body becomes progressively more dependent on its fat stores. The contribution of amino acids as a fuel source during exercise is limited, and occurs mainly during prolonged endurance exercise when carbohydrate stores are very low. In such instances, fatigue can be delayed or minimised by the consumption of carbohydrate during the event.

Pre-performance eating

As carbohydrate is the primary fuel source for exercise of moderate to high intensity, optimising carbohydrate status in the muscle and liver is the primary goal of competition preparation. The length of time dedicated to pre-event fuelling will depend on the balance between the anticipated fuel needs of the event and the preparation time that can be dedicated to the event.

For events lasting no longer than 60–90 minutes, athletes can usually ensure adequate glycogen stores for their event by resting or undertaking light activity for the 24–36 hours after their last training session, while consuming 5–7 grams of carbohydrate per 1 kilogram of body mass. To that end, carbohydrate-rich foods should form the basis of every meal and snack in the one to two days before competition.

Carbohydrate-rich foods should form the basis of every meal and snack in the one to two days before competing in events lasting no longer than 60–90 minutes.

For most events lasting longer than 90–120 minutes, which would otherwise be limited by depletion of glycogen stores, athletes may benefit from undertaking **carbohydrate loading**. This is a strategy involving changes to training and nutrition that can maximise muscle glycogen stores prior to endurance competition. The technique originally involved a three-day to four-day carbohydrate 'depletion phase' and a three-day to four-day 'loading phase'. Ongoing research has demonstrated that the depletion phase is no longer necessary and it is now thought that a two-day high-carbohydrate diet (10–12 grams of carbohydrate per 1 kilogram of body mass) combined with an exercise taper is sufficient to elevate muscle glycogen levels. It has been demonstrated that this extra supply of carbohydrate improves endurance exercise by allowing athletes to exercise at their optimal pace for a longer time.

Anyone exercising continuously for 90 minutes or longer using the same muscle groups is likely to benefit from carbohydrate loading. Such athletes include those competing in marathon running, longer-distance triathlon (half ironman and ironman) and endurance swimming. Although it might be argued that players in team sports, such as soccer and Australian Rules football, have heavy demands on their muscle fuel stores, it may not be possible to achieve a full carbohydrate loading protocol within the weekly schedule of training and games.

Carbohydrate loading will most likely cause body mass to increase. This extra weight is due to glycogen storage and the extra water retention that results from this. For some athletes, a fear of weight gain may prevent them from carbohydrate loading adequately.



Figure 7.5 Nutrition is a vital part of preparation for any endurance event, such as a triathlon

WEB

Internet support about carbohydrate loading can be accessed via www.oup.com.au/pdhpe12

Pre-performance meal

The goals of the pre-event meal are to:

- top up glycogen stores in muscle and the liver (especially after an overnight fast)
- ensure an adequate level of hydration
- prevent hunger
- assist in the psychological preparation of the athlete through routine or ritual.

As food consumed before exercise is only useful once it has been digested and absorbed, athletes are encouraged to consume this meal within the four hours prior to their competition. The pre-performance meal should be a carbohydrate-rich meal that the athlete has consumed before. The meal should also be low in fat and fibre and moderate in protein as these nutrients will take longer to digest and may increase the risk of stomach discomfort during exercise. Athletes should experiment to find the timing that best suits their needs.

Generally, tolerance of food and fluid is better during lower-intensity activities or sports where the body is supported (such as swimming and cycling) compared with sports such as running where the gut is jostled about during exercise. A general guide is to have a meal about three to four hours before exercise or a lighter snack about one to two hours before exercise. Including fluids with the pre-event meal will help athletes optimise their hydration status. The amount needed will differ between individuals and must take into consideration the conditions under which the exercise is to be conducted.

The following foods are examples of what may be suitable to eat 3–4 hours before exercise:

- pancakes or pikelets with maple syrup
- breakfast cereal with milk
- a bread roll with a cheese or meat filling and a banana
- fruit salad with fruit-flavoured yoghurt
- pasta or rice with a sauce based on low-fat ingredients (such as tomato, vegetables, lean meat).

The following snacks are examples of what may be suitable to eat 1–2 hours before exercise:

- toast or crumpets with jam or honey
- a liquid meal supplement
- a sport or cereal bar
- a piece of fruit.

Nutrition during performance

The goal of nutrition intake during exercise is to minimise the fluid deficit and, in the case of exercise of moderate to high intensity lasting longer than 60 minutes, provide an additional fuel source for the muscles and central nervous system.

Intake of carbohydrate during exercise provides an additional fuel source and has the potential to improve exercise capacity in situations where muscle or liver glycogen stores may limit performance. While most evidence for the benefits of carbohydrate supplementation during exercise has been described for prolonged bouts of moderate-intensity exercise, there is increasing evidence that it may also be of benefit to athletes competing in individual or team-based sports of an intermittent nature lasting greater than 60 minutes.

The amount of carbohydrate that athletes can consume will represent a compromise between what is ideal, the opportunities to consume foods/fluids during the event and the tolerance of athletes while exercising. For example, the ability of a road cyclist or tennis player to consume fluids during an event will generally be greater than that of a marathon runner. Depending on the nature

Figure 7.6 Proper hydration before and during an event will prevent dehydration and allow optimal performance



of the event, suitable carbohydrate-rich food and fluid options may include bananas, sports gels/bars and sports drinks. The latter has the advantage of helping the athlete meet his or her fuel and fluid demands simultaneously.

Dehydration to the extent of just 2 per cent of an athlete's starting body weight can have detrimental effects on performance, which include:

- reduced aerobic performance
- increased perceived exertion—causing the athlete to feel more fatigued than usual at a given work rate
- reduced mental function—having a negative impact on motor control (skill), decision-making and concentration
- slowed gastric emptying—resulting in stomach discomfort.

WEB

Access the 'Sweat' fact sheet at the AIS website via www.oup.com.au/pdhpe12

WEB

The Gatorade site can be accessed via www.oup.com.au/pdhpe12

Critical inquiry

Go to the Gatorade sports drink site and **assess** the claims the company makes about hydration and its products.

It is therefore important that athletes aim to start each competition or training session well hydrated and minimise the fluid deficit during exercise. Fluid requirements vary remarkably between athletes and between exercise situations. This makes it impossible to prescribe a general fluid-replacement plan. Athletes should be encouraged to look for opportunities to consume fluids during their sport, and aim to start drinking early and continue to drink small amounts regularly. Ideally, athletes should drink to a plan based on their own sweat rates during training and competition. While water is always a good fluid to choose, sports drinks can have the advantage of supplying carbohydrate during the event, as well as sodium to help in the absorption of the fluid into the body. This is especially important in events undertaken in the heat or where fuel supply and dehydration can limit performance.

Post-performance nutrition

Recovery is a challenge for athletes who are undertaking two or more sessions each day, training for prolonged periods or competing in a program that involves multiple events. In the training situation, with correct planning of the workload and the recovery time, adaptation to the physiological stress allows the body to become fitter, stronger and faster. In the competition scenario, there may be less control over the work-to-recovery ratio.

Recovery encompasses a complex range of processes that include:

- restoring the muscles and liver's expended fuel
- replacing the fluid and electrolytes lost in sweat
- manufacturing new muscle protein, red blood cells and other cellular components as part of the repair and adaptation process
- allowing the immune system to handle the damage and challenges caused by the exercise bout.

How well athletes recover after a bout of exercise will have an impact on their ability to perform in subsequent training and competition. The specific food and fluid recovery strategies that athletes adopt will depend on the nature of the training session or competition undertaken and the length of time before the next session or event. From a nutrition standpoint, the goals of recovery are as follows:

- *Refuel* carbohydrate (energy) stores.
- ***Rehydrate*** to replace fluids and electrolytes lost in sweat.
- *Repair* and regenerate damaged muscle tissue.
- *Revitalise* and maintain good immune function.

Refuel carbohydrate (energy) stores

Athletes should consume carbohydrate as soon as possible after an exhausting work-out (ideally within 30 minutes), to prepare for the next. The carbohydrate should be consumed either as part of their next meal or as a snack.

WEB

Internet support showing the link between glycaemic index and performance can be accessed via www.oup.com.au/pdhpe12

Table 7.3 Nutritious carbohydrate–protein recovery snacks

- 250–300 mL liquid meal supplement
- 250–300 mL milk shake, fruit smoothie or low-fat flavoured milk
- 1–2 sports bars (check labels for carbohydrate and protein content)
- 1 large bowl (2 cups) breakfast cereal with milk
- 1 large or 2 small cereal bars plus 200 g carton fruit-flavoured yoghurt
- 220 g baked beans on 2 slices of toast
- 1 bread roll with cheese/meat filling plus 1 large banana
- 300 g (bowl) of fruit salad with 200 g fruit-flavoured yoghurt
- 2 crumpets with thick spread of peanut butter plus 200 mL flavoured milk
- 300 g (large) baked potato plus cottage cheese filling plus a glass of milk
- 200 g pizza (1/3–1/4 pizza) with chicken/meat and vegetables

*Each snack listed contains about 50 g of carbohydrate and about 10 g of protein

Rehydrate to replace fluids and electrolytes lost in sweat

Most athletes finish training or competition sessions with some level of fluid deficit. Athletes should aim to replace 125–150 per cent of the fluid deficit over the next 2–4 hours to fully replace the existing and ongoing fluid losses.

Repair and regenerate damaged muscle tissue

Prolonged and high-intensity exercise causes a substantial breakdown of muscle protein. Dietary protein consumed immediately after a session is taken up more effectively by the muscle into rebuilding processes than is protein consumed in the hours afterwards. Protein should ideally be consumed with carbohydrate-rich foods to maximise this effect. Optimal amounts of protein are 10–20 grams.

Revitalise and maintain good immune function

In general, the immune system is suppressed during the hours following intensive training. Consuming carbohydrate during and/or after a prolonged or high-intensity work-out has been shown to reduce the disturbance to immune system markers. This may help reduce the risk of athletes catching an infectious illness during this time.

practical application

1 a Choose one of the following athletes:
- a male tennis player competing at 10 a.m. in hot, humid conditions
- a netballer playing in three matches over a day
- a male triathlete competing in a half ironman event in warm conditions.

b **Propose** a suitable dietary plan for the athlete leading into competition. Consider the diet during the two days leading into the competition, the pre-competition meal, what the athlete should consume during the event, and a suitable dietary strategy to enhance recovery.

Research and Review

1 **Discuss** the role of carbohydrate loading in improving sports performance.

2 a **Identify** the recommended daily intake of nutrients for:
- individuals
- high-performance endurance athletes.

b **Identify** the common and distinct features of these two diets.

3 **Explain** the role of fluid in maintaining body temperature.

4 **Investigate** the importance of the glycaemic index of foods on sports performance.

5 **Explain** the reasons why foods with a high glycaemic index allow a faster recovery of energy stores than do those with a low glycaemic index.

Supplementation

In their search to run faster, leap higher and become bigger, athletes use a number of **ergogenic** aids. The term 'ergogenic' comes from the Latin words for 'energy-producing'. An ergogenic aid is a technique that is designed to improve or increase work output and might be illegal (for example, performance-enhancing drugs) or legal (for example, training methods or the use of a **nutritional supplement**).

Athletes turn to nutritional supplements for a number of reasons. These include:

- a belief that supplements might enhance their performance
- a belief that their training needs are too high to be met by normal food intake
- a belief that they eat poorly or have an unhealthy lifestyle
- a belief in the claims of advertising.

Although one or more of these factors might be applicable to some athletes, most athletes should be able to meet their nutritional requirements through specialised training diets.

Nutritional supplementation should be considered the tip of the pyramid. Nutritional supplements may not be as effective as they could be if the athlete does not have a meal plan that meets the athlete's energy, macronutrient and micronutrient requirements, combined with a well-designed training program. In fact, in some situations, supplementing an athlete's diet with extra nutrients may reduce the athlete's adaptation to training.

In Australia the nutritional supplement industry is regulated by the Therapeutic Goods Administration (TGA). The TGA regulates the contents of supplements and the claims made by supplement companies. Its role is to ensure companies are not making false claims about their products and are not including ingredients that are illegal in Australia. Despite this regulation, there are still many products on the market with capabilities that are overemphasised. It is the responsibility of each athlete and coach to use all information available to determine the benefits and side effects of a nutritional supplement and decide whether conditions exist in which supplements might be useful for the athlete.

WEB

Examples of nutritional supplements that might be useful to athletes can be accessed via via www.oup.com.au/pdhpe12



Figure 7.7 Power bars are commonly used as nutritional supplements

Risk of doping with nutritional supplements

With the greater focus on drug testing in the current sporting world, supplementation has been identified as a potential source for 'inadvertent doping'. There have been numerous cases where athletes have tested positive to substances banned under the World Anti-Doping Agency (WADA) code and later found that the source of the substances were nutritional supplements. An international study in 2004 found that out of 634 supplements tested, 15 per cent of the supplements were found to be positive for doping substances. These products containing doping substances were not isolated to one country: the supplements came from the United States, the United Kingdom, the Netherlands, Italy and Germany. No Australian products were included in this study. This raises an important issue for athletes who are taking nutritional supplements as, under WADA rules, being unaware that the supplement contained a doping substance is not a valid defence. Some athletes regularly take nutritional supplements without any concern for these issues. Any athlete taking nutritional supplements must give sufficient consideration to the risks associated with taking such substances from unknown sources.

Vitamins and minerals

Vitamins and minerals are required for health and optimal performance. Deficiencies can lead to symptoms of fatigue, infections, illnesses and slower recovery time from injury. Deficiencies can occur in a small population of athletes; these are usually closely linked to the inability of those athletes to meet their energy requirements.

It is a common attitude of athletes that it is cheaper and easier to take a supplement than it is to fix the underlying reason for the deficiency. Even though true vitamin and mineral deficiencies rarely occur in athletic populations a majority of athletes take vitamin and mineral supplements. Athletes and supplement company advertising often justify this practice through the assumption that athletes need far higher doses of these vitamins and minerals than do the average population.

Another common reason for consumption of vitamin and mineral supplements is the belief that given the difference between winning and losing is so small, athletes may not want to risk not taking them. This provides them with a false sense of accomplishment; they may be satisfied that by taking these supplements their diet is nutritionally adequate when, in fact, it may still be inadequate.

Vitamins

Vitamins are organic compounds that are required in small quantities for normal growth, development and **metabolism**. They often act as co-enzymes to assist the enzymes that **catalyse** the breakdown of carbohydrate, proteins and fats. Vitamins can be divided into two distinct groups: fat-soluble vitamins and water-soluble vitamins. Fat-soluble vitamins are A, D, E and K. They are usually stored in the body's adipose tissue and, as such, can build up to toxic levels if large amounts are taken over time. Water-soluble vitamins are the B-group vitamins and vitamin C. These vitamins dissolve in water and are easily expelled by the body if intake is excessive. Therefore, athletes need to consume foods high in water-soluble vitamins more often than foods containing fat-soluble vitamins.

Although the vitamin supplementation industry is massive, the average healthy adult can meet his or her RDI of all vitamins and minerals from a well-balanced, nutritious diet. Many people use vitamins as a type of nutrition insurance; just in case they are not receiving enough from their diet. In certain circumstances vitamin supplementation can be of assistance, but medical advice should be sought before using them.

As mentioned above, the main vitamins that athletes need are water-soluble vitamins. The primary sources of these vitamins are fruits and vegetables, wholegrain breads and cereals, some lean meats and dairy products. Meeting energy requirements by focusing on foods that are rich in nutrients and carbohydrates and choosing from a range of different foods will ensure athletes are naturally increasing their vitamin intakes and meeting their requirements. In terms of sports performance, dietary deficiencies in vitamins occur very rarely in athletic populations. Usually athletes who restrict energy intake or food choices for long periods of time are those at greatest risk of vitamin deficiencies.

Fat-soluble vitamins can become toxic if large doses are taken in supplementary form. Recently the high level of vitamin supplementation has come into question regarding its ability to improve performance and its potential to reduce the benefits of training. Researchers around the world have started to look at the stress the body undergoes when exercising. When an athlete trains hard, the stress of the training leads to the body adapting to the training load and becomes more efficient at working at those intensities. When an athlete supplements high levels of vitamins (specifically the antioxidant vitamins A, C and E) this helps the body deal with the stress, hence lowering the amount of stress the body actually experiences. With a reduction in stress, there is potentially a corresponding reduction in the adaptation the body has to that exercise. So supplementing with vitamins may actually hamper training adaptations, leading to reduced performance gains over training cycles.

If an athlete and his or her coach think that a vitamin supplement may be necessary it is important that they consult a doctor or sports dietitian to ensure it is suitable to support the athlete's training goals.

Minerals



Large quantities of protein are not required to increase muscle mass.

Minerals include calcium, potassium, iron, sodium, phosphorus, magnesium and chloride. Minerals are important to cellular functions, such as muscle contraction, fluid balance and maintenance of energy systems. Athletes usually focus on mineral intake in relation to exercise-related losses. These are mainly associated with those lost through sweat (mainly sodium).

Usually performance will not be improved by taking large doses of minerals above the standard recommended intakes. Some athletes may be at risk of mineral deficiencies in certain situations. Iron and calcium are two minerals that are considered essential for athletic performance and so dietary intakes of those need to be adequate. As with vitamins, mineral deficiencies usually occur in relation to inadequate energy intake or from the restriction of particular food groups, such as red meat or dairy products. Mineral supplementation should not be undertaken without clinical evidence of a deficiency.

Protein

Because amino acids are critical for growth and repair, many athletes have attempted to increase their protein intake to improve muscle repair and increase muscle growth. As mentioned previously, large quantities of protein are not required to increase muscle mass. In fact, most athletes consume more than enough protein within a high-energy diet to meet their needs. Athletes typically focus

on protein intake at the neglect of total energy intake. Without a suitable energy intake and training program, muscle tissue growth will not occur.

Protein supplements usually come in two forms.

- isolated proteins sold as protein-only powders (such as WPI or whey protein isolate)
- protein mixed with a number of other nutrients to enhance muscle growth (such as carbohydrate).

Athletes often consume protein supplements under the misconception that extra protein will enable the body to build muscle tissue faster. In fact, at any one time the body can utilise only a small amount of protein to build muscle tissue and the rest is used in other bodily processes. This means protein consumed above this small amount will not aid in muscle tissue growth and is often wasted.

Although protein powders are convenient and easy to use, they are no better than whole-protein food sources. Any claimed benefits of protein powders can be far outweighed by increasing energy intake suitably, and planning food availability to ensure nutrients are delivered when needed by the body.

Milk is one of the best all round protein-recovery and muscle-building foods; it is cheap, readily available and great tasting. It contains two different proteins (whey and casein) that work synergistically to increase muscle protein synthesis and reduce muscle protein breakdown. It also contains carbohydrate for energy, as well as other nutrients that are essential for muscle tissue growth and repair.

practical application

Nutritional supplements

1 Visit a health food store and find a supplement that is advertised as having the ability to build large amounts of muscle tissue rapidly.

a Write down the nutritional make-up of the product; that is, the levels of energy, protein, carbohydrate and fat it contains.

b Using only what you can find at a local supermarket, make a similar supplement from whole foods.

Caffeine

Caffeine is a central nervous system stimulant. It is commonly consumed in tea, coffee, cola drinks, energy drinks and chocolate. High levels of caffeine are not necessary for sports performance.

Caffeine has a number of effects. Caffeine:

- increases heart rate and can affect heart rhythm
- relaxes smooth muscle (such as intestinal muscles)
- can produce symptoms of anxiety in high doses
- decreases an athlete's rating of perceived exertion—athletes feel as though they are performing more easily than they actually are.



Figure 7.8 High levels of caffeine are not recommended for sports performance

Caffeine is absorbed through the intestines. Its effects can be felt in as little as 30 minutes but the majority of caffeine's ergogenic effects are seen after 45–60 minutes when blood levels of caffeine peak. In the past, consumption of large amounts of caffeine (>12 micrograms/millilitre of urine) was considered illegal in international sport and banned under the WADA code. Caffeine has recently been removed from the WADA banned list. New evidence has shown that high doses of caffeine (>6 milligrams per kilogram body weight) are unnecessary to see performance enhancement and generally result in adverse side effects. In fact as little as 2–3 milligrams per kilogram body weight is enough to potentially improve performance.

The diuretic effect of caffeine is a concern held by many athletes but is often over-exaggerated. Caffeine is a mild diuretic but during exercise this diuretic effect falls off dramatically and will not exacerbate dehydration during exercise. The current boom in the energy drink market has meant there are products available that provide well in excess of 2–3 milligrams of caffeine per kilogram body weight in one drink. A level above this may be detrimental to some athletes as it can increase anxiety and make them feel 'jittery and unsettled' before competition. Athletes need to be aware of individual variation in the benefits of caffeine. Athletes who are highly sensitive to caffeine need to be wary of the timing of its intake and weigh up the benefits compared to the side effects. As indicated in Figure 7.8, ingesting too high a dose of caffeine may impair visual information processing. Athletes should also be aware that caffeine may reduce sleep quality and quantity, which may adversely affect their recovery.

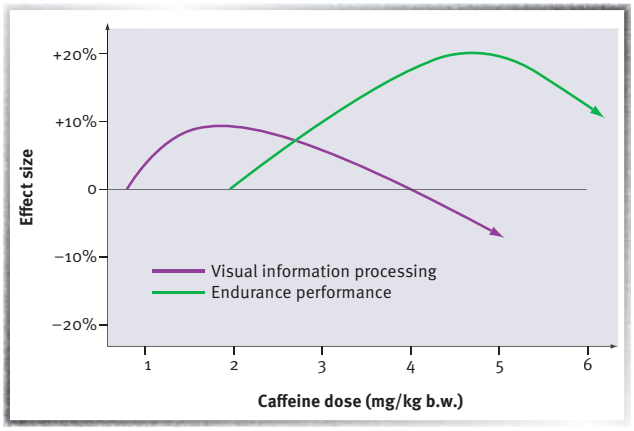


Figure 7.9 Effects of caffeine

Critical inquiry

1 **a** **Identify** the caffeine content of each of the following:

- an energy drink
- an espresso shot
- a fat metaboliser
- a No-Doz tablet.

b **Compare** the amount provided in a standard serve of each with the doses for performance.

Creatine

Creatine is a compound that occurs naturally in the body. It is found mainly in the muscle tissue in the form of creatine phosphate, which provides a ready source of ATP to the working muscle in times of high demand (such as in high-intensity anaerobic exercise). At times of lower demand (that is, at rest or during lower-intensity or more aerobic exercise), creatine is resynthesised to creatine phosphate ready for the next high-intensity bout.



Figure 7.10 Power athletes, such as throwers, can benefit from creatine supplementation

The average person requires approximately 2 grams of creatine a day. In a normal training diet an athlete's dietary intake will be approximately 1–2 grams per day and the body has the ability to produce the remainder. The main source of dietary creatine is animal products, such as meat. Dietary intake increases in athletes who consume large amounts of meat products in their diet (such as young male team sport athletes). Athletes attempt to increase the body's stores of creatine by supplementation. The body has a maximum, or ceiling, amount of creatine it can store and once this maximum is reached it will break down the excess creatine into creatinine and excrete it through the urine. Some athletes naturally have higher creatine stores than others, and therefore reach their ceiling very quickly when they start supplementing. These athletes are often referred to as non-responders as they often see little or no benefits/bodily changes during creatine supplementation. Athletes who have low dietary intakes of creatine (such as vegetarians) often report large bodily changes (mainly weight gain) and performance benefits from creatine supplementation.

By supplementing creatine, athletes are trying to enhance the efficiency of the ATP-PC system to provide energy during high-intensity activities. Studies have shown that while creatine is able to improve the recovery rate (faster resynthesis of ATP) it does not extend the length of time a performance can be maintained. Due to its ability to improve resynthesis rates of ATP during short rest periods, creatine supplementation will not usually improve one-off efforts. Instead, creatine supplementation is used in sports where training sets incorporate very high intensity explosive efforts with short rest periods (over 30 seconds) between bouts of exercise.

Creatine supplementation is usually taken in two ways to saturate the muscle tissue stores. Athletes either load with 20 grams (four 5-gram doses spread over a day) per day for five days (rapid load) or 3 grams per day for a month (slow load). Athletes will choose the differing loading protocols based on the goal of the training and the side effects that creatine supplementation can have.

Creatine monohydrate is the original form of creatine researched and has the most scientific support. Newer versions are being marketed as superior but to date none has been shown scientifically to be more

beneficial than creatine monohydrate. The consumption of creatine with carbohydrate has been shown to improve its absorption and storage in muscle tissue. It is therefore recommended that athletes take creatine with a source of carbohydrate. Once the muscle tissue stores of creatine have been saturated a smaller maintenance dose of 2–3 grams per day is adopted to ensure the maintenance of the high stores. Once an athlete ceases creatine it usually takes about 28 days for the muscle stores of creatine to return to pre-loading levels.

While there are some benefits to creatine loading, one of the main negatives is weight gain, which is generally in the range of 1–2 kilograms over the loading phase. This occurs due to cells in the body retaining extra water as creatine storage increases. This can be a concern to athletes who want the benefits of creatine but do not want to carry extra 'dead' weight.

Although many athletes believe creatine is beneficial in all situations, it must be remembered that it is a highly specific fuel source. Creatine will not be beneficial for athletes who are not already consuming suitable energy and macronutrient intakes. It is likely to only be of benefit to athletes who are undertaking explosive short-duration activities with short rest periods in between, rather than one-off sprints or endurance events.

Critical inquiry

1 **a** Visit a local health food store or supplement shop and **identify** a range of different creatine products. You should aim to look at one of each of the following:

- a pure creatine monohydrate product
- a product with a proprietary blend of creatine ingredients
- a product that is a mix of creatine and a range of other nutritional supplements purported to improve muscle tissue growth.

b Using the AIS fact sheet on creatine and other supplements in the A and B classification groups, try to **identify** which supplement will supply an individual with a recommended dose of such supplements.

c **Calculate** how much it will cost per month to use the various supplements identified above.

WEB

The AIS fact sheet on creatine referred to in the task above can be accessed via www.oup.com.au/pdhpe12

Recovery strategies

The physiological and psychological demands placed on athletes highlight the need to manage fatigue to prevent excessive fatigue, illness, injury and underperformance. Ensuring the athlete employs appropriate recovery strategies (including maximising sleep quality and quantity) can minimise fatigue associated with high-volume training.

The aim of recovery is to return to a pre-training/pre-competition physiological and psychological state as quickly as possible, to avoid fatigue from previous training sessions/competitions affecting subsequent training sessions or competitions and to optimise chronic improvements in physiological capabilities.

If recovery is inadequate the athlete may be:

- incapable of performing at the expected standard
- prone to injury of the affected area
- predisposed to injuring another part of the body
- susceptible to overtraining or non-functional overreaching.

A range of techniques can be used to assist an athlete recover from a game, performance or heavy training session. Nutritional strategies to assist in the recovery of energy stores have already been discussed. A number of other strategies are designed to allow both the body and the mind to regain strength ready for the next performance.

Research and Review

1 **Identify** the common vitamins and minerals.

2 For the vitamins and minerals identified in task 1 above:

a **explain** their function within the body

b **identify** the foods they can be found in naturally.

3 Research an athlete who has used creatine as a supplement. **Outline** the athlete's reasons for using creatine and any benefits or negative consequences he or she encountered as a result of its use.

Physiological strategies

Cool-down

Cooling down following activity is designed to apply an active recovery strategy and therefore reduce the occurrence of delayed-onset muscle soreness (DOMS). The process of cooling down (continual and slow movement and stretching following exercise) was outlined in Chapter 5 of this book. This has many benefits for the individual, including;

- a reduction in the level of lactate in the blood stream
- a gradual lowering of the core body temperature
- psychological benefits, such as feeling better when the body has been returned to a near normal state following exercise.

Evidence suggests that this active recovery can improve a following performance by 30 per cent if the time between performances or training sessions is short. This process can be witnessed at the conclusion of major football games where the teams often come back onto the field to perform their cool-down. Many professional teams require their players to train every day and if their performance has been hindered by the lack of a cool-down the benefits of the next training session will be diminished.

Passive recovery

Passive recovery refers to resting with no activity following exercise. It is believed that resting will allow the body to recover from previous efforts by allowing metabolite removal and substrate resynthesis within the working muscles. Anecdotally, the use of passive recovery is a common method of recovery used by many athletes and coaches during repeated sprint training.

Hydration

Hydration is an important consideration following exercise, especially if the athlete has been exercising in hot, humid conditions and is at risk of dehydration. Many athletes drink water while playing or participating in activity, but most will have only replaced between 30–70 per cent of the total fluid lost during activity. In addition, body temperature remains high following activity, causing further dehydration.

When an athlete has to perform two bouts of exercise in quick succession a specific plan for recovery hydration may be beneficial. By following the advice below, athletes can avoid the effects of fluid loss discussed earlier in the chapter.

Athletes should monitor their body weight. If they are lighter by 1 kilogram they will have a deficit of 1 litre of fluid. This does not mean, however, that by drinking 1 litre the deficit will be removed. The body will be still producing urine and possibly sweating and, accordingly, the athlete will need to drink 1.5–2 litres of fluid to correct this deficit.

Carbohydrate, fluid and salts can be replaced through the use of commercial sports drinks. The drinks should be cool as this will help to reduce the body's core temperature following exercise.

Athletes should avoid consuming alcohol following exercise as this substance causes an increase in the level of urination; that is, it has a diuretic effect. This will reduce the effectiveness of hydration strategies and leave athletes under-hydrated. Alcohol also inhibits the effectiveness of injury management strategies due to its effects on blood vessel dilation and increased blood flow to damaged areas.

Neural strategies

Neural recovery strategies are those that help the central and peripheral nervous systems recover from a high level of work. The central nervous system consists of the brain and spinal cord. The peripheral nervous system consists of the nerves running from the spinal cord to the muscles. These systems fatigue due to the change in chemicals (such as lactic acid) found in the muscles following heavy bouts of exercise or due to psychological reasons. Specific strategies can assist with recovery of the neural pathways and improve subsequent performances.

Hydrotherapy

Hydrotherapy involves the use of water to assist with the recovery of muscles following exercise. Hydrotherapy is becoming an increasingly popular means of enhancing post-exercise recovery. Various physiological effects have been shown following whole-body immersion in water. These include changes in cardiac response; changes in blood flow (arising from changes in hydrostatic pressure); and skin, muscle and core temperature changes. Water can be used in many ways to assist in recovery, including hot water immersion and contrast water therapy.

Hot water immersion

Hot water immersion (HWI) (temperature approximately 37°C) is a strategy utilised by elite athletes in a bid to enhance recovery. HWI results in increased blood flow and increased skin, muscle and core temperature. Most athletes use spa baths for HWI and use the spa jets as a form of **massage**. It is more common to combine this strategy with cold-water immersion, which is referred to as contrast water therapy.

Contrast water therapy

During contrast water therapy (CWT) participants alternate between heat exposure and cold exposure by immersion in warm and cold water, respectively. Possible benefits of CWT include a reduction in swelling, alterations in tissue temperature and blood flow, changes in blood flow distribution, reduction of pain, and improvements in the range of motion.

Massage

Massage is another neural strategy that can be applied by athletes. This can be delivered by a masseur or through self-massage by shaking the muscles used during exercise. In common with hydrotherapy, massage may bring both

physical and psychological benefits to the individual following exercise. Massage has a number of benefits. For example, massage may:

- increase blood flow to the muscles, enabling a faster removal of lactic acid
- decrease levels of muscle tension and soreness following exercise, which lowers the risk of injury at the beginning of the next bout of activity and enables a higher beginning point for performance
- increase joint flexibility
- enhance immune system functioning
- decrease tension in the nervous system—the nerves are more relaxed and able to function more effectively
- relax the person and provide a greater sense of well-being—this allows better sleep, which helps to hasten recovery after strenuous exercise.

While massage provides certain benefits, some clinical trials have not been able to prove that performance improves as a result of massage. Yet many athletes who use massage, including cyclists and AFL players, claim that they benefit from the process.



Figure 7.11 Massage may benefit athletes physically and psychologically

Tissue damage strategies

When strenuous activity is undertaken muscle fibres will be torn and damaged in minor ways. This is a perfectly normal reaction by the body and in many cases strengthens the muscle, enhancing future performance. Studies indicate that this process of muscle damage and repair is responsible for much of the DOMS in the days following high-intensity activity. Two techniques that have become quite popular to treat tissue damage are cryotherapy and the use of compression garments.

Cryotherapy

Cold water immersion (CWI) and other forms of cryotherapy have traditionally been used by elite athletes to treat soft tissue injuries. This is due to its ability to reduce inflammation and to alleviate spasm and pain. The physiological response to CWI
is well documented and includes decreases in heart rate and cardiac output, an increase in blood pressure, decreases in core and tissue temperature and a reduction in inflammation, pain and muscle spasm.

Cold water immersion is commonly known as 'ice baths' and involves immersing the body in water of approximately 10–15°C for around 5 minutes. Cryotherapy improves blood flow to the muscles. When the muscles are submerged in ice water, the blood vessels exposed to the cold will narrow; that is, vasoconstriction will occur. This process forces blood away from the muscles, taking with it the by-products of energy production, such as lactic acid. After a period of time, blood will flow back into the area, bringing with it fresh supplies of energy and the enzymes needed for muscle repair.
This allows a faster recovery to occur.

Cold water immersion is commonly known as 'ice baths' and involves immersing the body in water of approximately 10–15°C for around 5 minutes.



Figure 7.12 Many football players sit in ice baths to help their leg muscles recover following a game

Compression garments

Many athletes wear compression garments in a bid to increase recovery from exercise. Compression garments are widely used in medicine to treat problems with blood flow in an attempt to improve circulation. The use of lower-body compression has been found to promote venous blood flow and assist with venous return in patients. By improving circulation and promoting venous return in the post-exercise period there may be an accelerated post-exercise inflammatory and repair response, aiding the recovery process. The interest in compression garments for use by the athletic population largely stems from the beneficial effects they have on patients with circulatory difficulties.

Research has shown that there may be a reduction in the perceived impact of DOMS following exercise when compression garments are worn. The benefits of compression may be due to an increase in blood flow, a decrease in inflammation and/or a decrease in pain. Comprehensive research into the benefits and mechanisms of compression garments is limited at this stage. Further research is needed.

Psychological strategies

Following engagement in physical activity the body can take a long time to return to normal resting levels. Heart rate, breathing and body temperature all remain elevated and may take some time to drop. This is especially true if heavy training has been undertaken and there is some anxiety about the next performance.

Relaxation

Relaxation is a positive recovery strategy that can be used following application of many of the other strategies already discussed. Physical recovery is important and letting the mind wind down will assist the body to relax. This will assist in finalising the repairs and restoring energy levels within the muscles.

Physiologically, relaxation involves a decrease in breathing rate, heart rate, muscle activity and oxygen consumption. In contrast, brain-wave activity and skin responses are increased. All these physiological changes lead to a faster and more complete recovery, which will assist athletes in their preparation for the next training or performance.

Psychologically, many athletes will mentally replay many aspects of a performance once it has been completed. This can lead to increased levels of anxiety if the performance was poor or, if the performance was good, the reflection can create excitement. These psychological changes lead to physical changes in the body, such as increased heart rate and muscle tension. This will hinder the ability of the body to finalise recovery, which happens during periods of extended rest, such as sleep.

Athletes can use several relaxation techniques to assist in their recovery. These techniques include progressive relaxation, autogenic training, meditation and biofeedback, which were explained in Chapter 6.

Sleep

Elite athletes and coaches often identify sleep as the most important component of the recovery process. Sleep deprivation is one of the major reasons athletes report high levels of fatigue and possibly overtraining. When athletes are sleep deprived they can have a very large decrease in performance. Also their ability to concentrate, focus and make decisions may be decreased, which can be very detrimental to performance in team sports in particular.

Recommended ways to promote sleep are:

- Maintain a regular sleep–wake cycle.
- Create a comfortable, quiet, dark and temperature-controlled bedroom.
- Avoid alcohol, caffeine, large meals and large volumes of fluid prior to bedtime.
- Utilise a 'to-do' list or diary to ensure organisation and unnecessary over-thinking while trying to sleep.
- Investigate relaxation/breathing techniques.

Research and Review

1 **Explain** the differences between active and passive recovery. Give some practical examples of each.

2 Research other recovery strategies.

a **Outline** how they are undertaken.

b **Identify** any proposed benefits gained by their use.

3 **Investigate** the role of relaxation techniques in assisting the body to recover from training.

how can nutrition and recovery strategies affect performance?

chapter summary

- Optimal performance in training and competition requires the correct balance of energy sources, nutrients and fluids.
- Many athletes require a diet that is higher in carbohydrates, protein and total energy intake than is required by non-athletes.
- Different types of athletic performance have different dietary needs.
- Pre-performance eating allows energy stores to be topped up before activity is undertaken.
- Carbohydrate loading is a specific eating and training plan designed to maximise the stores of glycogen within the body before competing in endurance sports events that last longer than two hours.
- During exercise, hydration is a major consideration, especially during hot, humid conditions. If an individual becomes dehydrated, his or her performance will decline.
- Eating carbohydrate-containing foods and fluids soon after finishing exercise allows energy stores to recover more quickly.
- Supplementation is the process of taking high doses of nutrients or chemicals with the hope that it will improve athletic performance.
- The ability to recover after competition and training is critical in ensuring that maximal performances can be maintained. Recovery strategies for an individual can involve a range of strategies.

revision activities

1. **Propose** an eating and training plan that incorporates carbohydrate loading prior to a race.
2. **Examine** a range of sports drinks and assess their source and amount of carbohydrate and sodium. Compare each one with recommendations for fluid replacement.
3. **Describe** a range of sports/activities that could benefit from creatine supplementation.
4. **Outline** the benefits to recovery of cooling down after activity.

extension activities

1. a **Identify** commonly used vitamin and mineral supplements.
   b **Describe** the role that the listed vitamins and minerals play in the regular functioning of the body.
2. Caffeine was once included by the International Olympic Committee (IOC) on its list of banned substances, but the IOC has since removed caffeine from that list. **Explain** the reasons for this reversal of policy.
3. **Explain** why maintaining hydration is so important in avoiding heat-related injury during physical activity.
4. Consider tennis players in a tournament. **Describe** the nutritional considerations the athletes may need to be aware of and how they might manage their intake of food and fluid over the day.

exam-style questions

1. **Outline** the nutritional considerations of an Olympic-distance triathlete during a race. (3 marks)
2. **Describe** the role of carbohydrate loading in preparing an athlete for competition. (5 marks)
3. **Examine** the use of protein supplements by strength and power athletes. (8 marks)
4. **Discuss** the use of recovery strategies in improving training and performance. (6 marks)
5. a **Identify** the supplements used to improve performance in sport. (4 marks)
   b **Evaluate** their effect on the performance of an athlete with a balanced diet. (8 marks)

chapter 8

how does the ACQUISITION OF SKILL affect performance?

The ability of individuals to experience, learn and refine motor skills greatly affects their ability to perform any physical activity. This chapter explores the processes that individuals undertake when learning a new skill and how these processes can be adapted to help individuals learn these skills more easily and quickly. It also examines the ways in which movement can be assessed.

Learning skills

There is a variety of views about how learning actually occurs. Basically, we learn in three main ways:

- **cognitive** learning—learning by receiving knowledge and information
- **affective** learning—learning on a social level (for example, by developing ideas of fair play and self-esteem)
- motor learning—learning by acquiring physical **motor skills**.

In a discussion of sports performance, motor learning is of greatest importance, but cognitive learning and affective learning cannot be overlooked. For example, learning complex set plays in the game or cooperating as a team member are extremely important aspects of performance.







Figure 8.1 Skills are acquired through learning and practice

A *skill* can be defined simply as an act or task; for example, driving a car. We can also use the term to indicate the quality of a performance; for example, when we say that Michael Clarke is a skilled cricketer. Driving a car, playing golf or reading this book all require certain skills necessary to perform the specific activity. Learning and performing skills forms a huge part of our lives.

When you watch an elite sportsperson playing sport, think of all the physiological and psychological reactions and changes that are occurring in his or her body. The sportsperson has learnt to play his or her sport very well. How did the person do that? What made the sportsperson such a good player? What does the sportsperson think about during the performance? What pre-game meal did the sportsperson eat? These are precisely the type of questions sports scientists ask about athletes. They analyse every aspect of athletes' performances, using their thorough knowledge of sports science to inform their analysis.

Many of us have been in the situation where we have invited friends along to play our favourite sport—a sport that we have practised for years, but which the visitors have never played—and find that our friends (at their first attempt) are almost as good as we are (after years of practice). This sort of experience makes us consider questions that are similar to those posed by sports scientists:

- Why does it take some people days to learn a mathematical concept, while other people grasp it in a few minutes?
- What makes an 'all-round athlete'—a person who appears to excel at every sport he or she attempts?
- How was Martina Navratilova able to stay at the top of women's tennis for so many years?

The answer to such questions lies in an understanding of the major factors that affect the acquisition of skills. These factors include the:

- stages of skill acquisition
- characteristics of the learner
- environment.

The stages of skill acquisition

What is the difference between your tennis serve and that of Serena Williams? And what is the difference between your goal-kicking and that of Matt Giteau? How did they get to be so much better at their sports than the rest of us? Did they once serve or kick like us?

It is generally agreed that learning involves **practice** and time. Over time, and with practice, someone who is a beginner—in terms of his or her cognitive, affective and motor skills—will progress through various stages to become a skilled performer.

Skill learning is a continuous and dynamic process without distinct and definite stages. For convenience, however, certain 'general' changes can be described in skill learning. For example, over time, improvements in accuracy and rate are observed, as are greater

Skill learning is a continuous and dynamic process without distinct and definite stages.

consistency, a reduction in errors and the development of smooth, effortless performances. These changes can be broadly placed into three stages, as developed by Paul Fitts and Michael Posner in 1967. The stages are known as the:

- *cognitive* (or understanding) stage
- *associative* (or practice) stage
- *autonomous* (or automatic) stage.

Most individuals move from stage to stage as they learn skills. However, some might not move on to the last stage, due to the training demands, the complexity of the task or a lack of motivation.

Cognitive stage

The **cognitive stage** is characterised by thinking—trying to understand the skill. In this stage the learner forms a cognitive picture of the skill and what is required to do it. The movements in this stage are jerky, halting and poorly timed. Performance is variable with a large number of gross errors—the learner knows that something is wrong, but is unsure how to correct it. While learning to play a golf shot, for example, someone in the cognitive stage will often hit the ground or miss the ball completely. An increase in 'self-talk' is evident as this stage progresses. Fortunately, this stage is also quite short and, with regular practice and thought, the learner will make rapid and large gains in proficiency.



Figure 8.2 A coach should teach simple, fundamental skills during the cognitive stages

The coach should teach simple, fundamental skills in this stage, by demonstrating, modelling and giving clear instructions. Instructions should be brief and should focus on only a few skills at a time. Coaches should observe the following general points:

- Employ a range of motivational techniques.
- Keep instructions and demonstrations short and simple.
- Have athletes follow an example at first and then try the skills themselves with more instruction and feedback.
- Allow for constant blocks of practice.
- Use frequent knowledge of performance (KP) feedback.
- Remember that the aim at this stage is a rough approximation of the required skills.

Feedback at this stage is very important and is supplied predominantly with visual demonstrations and verbal information. The learner needs specific information for corrections, and requires attention to individual skills. It must be remembered that the learner might not understand the task, so the amount and speed of information should be controlled, and the task itself must be clarified, perhaps by visual, auditory or even manual means.

Associative stage

In comparison with the cognitive stage, the **associative stage** is quite long. In fact, the person might never move beyond the associative stage. In this stage, the fundamentals and mechanics of the skill have been learnt, and performance is less variable and more consistent. There are fewer errors and they are less gross because the athlete has developed the ability to detect and correct errors. Movements become **coordinated** and refined to the task as the athlete learns to use environmental cues for timing. **Anticipation** develops, and smoother, unrushed movements result as the individual needs to think less about the skill and there is a shift to memorised movements. There is rapid improvement with a marked decrease in energy expenditure. The golfer, for example, will be able to make regular contact with the ball, though direction and distance will not yet be as consistent as it will become.

In the associative stage it is important for the coach to communicate well and give good feedback. Instruction needs to be more individual, with errors identified and corrections prescribed. There should be a progressive increase in task complexity. Demonstrations, videos of the athlete performing and verbal descriptions of corrections are useful.

Coaches of players in the associative stage should:

- Teach movement patterns first and then add other environmental situations (game-like situations).
- Provide variable practice situations. For example, soccer passing could include 'keep off' and corner passing.
- Use both knowledge of performance (KP) and knowledge of results (KR) feedback, and avoid giving feedback on every attempt.
- Practise skills randomly rather than in blocks.
- Encourage the use of mental imagery.

Autonomous stage

After much practice and experience, the skill becomes habitual or automatic. This is the **autonomous stage**. In this stage, improvements come slowly, but there is good consistency of performance. Most of the skill is performed without thinking because the athlete requires less attention to basics. Instead, he or she can give more selective attention to higher-order cognitive activities, such as game strategies and external cues; for example, the spin on the ball or the position of the opposition. The athlete has good timing, and can detect and adjust errors and disguise actions. This develops self-confidence and risk-taking in performance situations. The golfer, for example, will be able to change a swing to suit the particular shot required and be able to curve the ball with control after hitting it to allow for external factors, such as slopes and wind.

In the autonomous stage the practice sessions need to be well organised to ensure the best improvements. The athlete must be highly motivated and given a great deal of feedback. Training should attempt to simulate the actual performance conditions. Psychological skills training can be very effective in this stage, especially when dealing with anxiety in competitions.



Figure 8.3 When a player reaches the autonomous stage, his or her performance is consistently good

WEB Internet support for the stages of skill acquisition can be accessed via www.oup.com.au/pdhpe12

Critical inquiry

1. Three stages of skill acquisition are described earlier. **Discuss** whether these three stages actually exist. **Investigate** how else we could explain how skills are learned and performed.
2. **Propose** reasons for the improvements in performances of well-coordinated athletes who seem to progress very quickly or even skip stages.

practical application

Stages of skill acquisition

1. Individually, or in small groups, practise daily a new skill; for example, juggling or throwing with your non-preferred hand at a target. Keep a record of your daily personal results and comments (regarding feelings, frustrations, problems and insights). Record these data for 20 trials per day over five days.
   - a **Describe**, in brief, the skill and scoring procedure.
   - b **Construct** a graph of the average scores for each day.
   - c In terms of the three stages of skill acquisition described earlier, **identify** which stage you reached.
   - d **Explain** how you moved from one stage to the next.
   - e **Identify** what would be required for you to progress further.
   - f **Identify** the attributes that would characterise a performer who has reached the autonomous stage in this skill.
   - g **Identify** the problems, issues and feelings that you experienced at each stage and why.
   - h **Compare** your results with the video image referred to above.

WEB The video image that needs to be viewed in part h of the Practical Application can be accessed via www.oup.com.au/pdhpe12

Research and Review

1. **Distinguish** between the important features of the cognitive, associative and autonomous stages of skill acquisition.
2. **Describe** how feedback given to a learner changes between the cognitive and autonomous stages of skill acquisition.
3. **Explain** the differences you would see in an individual as he or she moves through the three stages of skill acquisition in the sport of golf.

Characteristics of the learner

Each human has unique physical, social and emotional characteristics. The ways in which people learn, perform and think affect every aspect of their lives. These individual differences include inherited, social and emotional factors and they account for the variability in the learning of motor skills.

Inherited factors affecting skill acquisition include gender, age, race, somatotype (body shape), muscle-fibre composition, information-processing capacity and aptitude for the activity. These can be described as the natural ability of the athlete.

After training and practice an athlete's ability to perform activities is usually improved. Prior experience with the task (or with a similar task) will also affect performance.



Figure 8.4 Gregory Norman Jnr is an accomplished golfer who has played alongside his famous golfing father, Greg Norman Snr

Federer still motivated to be the one

World No 1 Roger Federer has dismissed suggestions his career is in decline and said he would use recent defeats as motivation after recovering from a virus.

The Swiss lost in the first round in Dubai last week to Scotland's Andy Murray, his first match since being beaten by eventual champion Novak Djokovic in the Australian Open semi-finals in January.

'In Switzerland there is a little too much speculation my career is over,' Federer, 26, said before yesterday's 6-3 6-7 7-6 win over former world No 1 Pete Sampras in an exhibition at Madison Square Garden.

'People just need to know I'm healthy and happy and not miserable and down and out.'

Federer won the final set tie-breaker, 8-6, to ensure victory in the good-natured contest before a crowd of about 19 000, including world No 1 golfer Tiger Woods.

'Honestly, losses like this motivate me more than anything,' Federer said.

'Trying to come back, trying to prove I'm still the one to beat.

'I just want to show I can do it over and over again.'

The successive defeats dented Federer's aura of invincibility and fed the confidence of younger rivals who have seen him reign as No 1 for 215 consecutive weeks.

Within two Grand Slam titles of Sampras' record 14, Federer said his affection for tennis was greater than ever.

'I love competing on centre courts all over the world. So many people are happy when I get there. It touches me. I love to practise more and more now,' he said.

'What I enjoy most are the matches, the pressure, the fans, centre court.'

Federer said he was looking forward to competing at the Beijing Olympics in August and future Games.

'The (London) Olympic Games in 2012 is something I'm looking forward to, and go from there. See how I feel with my fitness, my motivation.'

Federer may have made his worst start to a season in eight years but Sampras was confident he would soon be winning again.

'In a lot of ways Roger has created this sort of monster of being unbeatable,' Sampras said.

'If you lose a match here, lose a match there, people have the assumption he has lost his edge, lost his dominance.'

The Australian, 12 March 2008

For example, in taking up basketball, the skills of netball are more easily transferred to the new sport than are the skills of, say, hockey. This transfer of prior experience can also apply to other aspects of various activities, including fitness, strength and flexibility. For instance, if aerobic endurance, speed or strength are required to perform the new skill, someone with previous experience in these will take less time to learn the skill, and will be able to participate at a higher level, than will a total beginner. Even knowledge of the rules of the game, without ever playing it, can increase the ability of the person to perform the activity or skill. A good example of the transfer of skills and attributes from one sport to another is when athletes are able to change relatively easily between rugby union and rugby league, without any obvious decrease in performance.

Skill acquisition depends on levels of keenness, **confidence**, competitiveness, self-esteem and relations with others and even level of aggression. These *personality traits* are enhanced as involvement in activity is continued. Roger Federer is a good example of someone who exhibits all these personality traits (see article opposite).

Skill acquisition can be influenced by the reasons for participation, the level of aspiration, the degree of enjoyment, persistence at the activity, the effort put into the activity and the readiness of the participant to learn. Those athletes who are confident about their abilities, or their ability to improve and learn, can develop skills faster than those who are not. This self-confidence is sometimes evident in athletes as 'ego'. Ego can also be a good tool for coping with stresses, and for 'throwing others off their games'.

Critical inquiry

Analyse the article opposite and determine how this athlete might have come to be described as motivated, confident or naturally talented.

Research and Review

1. **Identify** pairs of sports (such as hockey and cricket) that show how prior experience can lead to a transfer of skills and improve how quickly the sport is learnt.
2. **Explain** how natural ability assists somebody to perform an activity well.
3. **Outline** the role that personality plays in determining athletic ability and learning.
4. **Identify** the characteristics of a learner that would have the greatest effect on:
   a. increasing performance
   b. decreasing performance.

The learning environment

Nature of the skill

The complexity of a skill to be learnt is obviously important in the acquisition of the skill. Movement tasks may be classified according to different criteria:

- the stability of the environment—open or closed
- the precision of the movement—gross or fine
- the distinctiveness of the beginning and end points—continuous, serial or discrete
- timing—externally paced or self-paced.

(See below for an explanation of these terms.) Not all skills fit into one or other category; instead they exist along a continuum. A task can be the whole game or activity, or it may be major individual skills within the game or activity.

WEB

Internet support for the nature of skills can be accessed via www.oup.com.au/pdhpe12

Closed and open skills

As noted earlier, in the early stages of learning a skill or activity, the coach tries to make the learning environment as stable and predictable as possible. Skills performed in this sort of environment are said to be **closed skills**, whereas skills performed in a changing, unpredictable environment are **open skills**. A continuum exists whereby closed skills are performed in fixed environmental conditions at one end of the continuum, and open skills are performed within a changing environment at the other.

Some examples of closed skills are those involved in golf, archery, weightlifting and synchronised swimming. In these activities the performer can use pre-learned skills or patterns of movement without having to make the major changes that would be needed if the environment were changing. When performing a closed skill it is the athlete who determines at what pace actions should occur. The athlete can execute the movement at a desired speed and method. Such movements are said to be **self-paced**. For example, a golfer places the tee and ball where the golfer chooses, approaches the ball when ready to do so, takes a pre-determined number of practice swings, looks up the fairway, and then swings—all at a pace determined by the golfer.

Open skills include batting in cricket, tackling a player in soccer, executing a set play in rugby union or making a ground stroke in tennis. In contrast to closed skills, open skills are **externally paced**. This means that they are initiated by actions from an external source or stimulus. The performer then responds to that stimulus. External conditions determine the timing of the performer's response and include the opposition, the weather and the time left in the game. The unpredictability of the environment forces the performer to respond in a variety of ways, some of which might not have been practised in training.

Sports can contain both closed and open skills. For example, a tennis serve is classified as open. All skills and all sports do not fit neatly onto one end of the continuum or the other.

When learning motor skills it is easier to learn closed skills than open ones. When playing softball, batting against a pitcher is an open skill. The batter needs to consider the speed, height and spin of the ball before contact can be made. Learning the actual skill of hitting can be made more closed through the use of a 'batting tee' so that the movement of swinging to hit a ball can be learnt. When the movement is learnt the skill can be made more open by hitting a ball hung on a string; while the ball will be moving, its height is predictable, allowing the batter to practise timing his or her movement before facing the totally open pitcher.

Skills performed in a stable, predictable environment are closed skills. Those performed in a changing, unpredictable environment are open skills.



Figure 8.5 Weightlifting is a closed skill



Figure 8.6 Facing a pitcher makes hitting a ball an open skill

Fine and gross skills

With regard to the **precision** of the movement, skills can be classed as either **fine** (using small muscle groups to perform them) or **gross** (using large muscle groups to perform them). Examples of fine motor skills include:

- writing
- spinning a ball when bowling
- throwing darts.

Gross motor skills include:

- walking
- running
- throwing.

Again, a continuum exists, and each skill can fall along the line between fine and gross. For example, a softball pitch involves subtle movements of the hand and fingers. It also involves larger gross motor movements from the shoulder, arm and back. The pitching action primarily involves gross motor skills, but the fine motor skills are also important.



Figure 8.7 Pole vaulting requires the use of serial motor skills

Discrete, continuous and serial skills

Skills can also be classified according to where they begin and end. If there is a *clearly defined* starting and finishing point, the skill is said to be a **discrete motor skill**. Examples include throwing a ball or performing a dive. If an *arbitrary* start or end point exists, the skill is described as a **continuous motor skill**. Swimming and running are examples of continuous motor skills. They are so classified because the beginning and end points are determined by the performer, and not by the task itself.

When a series of discrete motor skills is put together, a **serial motor skill** exists. Examples of serial motor skills include performing a dance routine, bowling a cricket ball and shooting an arrow in archery. In these situations a specific series of movements must be performed in a specific order for the task to be performed properly.

Critical inquiry

1 **a** Choose a sport and **identify** all the skills necessary in performing it.
b For each skill determine where it falls along each continuum below.

Closed _____ Open

Fine _____ Gross

Self-paced _____ Externally paced

Discrete _____ Continuous _____ Serial _____

The performance elements

When learning movement skills they are often first experienced in isolation. For example, a soccer ball will be stationary on the ground, and an individual will be asked to run in and kick it at a goal, and then he or she will do it again. This type of learning does not help an individual understand when to kick a ball in a game, which direction it should go or how hard it should be kicked. These questions can only be answered by the individual after having practised the skills in a game-like setting.

Movement skills can be learnt but if you can't apply them to a game situation then they will not be performed effectively. A forehand in tennis might be performed with precision, but be hit straight back to a player at the net. In this case the skill has been performed correctly but a poor choice of shot allows the opponent to win the point. By practising and developing decision-making skills and the tactical aspects of the sport the tennis player may have played a lob shot and won the point instead.



Movement skills can be learnt but if you can't apply them to a game situation then they will not be performed effectively.

Decision-making skills

Often in a game setting players need to assess their own strengths and weaknesses, their opponents' strengths and weaknesses and the situation of the game. The ability to assess these factors and then make a decision as to how to react to them affects an individual's ability to develop and perform movement skills, especially while playing games.

Coaches need to ensure the opportunity is available for individuals and teams to practise in game-like settings so that the individual can hasten the decision-making process when it is time to apply it during a game.

In many game situations, as the pressure to score or prevent the opposition from scoring mounts, poorer decisions about movement are made. In rugby league a player may try to throw a long pass to a winger in the hope that the winger will score a try, but this increases the risk of an intercept. In defence a player may rush up in the hope to tackle a player, leaving a gap in the defensive line for the opposition to run through. Specific training for these game situations will assist players to make better decisions when they need to in a competitive game.

Strategic and tactical development

When coaching less tactical sports (such as weightlifting, archery or gymnastics) coaches can be very specific and technical with the practice activities and feedback they give to the athletes. In tactical games (such as soccer, Australian Rules football and water polo) the learning environment needs to reflect the game environment if players are to understand how they are to apply the skills they have developed effectively in a game.

The tactics associated with game play are similar in many sports. In soccer, Australian Rules football and water polo, for example, movement into space, leading towards the ball, marking a player, moving into a position to shoot, and so on, are common to each. Individuals can learn the tactics of one game and then apply these across a range of similar sports.

The earlier an individual engages in learning the tactical aspects of the game the more effective the learning of this aspect will be. This process requires the coach to introduce skills into game-like situations rather than static skill drills. To teach somebody to pass a ball in soccer you could play a game of 'piggy in the middle', where two players are trying to pass the ball to each other and a third player is trying to stop the pass being made. For beginners the rules can be set to make it easier for a pass to be made, and as skills develop the rules can be tightened so that the defender has a better chance. By introducing skills in this way, players will become aware quickly that passes need to be made so that the opposition cannot reach them and so that they are directed to their own partners (team) if they are going to keep possession. Compare this approach to that of having two players learning to pass by passing the ball backwards and forwards between hats with no opposition and no tactical knowledge being learnt in the process.

This tactical approach to skill development has the following benefits:

- It allows individuals to understand the complete requirements of the skill.
- It allows practice for decision-making skills.
- It enhances motivation and confidence.
- It improves team coordination.

Each of these benefits is explained below.

Individuals quickly become aware of how much time they have to complete the skill in a game setting. They realise what the results of errors of skill will be (such as loss of possession) and they learn in what context the skill will be used in a game.

As skills and knowledge increase, the game-like practices will develop complexity and, as a result, the decision-making process will be developed and enhanced. They are likely to come across problems that will reflect those they will experience in a real game. Having practised responses to these problems they will be more likely to make decisions that improve performances in the game situation.

As players experience a game-like setting in most training sessions they will develop the confidence to display their skills while playing a game. The approach also motivates individuals as they can work at their own level of skill in most cases and not be held back to simple drills if they have a more advanced skill level than the rest of the team.

By playing in game-like activities with fellow team members there is likely to be an improved understanding of the way they will respond in a given situation.

Once the individual has developed the understanding of the skills and tactics of the game the coach can begin to influence the way the play is conducted on the field. The coach can plan and implement specific tactics during a game. Prior to individuals gaining this understanding they possibly will not understand what the coach wants them to do or why it is important for them to do it.

Practice method

Practising is essential to learning and improving, and can be done in a variety of ways. Types of practice methods include the following:

- speed and accuracy
- massed and distributed
- whole and part.

All these methods are described in more detail in the text that follows. It is essential to understand the applications, uses and limitations of each method. Sporting pursuits vary, and there is therefore no set routine for practice or performance. An astute coach organises training that is appropriate to the task and the athlete, and ensures that the training remains interesting and challenging. How a skill is practised will determine how that skill is acquired and performed. Perfect practice makes perfect performance.

Speed and accuracy practice

Speed is the rate at which a motor task is performed. **Accuracy** can be described in terms of how a particular response deviated from a specific end point (for example, a tennis serve missed the line by centimetres) or by the end position of an object on a target (for example, a 'bullseye' was scored).

Speed and accuracy are task-specific and should relate to the final expectations of the performance. When speed is predominant for a skill, early emphasis on speed is preferable. When accuracy is needed, early emphasis on accuracy is better. If attention is directed solely to accuracy when learning, speed will gradually improve. If attention is directed solely to speed, however, accuracy tends to diminish. Beginners should concentrate on accuracy, and then increase speed.



Beginners should concentrate on accuracy, and then increase speed.

Massed and distributed practice

The length of time spent practising skills and the time spent at rest are important training considerations. **Massed practice** is a relatively continuous type of practice in which the rest periods are either very short or non-existent; for example, when a netball goal shooter practises shooting for 20 minutes continuously. **Distributed practice** occurs when periods of rest, or periods of practising other skills, are equal to (or longer than) periods of practising the primary skill. An example of this is a netball goal shooter practising shots from the right for 10 minutes, having a break for 10 minutes, then practising shooting from the left for a further 10 minutes, followed by rest for a further 15 minutes.

There is no real difference between the two methods in learning basic skills. However, for improving performance, distributed practice is more effective than massed practice because it allows for feedback to be given, and decreases the likelihood of fatigue.

Massed practice is preferable for:

- highly skilled performers
- highly motivated performers.

Distributed practice is preferable for:

- the novice
- in situations where energy demands are high
- when the task is difficult or boring.

Whole and part practice

Another way of practising is to use the *whole-or-part* method. This method refers to whether skills should be practised in parts or as a whole. For example, should a softball hit be taught in its entirety or in its component parts, such as stance, grip, swing and follow-through? One method will be more effective than the other in any given situation, but a decision has to be made on which to use, and when. Figure 8.8 introduces the concepts of task complexity and task organisation to aid in this decision.

Task complexity refers to how many parts or component parts are present, and the intellectual demands of the task. A dance routine has a high level of task complexity, whereas weightlifting has a low level of task complexity. **Task organisation** refers to how the component parts of the task are interrelated. A jump shot in basketball has a high degree of task organisation because the parts of it are interrelated—with each part being highly dependent upon another to achieve the objective. Dance has a relatively low degree of task organisation because the order of performing the parts is not necessarily related to achieving a definite objective (such as scoring a goal) in the overall performance.

It is difficult to apply the above information because not all skills fit at one end or the other of the continuum of complexity and organisation. It is therefore difficult to predict which method to use. Some skills fall into the middle of the continuum, and might therefore require a combination of methods. It is not uncommon to use a combination of whole and part practice (learning skills as a whole at times, and in part at other times) or progressive part practice.

Progressive part practice is a term used to describe parts of a complex skill being learnt separately, and then the learnt parts being added together to form larger and larger parts, until the whole skill is practised. For example, a spike in volleyball can be broken down into run up, stepping, jumping and striking. Each skill is practised separately and then each is added to the others, until the whole skill is practised in its entirety. Part practice is useful for novices, or when learning a new skill.

Part practice is useful for novices, or when learning a new skill.

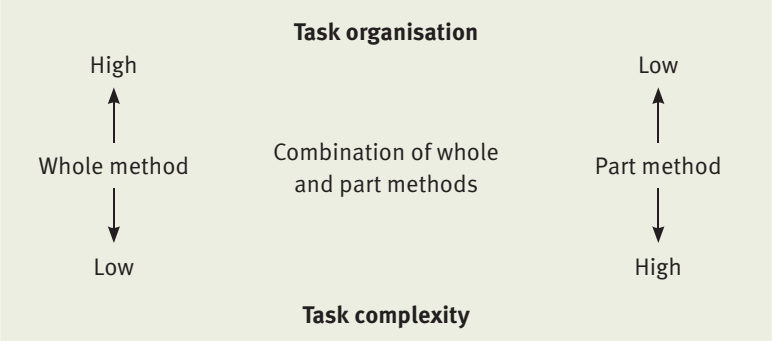


Figure 8.8 The relationship of task complexity and task organisation to whole and part practice

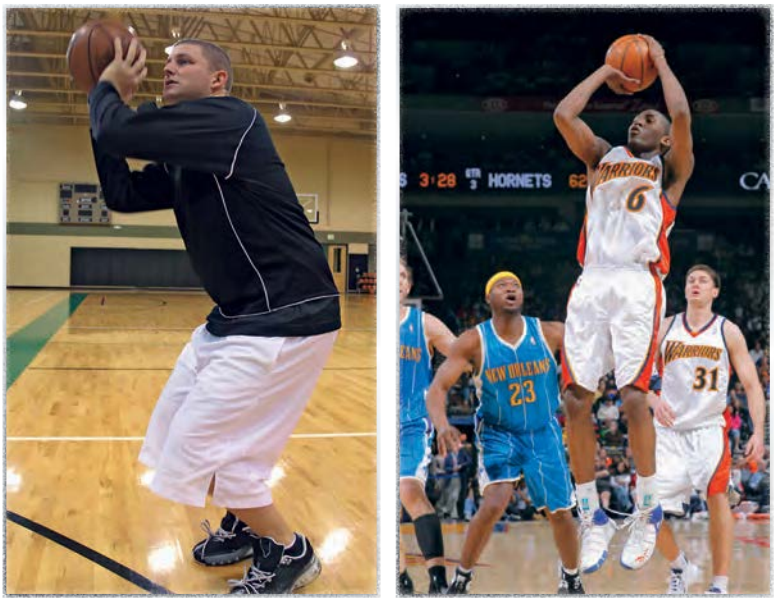


Figure 8.9 Practising the jump shot in parts, such as stance and grip (left). Performing the jump shot once it has been mastered will be practised as a whole (right).



Figure 8.10 If using progressive part practice, a spike in volleyball could be broken down into run up, stepping, jumping and striking

Keys to successful practice

Quality practice time is essential for the successful development of sports skills. To be successful in a sport an athlete must be prepared to maximise the type, number and length of practice sessions.

Practice must be specifically related to the activity or game played. Coaches should attempt to make training situations as similar to games as possible; for example, by requiring the athletes to wear playing gear to training.

Time spent in the total practice period, time spent at rest and time spent on particular skills should all vary according to the skill level of the learner and according to the importance of the skill in the performance. A tennis player might therefore have a session of practising serving every 5–10 minutes, as the player does in the game.

The practice conditions should also be varied. Athletes will soon lose motivation if the same skills and drills are repeatedly taught in the same way. The skill itself should be analysed according to how it is used in the game, and practised accordingly in a *variety* of ways.

Critical inquiry

1. Choose a sport and suggest examples of how to structure three training sessions for that sport. Each training session should emphasise one of the following:
   a. accuracy
   b. whole practice
   c. part practice.

Research and Review

1. Bowling a cricket ball requires both speed and accuracy. **Describe** how you would teach a beginner to bowl.
2. Name a skill and **identify** all the segments into which it can be broken for part learning.
3. **Identify** examples of sporting situations in which massed practice is preferable, and those in which distributed practice is preferable.
4. **Classify** the following sports as closed/open, gross/fine and discrete/continuous/serial:
   a. surfing
   b. playing snooker
   c. throwing the javelin
   d. high jump
   e. taking a penalty stroke in hockey
   f. goal-keeping in soccer
   g. aerial skiing.
5. Choose from hockey, Australian Rules football or netball. **Propose** three activities that will help beginners to understand the defensive strategies used in the game.
6. The way in which skills are learnt, practised and, finally, acquired depends on the characteristics of the learner and the nature of the learning environment. **Discuss** this statement with reference to how a novice Australian Rules football player might be coached through the stages of skill acquisition.

practical application

Types of practice

1. In your own words, **describe** Figure 8.8 (page 158). Provide three sporting examples for each method: whole and part practice.
2. Divide the class into three groups.
   a. Design a number of practical activities that examine the effects that the various types of practice may have on performance. **Examine**:
      - whole and part practice
      - massed and distributed practice
      - speed and accuracy practice.
   b. Conduct the activities in groups involving the rest of the class.
   c. **Evaluate** the effectiveness of each type of practice according to the skill level of the people involved.

Feedback

How many times have you stood on a sideline and heard remarks similar to the following?

- 'Hey, Bill, you're as slow as a wet week.'
- 'You couldn't even catch a cold.'
- 'Hey, ref, it's a good game. Why don't you watch it?'
- 'My grandmother can tackle harder than that!'

All these remarks belittle the player or official, and diminish the respect between the speaker and the person to whom the comment is directed. They are negative in nature. Compare them with the following:

- 'Bad luck, Sarah. Just give it a little more air next time.'
- 'Good goal, Bok. Now hustle back into position.'
- 'Nice pass, Helen. You're getting better every training session.'

These comments are designed to make the participant feel good about his or her performance. They reinforce the desired response and improve the relationship between the speaker and the person to whom the comment is directed. They are *positive* in nature.

Positive feedback is designed to make the participant feel good about his or her performance.

When performers receive any sensory information about an action, this is termed *feedback*. Feedback comes from a variety of sources and can have the following effects:

- reinforcement of the correct or desired response
- motivation of the performer to improve or maintain the performance
- correction of the action as a result of information received about errors.

The performer can come to rely on feedback and, when feedback is withdrawn, the performance can decline.

Sources of feedback

Feedback can come from sources within the athlete. This is called *internal* or *intrinsic* feedback. Alternatively, it can come from external sources, in which case it is termed *external* or *extrinsic* feedback.

Internal feedback

Internal feedback is information received naturally from the senses as a result of movement. When passing a basketball, the athlete is aware of his or her own legs, shoulders, arms and fingers moving through the air. The athlete is aware of the ball leaving the fingers, and can see and hear it being caught by a partner. The athlete thus perceives information about the performance without the use of equipment, devices or other people. Therefore, internal feedback includes sensations (such as sights, smells, touch and sounds) that are related to the performance.

External feedback

External feedback is information that is provided from outside the performer's natural sensory awareness of the immediate action. This external feedback might be the coach's voice, the scoreboard, video analysis or the cheer of the crowd. The external feedback supplements the performer's natural internal feedback. In some cases, there is no external feedback.

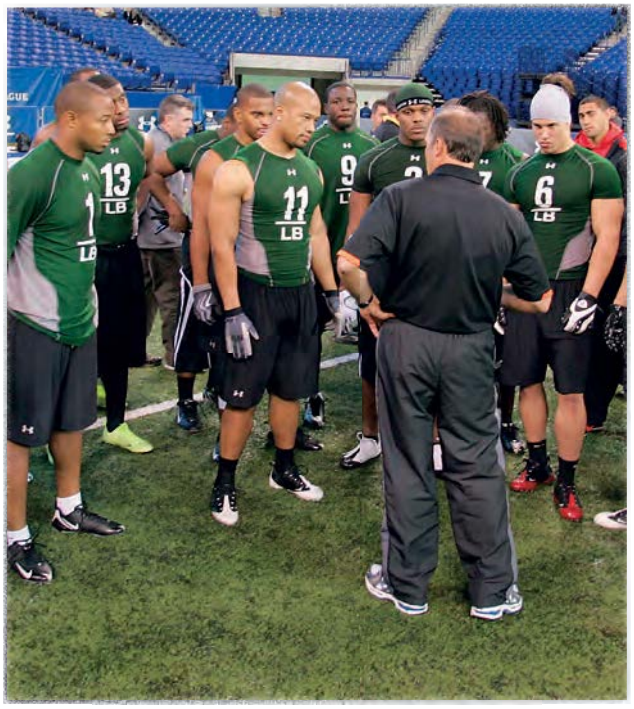


Figure 8.11 Coaches provide external feedback

Types of external feedback

Two important forms of feedback are:

- **knowledge of results (KR)**
- **knowledge of performance (KP)**.

KR is information that is provided externally after the completion of the action. It is based on the outcome of the performance or on what caused the outcome. It is particularly helpful when learning a new skill. KR allows the learner to correct an action the next time, to be reinforced when the attempt is totally or partially correct, and to remain motivated to try again. A score in gymnastics and the coach's reaction to his or her team's performance are examples of KR.

KP is information that is received either internally or externally concerning the movement executed. KP does not inform about the movement success (as KR does). Rather, KP informs about the performance of the movement pattern itself, or how it looked. For example, a gymnastic coach informing the gymnast that she had good body shape and height during a movement or that her feet came apart directly relate to the actual movement and not the score that the gymnast will receive.



Figure 8.12 Arrows in a target provide knowledge of results



Figure 8.13 The feel of a ball as it hits a table tennis bat is an example of concurrent feedback

Timing of feedback

The *timing* of feedback is very important. There are many opportunities before, during and after a performance when an athlete might receive feedback.

Concurrent feedback is feedback received during the performance. Examples include the feel of a ball as it hits a table tennis bat, or the sight of the goalkeeper moving to the left before a penalty stroke. The athlete can respond to this concurrent feedback at the time.

Delayed feedback (or *terminal feedback*) is provided after the performance, and is therefore received too late to produce a response at the time. A player jumping to head the ball in soccer cannot change the body's position in the air when the ball is 1 metre from the head. In this case, the correctness of the action is gauged after the ball has been headed. The feedback might be a goal or a comment from the coach. This is an example of delayed feedback.

Concurrent and delayed feedback can therefore be provided both internally and externally. Concurrent feedback, and doing other activities between performances, might hinder learning as it can distract the learner from concentrating on the movement as it is being performed.

practical application

Feedback

1 Divide the class into three groups to perform this simple throwing activity. You will need supervisors, recorders and subjects. The task is to throw a ball towards a bullseye target that has various scoring sections. The ball is to be thrown 10 times, receiving feedback according to the following:

- Group 1 receives KR only. Perform 10 throws blindfolded. Only the score for each throw is given to the performer.
- Group 2 receives KP only. Perform 10 throws blindfolded. No feedback is given.
- Group 3 receives a combination of KR and KP. Perform 10 throws without the blindfold. All scores are given to the performer.

Record all results. Graph the average results for each group. Then complete the following tasks:

a **Describe** the group averages and the trends observed in the activity.
b **Identify** any improvement in performance noted across the 10 trials.
c **Discuss** the influence of KR and KP on performance.
d **Outline** why groups 1 and 2 needed to be blindfolded.

2 **Identify** a basic tactic associated with a sport of your choice. Design two modified games, as follows, that will assist the learning of the tactic you have identified:

a a simple modified game for a beginner
b a complex modified game for an advanced player.

3 You have just been appointed the new coach of the Bayside under-7s soccer team. Most players are new but some have played for a season. The team includes boys and girls. **Outline** your coaching plan for the season, which runs for eight weeks. Include examples of suitable practice methods and how you will use feedback during the stages of skill acquisition. How will you account for the variations in the characteristics of the group, and how will you develop strategies and tactics in the group?

Usefulness of feedback

For extrinsic feedback by observers to be effective, it should:

- contain no sarcasm
- praise and criticise the behaviour, not the person
- be constructive
- be meaningful to the individual
- contain positive non-verbal communication
- be communicated effectively
- be consistent
- use the 'sandwich approach'—give a positive statement, then corrective feedback, then a compliment (for example, 'Good run, Juanita. Next time pass the ball. Keep up the great effort.')

Research and Review

1. **Explain** why feedback plays a major role in the learning of skills, and in sporting performance.
2. Using examples from sport, **explain** the difference between KR and KP.
3. **Explain** why the timing of feedback is critical in the correction of skills.
4. **Describe** how the type of feedback individuals receive will change as they move through the stages of skill acquisition.

Assessment of skill and performance

Characteristics of skilled performers

The main aim of the analysis of human performance is to improve performance. A skilled performer has learnt how to achieve a particular performance goal at almost every attempt, and to do so with minimal waste of physical and mental energy, or time. A number of perceptual abilities and physical attributes has been identified by sports scientists to explain differences between skilled and unskilled performers, and to explain individual variations in the acquisition of skills.

Perceptual abilities are those related to the senses.

Skilled performers are usually stronger and more flexible, have better body coordination and whole body balance, and have better stamina than do unskilled performers.

In addition, with respect to perceptual motor abilities, skilled athletes perform better in the following areas compared with unskilled athletes:

- ***kinaesthetic awareness*** *and* ***proprioception***—skilled athletes have an ability to utilise the sensory information gained from within their body concerning body position and limb awareness
- *anticipation* of what might happen next and appropriate response to it—skilled athletes rely on external environmental information, memory and 'feel' during the performance
- *timing* of responses—skilled athletes have quick and efficient responses (reactions and movements), making them appear to have 'all the time in the world'
- *limb coordination*—skilled athletes hold their arms steady and have excellent hand and finger coordination

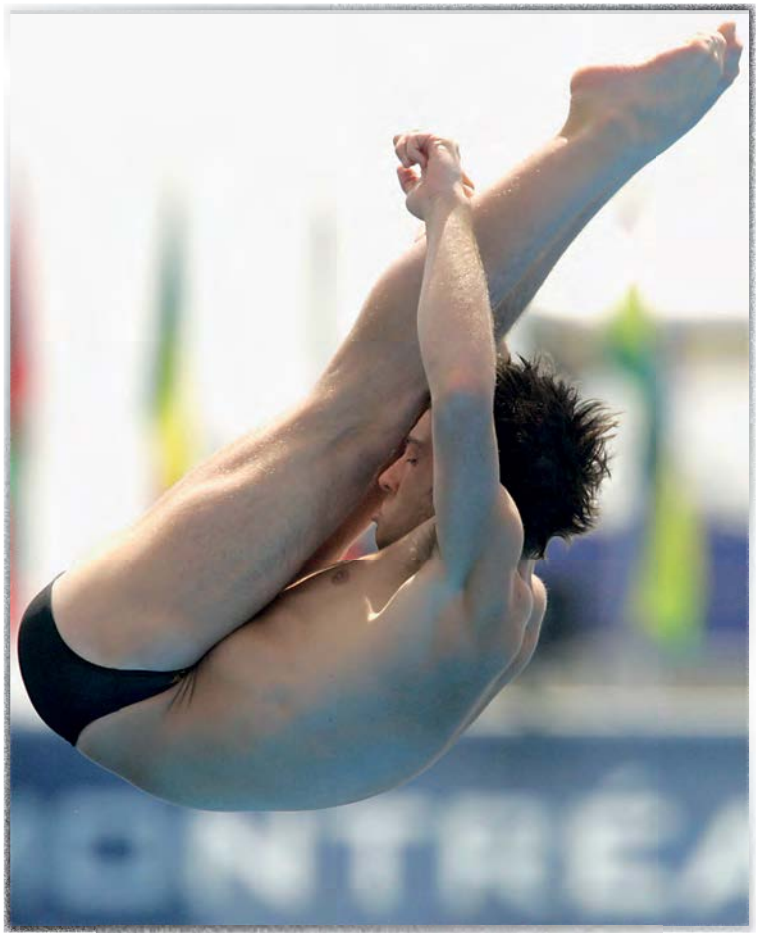


Figure 8.14 Skilled performers, such as diver Matthew Mitcham, have learnt how to achieve a certain performance goal at almost every attempt

- ***consistency*** of performance—skilled athletes make very few errors during an activity
- *technique*—skilled athletes maintain correct technique despite fatigue or the game situation
- *response to cues*—skilled athletes are able to respond to many cues and recognise and respond only to those cues that are relevant
- *mental attitude*—skilled athletes are more aggressive, competitive, ambitious, self-assured, adventurous, confident, determined and committed; have better concentration; are able to self-regulate anxiety and arousal; and can understand and use complex skills and patterns.

A skilled performer is able to perceive, decide and act in a manner that is efficient in terms of both energy and time. The skilled performer is faster and more accurate and has greater consistency than unskilled performers. Through experience and practice, skilled performers develop special attributes, such as anticipation and relevant cue recognition.

In addition, the skilled performer:

- appears to be smooth and effortless
- has composure
- is able to adjust to changes in plans
- is relatively unaffected by the competitive environment
- is able to regulate personal effort levels
- is able to overcome physical demands and pain
- is able to cope with poor officiating
- can handle the pressure in the final stages of a contest.

There are thus many important observable and measurable characteristics of skilled performance and skilled performers.

practical application

Characteristics of skilled performers

1 Interview a skilled athlete.

a **Investigate** what motivates the athlete to train and perform in the chosen sport.

b **Identify** the characteristics and skills that the athlete believes to be essential for success in the sport.

c Discover how the athlete has developed these skills and characteristics.

Critical inquiry

View a number of videos of skilled and unskilled performances in one skill area. **Compare** and **contrast** the performances. For example, you could film your classmates dribbling soccer balls and compare that with the soccer dribbling skills displayed in the YouTube footage referred to below.

WEB The video image that is suggested for viewing in the Critical Inquiry task can be accessed via www.oup.com.au/pdhpe12



Objective and subjective performance measures

Before you decide to do your homework you mentally collect data about the task. The decision you make about the homework you do is based on the time available, the work, the subject and the possible outcomes of doing it—or not doing it! You are measuring and testing data before making the better decision.

In much the same way, a gymnastics judge is able to collect data before making a decision about the quality of a particular gymnast's performance. Similarly, a coach collects data about an athlete's fitness level. Measurement is an important process that allows skills and performances to be evaluated and compared.

Measurement is the act of assessing, usually by the assigning of numbers to whatever is being assessed. A *test* is an instrument that can be used to make measurements. **Appraisal** (or *evaluation*) is a dynamic process in which a decision is made concerning the value, merit or quality of what is being measured. An example of this is using a sit-up test to measure abdominal strength. Simply giving the athlete a score gives no information about the quality of the performance. By comparing the athlete's results with established norms, however, a value judgement (appraisal) of the performance can be made.

Measurement has many purposes, including:

- placement of athletes into ability groups
- diagnosis of strengths and weaknesses
- prediction of future performance results
- motivation of the performer
- achievement and improvement of levels of skill
- evaluation of instruction methods.

Skills can be appraised by subjective or objective observation.

Subjective appraisal depends on the observer's personal judgment of how well the skill was performed. It is based on personal feelings, and is affected by the mind and temperament of the observer, rather than the attributes of the object. This applies to quality and style of performance, such as in dance or gymnastics routines.

Objective appraisal involves an impartial measurement based on certain indisputable facts about the performance. It occurs without bias or prejudice, and is such that observers will give the same result for the same performances; for example, when a batter is bowled out in cricket, or when the final score for a golfer is six strokes under par.

It is important to establish performance measures upon which to base the appraisal of athletes. It is equally as important to be able to interpret the results of the performance measures. Apart from objective and subjective appraisal, there is a number of other ways in which performances may be judged. There are 'norm-referenced tests' and 'criterion-referenced tests', 'rating scales' and 'percentile rankings'. These measures allow observers to evaluate and rank performance.

The appraisal of skill can involve three types of measurement:

- information-processing capacity (for example, memory and reaction time)
- general motor ability (for example, speed and power)
- specific sports skills (for example, kicking and passing).



Figure 8.15 A race time is an example of an objective appraisal

Critical inquiry

1 **a** **Identify** examples of each of the following:
- norm-referenced tests and criterion-referenced tests
- rating scales
- percentile rankings.

b **Describe** what each is measuring.

c **Explain** how each measures this.

d **Discuss** the advantages and disadvantages of each type.

Skill-related tests

In addition to standard health and fitness tests for endurance, anaerobic capacity, strength, and so on, it is possible to measure motor-skill accomplishment. Skill-related tests can provide objective methods for evaluating the skill attributes that are required for success in particular sports. Skill-related tests can also:

- evaluate learning
- predict future performance
- classify and compare participants
- motivate
- determine achievements
- diagnose injury
- act as a learning tool.

5 = excellent	Proper grip, good balance, footwork and near-perfect form. Demonstrates consistent stroke mechanics. Anticipates opponent's shots. Placement appropriate for opponent's weaknesses or position.
4 = good	Proper grip, good balance, adequate footwork and acceptable but not perfect form. Demonstrates above-average consistency of stroke mechanics. Anticipates opponent's shots. Consistent placement within court area.
3 = average	Proper grip and acceptable balance, but footwork is poor. Form is somewhat erratic and inefficient, resulting in inconsistency in shot placement. Style of play may be defensive. Little anticipation of opponent's shots.
2 = fair	Uses improper grip at times, poor footwork and basically incorrect form. Inconsistent stroke mechanics. Defensive style of play, merely trying to get ball over net. Little anticipation of opponent's shots. Unable to sustain a rally.
1 = poor	Incorrect grip, off-balance, with poor footwork. Form is very poor and erratic. Inaccurate shot placement. No anticipation of opponent's shots. Experiences difficulty in getting ball over net.

Figure 8.16 Tennis rating scale

The skill-related tests shown in Figures 8.16, 8.17 and 8.18 (page 166) are considered to be objective, reliable and valid. Most skill tests are accompanied by a set of norms allowing comparison of performances.

Scale description

5 points— Exceptional ability for the age and gender of the student

4 points— Above-average ability for the age and gender of the student

3 points— Average ability for the age and gender of the student

2 points— Below-average ability for the age and gender of the student

1 point— Inferior ability, far below average ability for the age and gender of the student

Critical elements	Scale (1–5)
A Spiking	
i Approach	5 4 3 2 1
ii Jump	5 4 3 2 1
iii Spike placement	5 4 3 2 1
B Serve	
i Accuracy	5 4 3 2 1
ii Difficulty of return	5 4 3 2 1
C Passing	
i Proper use of hands	5 4 3 2 1
ii Accuracy	5 4 3 2 1
D Team play	
i Hustle	5 4 3 2 1
ii Teamwork	5 4 3 2 1

TOTAL SCORE _____

Figure 8.17 Volleyball rating scale

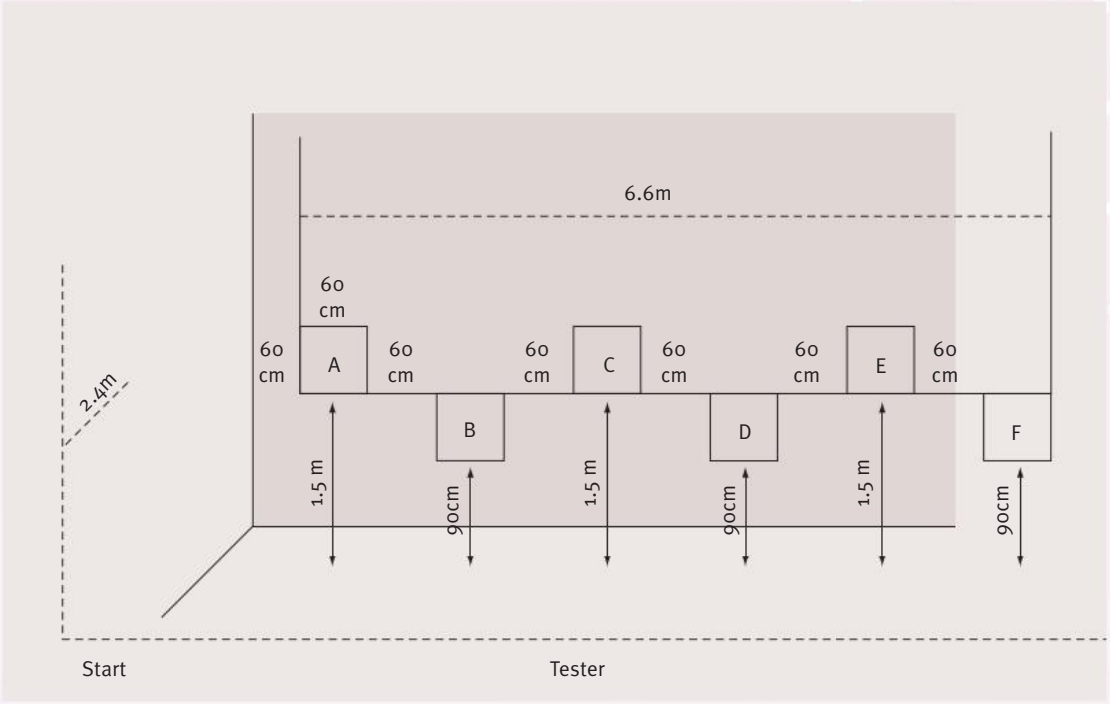
Passing

Objective: To measure skill in passing and recovering the ball while moving

Equipment: Standard inflated basketball, stopwatch, smooth wall surface, marking tape

Procedure: Six squares are marked on the wall and a restraining line is marked on the floor 2.4 metres from the wall. Three 30-second trials are administered, with the first trial considered practice and the last two timed. The player, holding a ball, stands behind the restraining line and faces target A. On the command 'Go', the player chest-passes at target A, recovers the rebound, and moves opposite target B. From behind the restraining line the player chest-passes at target B. This pattern continues until target F, where two chest-passes are executed. Then the player moves to the left, passes at target E, and continues to move left passing at each target in turn.

Scoring: Each pass that hits the desired target counts two points. Each pass hitting the wall but missing the target counts one point. The sum of the last two trial points is the final score.



AAHPERD (American Alliance for Health, Physical Education, Recreation and Dance), 1984

Figure 8.18 Basketball rating scale

practical application

Skill-related tests

1 a In pairs, take turns at the passing skill test above. **Identify** any difficulties in undertaking the test.

b **Discuss** the strengths and weaknesses of the skills test.

c **Propose** another test for a different skill in the same sport.

2 a **Investigate** other sports that utilise skill-related tests.

b **Describe** the test undertaken.

c **Evaluate** the effectiveness of the test in determining the skill level of a player in the sport.

Validity and reliability of tests

In the pursuit of accuracy, credibility and fairness, new and improved techniques have been devised to provide measurements of performance. The elimination of human error tends to increase the objectivity and reliability of tests in many sports.

Validity is the degree to which a test measures what it is designed to measure. For example, a sprint test does not measure aerobic endurance. Factors that affect validity include the type of measurement tool chosen and the characteristics of the individual, such as age, gender and whether the person is a novice or an expert. An example of an invalid test is a teacher telling a class that an examination will be on energy systems, when the examination is really on skill acquisition. Validity would be in doubt if the results of a battery of tests indicate that an individual is not suitable for basketball, but that person then wins an award for most valuable player of the season.

Reliability is the ability of the test, and the test results, to be repeated. For example, it is difficult to achieve the same 40-metre sprint results on grass and on sand. The reliability of an instrument or test is dependent on the extent of its measurement error, and its capacity to discriminate between different levels of ability in a group. An example of an unreliable test is to compare a 'beep' test conducted on grass with one done on the gym floor, and to use different tape decks for each.

A test can be reliable but invalid. That is, a test can give consistent results, but not measure what it claims to measure. A test cannot be valid if it is not reliable. That is, if it cannot provide stable, repeatable results, it is not valid. The reliability of a test should be determined before its validity.

A test can be reliable but invalid, *but* a test cannot be valid if it is not reliable.

practical application

Skill-related tests

1. **Construct** a new sports skill-related test for a sport of your choice. Administer the test and decide how to determine its reliability and validity.
2. Choose a sport and design an appropriate performance-appraisal technique that is objective, valid and reliable.
3. Find three other skill-related tests that are reliable and valid, and participate in them as a class.

Critical inquiry

1. **Assess** whether it is possible for a skilled performance to take place but the athlete not to win.
2. **Identify** who creates the standards of performance for particular events.
3. **Describe** the 'quality of performance' within a sport of your choice.

Research and Review

1. **Describe** the difference between measurement and appraisal.
2. **Identify** how judges and observers can maintain test objectivity.
3. **Identify** the essential characteristics of a skilled performer in your favourite sport or activity.
4. **Outline** the factors concerning both the environment and the athlete that contribute to a skilled performance.
5. **Compare** the characteristics of a highly skilled performer with those of an unskilled performer. Use examples to illustrate your answer.

Personal versus prescribed judging criteria

Why is it that one person likes a particular film and another loathes it? How is it determined that Ricky Ponting might be the best batsman in the world? Who decides whether there is such a thing as a 'perfect 10' in gymnastics? The answers to these questions lie in the science of measurement and appraisal. Measurement and appraisal are not mutually exclusive: they can exist separately or together. In fact, adding measurement to appraisal will increase the objectivity of judgment of a performance.

Using measured numerical information, judges are able to compare performers among teams or as individuals. Appraisal relies heavily on the judges' subjective evaluation of the performance. Their objectivity increases as they become experienced at judging. The evaluation might be done either by an **established criterion** (a prescribed judging criterion) or it might include feelings, emotions, expectations and preconceived ideas about the performance, and thus be a **personal judging criterion**. Similar processes are used whether evaluating a movie or choosing a player for next week's game based on performance at training. Two examples of prescribed judging sheets for gymnastics are shown in Figure 8.19 (page 168).

Neutral errors include those for stepping out of bounds or violating time requirements, as well as attire or podium violations.

Women's gymnastics scoring sheet

School _____ Judge _____

No. 1 **VAULT 1** **VAULT 2**

Vault name Value Preflight

1 _____ _____ On horse

Deduct _____ Landing

2 _____ _____ Neutral

Deduct _____ Total deductions

Final score _____ _____

No. 2 **VAULT 1** **VAULT 2**

Vault name Value Preflight

1 _____ _____ On horse

Deduct _____ Landing

2 _____ _____ Neutral

Deduct _____ Total deductions

Final score _____ _____

Event _____ Name of judge _____

Competitor _____

Scratch area	Difficulty (4.0)	
	Originality (1.5)	
	Composition (0.3)	
	Execution (1.5)	
	Amplitude (1.3)	
	General impression (1.0)	
	SCORE	
	Falls, neutral deductions	
	FINAL SCORE	

Comp _____

Event _____

Score _____

Judge _____

Figure 8.19 Two gymnastics scoring sheets

Scratch means no handicap or bonus is given.

practical application

Personal versus prescribed judging criteria

1 Choose a video of a dance or gymnastics performance to watch; for example, the rock eisteddfod. Develop an appraisal instrument (prescribed or personal judging) so that you can evaluate the performance. It may be any type of instrument. View the performance and judge it based on the appraisal instrument. Then complete the following tasks:

- a What were the limitations of your instrument?
- b Comment on the objectivity, validity and reliability of your instrument.
- c Exchange your instrument with that of someone else in the class, and evaluate the performance using another instrument.
- d **Discuss** any similarities or differences in the judging results.



Research and Review

1 'There is no such thing as a totally objective appraisal'. **Discuss**.

2 What is a quality performance? **Explain** with examples.

3 **Discuss** whether the benefits of skilled performance outweigh the negative outcomes. Provide examples of positive and negative outcomes of actual sporting events.

4 **Discuss** important considerations when using tests or instruments to measure skill and performance.

how does the acquisition of skill affect performance?

chapter summary

- There are three stages of skill acquisition:
  1. cognitive—the beginning stage where the individual is working out what needs to be done to perform the skill
  2. associative—where the individual practises the skills and begins to apply them in game settings
  3. autonomous—where the individual can focus on the environment in which the skills are occurring and not on the skill itself.
- An individual's characteristics (such as genetic traits, confidence and prior experience) can influence the speed with which that person may acquire a skill.
- Open skills are those that occur in an unpredictable and changing environment and tend to be externally paced. Closed skills are the opposite of this.
- The type of practice undertaken will be determined by the complexity of the skill and the degree of physical effort required to perform it.
- The type of feedback given to an individual will change as the person develops the ability to perform the skill.
- The performance elements are those factors that are required to perform the skill in a game setting, such as decision-making skills.
- The way a performance is assessed can be objective (that is, based on facts, such as a score or time) or subjective (that is, based on the observer's opinion).
- Many sports try to make their judging more objective by establishing specific criteria against which scores are awarded.
- Tests that are valid assess the attribute they state they are testing for. Reliable tests are those that are conducted in exactly the same way each time.

revision activities

1. **Describe** how making a skill more closed in nature can improve the speed at which it is learnt.
2. For a sport of your choice, develop a training session that shows knowledge of the performance elements.
3. **Outline** the key differences between a skilled performance and an unskilled performance.
4. **Distinguish** the characteristics that an individual will display between the cognitive and autonomous stages of skill acquisition. Use specific examples from a sport of your choice.

extension activities

1. **Identify** technology that can be used to improve the feedback given to an athlete.
2. Design valid and reliable skills tests that assess a range of skills in a team sport of your choice.
3. Choose an elite performer in any sport and describe the characteristics that athlete displays as a skilled performer.
4. Explore the USA Diving website and explain the way that attempts have been made to make judging of diving more objective.

WEB

The USA Diving website can be accessed via www.oup.com.au/pdhpe12

exam-style questions

1. **Identify** how the nature of the skill influences an individual's ability to learn a movement skill. (3 marks)
2. **Outline** the role of feedback in skill acquisition. (4 marks)
3. **Describe** how the characteristics of a learner can influence that individual's progression through the stages of skill acquisition. (5 marks)
4. a **Outline** the nature of skills and performance elements. (4 marks)
   b **Analyse** how these would be applied to the stages of skill acquisition. (6 marks)



outcomes

A student:

- H2 analyses and explains the health status of Australians in terms of current trends and groups most at risk
- H5 explains the different roles and responsibilities of individuals, communities and governments in addressing Australia's health priorities
- H6 demonstrates a range of personal health skills that enables them to promote and maintain health
- H14 argues the benefits of health-promoting actions and choices that promote social justice
- H15 critically analyses key issues affecting the health of Australians and proposes ways of working towards better health for all
- H16 devises methods of gathering, interpreting and communicating information about health and physical activity concepts.

option 1

The health of young people

coming up This option focuses on the health issues of young people. The nature of the lives of young people, and the developmental and social forces that influence their health are examined. In this Option, students learn how the successful management of these developmental forces assists in establishing good health. Through an examination of examples of health promotion campaigns and health services, students learn to evaluate the services available to young people.

FOCUS QUESTIONS

- What is good health for young people? ..... [page 172]
- To what extent do Australia's young people enjoy good health? ..... [page 196]
- What skills and actions enable young people to attain better health? ..... [page 226]







chapter 9

what is good health FOR YOUNG PEOPLE?

In this chapter you will explore the nature of young people (typically those aged between 15 and 25 years) and the aspects that distinguish them from previous generations. You will analyse the health of young people and examine the range of factors that may impact on their health. You will look at how young people can successfully manage developmental aspects that may impact on their health.

The nature of young people's lives

The transition from being dependent children to independent adults is a period of rapid emotional, physical and intellectual transition for young people. During this period young people experience a range of life events and make decisions that may have an impact on their immediate and longer-term health and well-being. Some of these decisions include those concerning schooling and career paths; relationships with families and peers; sexual behaviours; employment; finances; and contact with drugs, alcohol or the justice system.

In recent decades, the transition to adulthood has been made more complex by the social, economic, environmental and rapid technological changes in Australian society. Compared with young people from previous generations, young people today have fewer siblings and are more commonly living in single-parent families, blended families or families with both parents in the workforce.







Figure 9.1 The transition from being dependent children to independent adults is a period of rapid emotional, physical and intellectual transition for young people

Diversity of young people

Young people are diverse in terms of developmental stage, motivation, values, socio-cultural background and influence of family and peers. Young people are often viewed as being a **homogeneous** group (that is, all the same) with similar interests, motivations, backgrounds and problems. Although all young people proceed through a process of developmental stages, the rate of progress of each individual will be determined by his or her social, economic and physical environment. Many young people will not have the opportunity to attend post-compulsory education, perhaps due to their socio-economic status and educational ability. For other young people, a university education is expected by their family, and their future employment plans revolve around their educational success.

Young people vary in their aspirations, abilities, levels of family support and socio-cultural background. It is essential to realise that this will determine the rate at which they progress from childhood to adulthood. Young people who complete their education at Year 10 do so for many reasons; for example, to contribute to their family's finances, to follow employment pathways or in response to personal circumstances.

Not all young people share the same values. Values are largely determined by culture and family beliefs. Young people within numerous cultural groups, including Aboriginal and Torres Strait Islander people, are closely tied to the values of their communities. The peer group plays a significant role in testing the family values of all young people. The values learned from families during childhood are often questioned as young people strive to develop their own identities. Although family values might be extremely important for most young people, other influences emerge as significant for some young people. As young people reject the values of their family and adopt those of their peers, health-compromising behaviour can emerge, such as drug abuse, physical inactivity and poor nutritional habits. Conversely, the values of the peer group can positively affect the health status of some young people. The peer group might become a source of motivation for good health practices, such as adopting safe levels of drinking.

Young people vary in their rate of maturation, both physically and in social and emotional development. As higher levels of education become essential for employment, many young people are remaining in the family home until they complete their training or tertiary education. In terms of developing independence and self-sufficiency, many young people are still reliant on their parents for accommodation and financial assistance. According to a report published by the Australian Institute of Health and Welfare (AIHW) in 2007, most young people lived in families. Of these, 80 per cent were living in couple-parent families and were more likely than young people from lone-parent families to have an 'employed' parent or one who had completed secondary school.

Meet the multividuals

Today's youth are bamboozling the marketers by refusing to fit into neat, easily defined subcultures, writes Julian Lee.

Marketers have pigeonholed young people since 'teenagers' appeared in the 1950s. From bodgies and surfies to crusties, homies, burbanites and glitterazzi, researchers have never left us short of a colourful tag to describe the latest 'youth tribe' …

Now, we are told, tribes are on the way out. Welcome to the 'multividual'—the marketer's new moniker to describe today's 16- to 28-year-olds.

The singular devotion to a tribe, its way of life, music, clothes and attitudes has no place in the pick-and-mix world of today's youth culture, according to an advertising strategist, Jamie Mackay.

Mackay's theory is that today's young adults … no longer belong to tribes but borrow from each subculture and reassemble it in their own personal style.

'There's a sense of belonging to groups, but there's no longer that exclusivity that goes with it,' says Mackay …

'I may be a surfer but that doesn't mean I hang only with a crowd of surfies ...

'Today it's all about collective experimentation ... about moving between different groups and picking from the best of them,' says Mackay …

[Marketers] can no longer rely on fashion and music as a means of identifying tribes …

The logic goes that if you can identify a leader in a specific tribe and target them with your product, the tribe will follow.

Coca-Cola made this strategy into an art form by targeting Australia's surf culture with ads that featured the coolest, best surfer … Pepsi Max picked extreme sports, Bacardi clubbers, Panasonic grunge, Sprite rappers, and so forth …

[Portable] digital music players and the internet compete with television and radio for the attention of young people …

'The fragmentation of media basically means that there is no longer a single way of reaching people,' says Adam Ferrier of communications strategy firm Naked …

'It's definitely getting harder to spot the nerds from the cool guys because they all look the same,' says Ferrier …

Fashion, for example, is no longer the hallmark of a tribe that it once was. Fast-growing retail chain Industrie sells cheap clothes that fuse punk, surf and club cultures, to name a few, changing its merchandise frequently.

Billabong—the ultimate surf brand—has broadened its appeal from the beach to a more urban look. The motifs on its T-shirts and board shorts pay homage to the graffiti artist …

The weekly ritual of changing mobile-phone ring tones and screensavers is another manifestation of this eclectic approach. But the Apple iPod—the ultimate accessory for the pick 'n' mix generation—is the lodestar of this shift. Its technology—and the availability of tunes online—has encouraged millions of music fans to sample new genres with which to personalise their play lists. 'It's perfect for this generation,' Mackay says. 'That's why they've embraced it so wholeheartedly.'

The national youth radio network Triple J … increased its 18-to-24-year-old audience last year.

Triple J's marketing manager, Louis Rogers, says the station's audience jumps sharply among school leavers as they take their first steps of independence. 'It takes a huge amount of perseverance to be a Triple J listener and at school they don't really have that confidence to break out of that herd mentality,' he says.

He also cites the continued success of rock festivals such as the Big Day Out as further evidence of the dismantling of tribal barriers: 'You don't get Goths paying out on rockers. It's just one big group hug for this eclectic culture.'

Melissa Gay, the interactive development manager for pay TV music channel V, says: 'The key to it is keeping it fresh and staving off boredom. I think it's simple: they have a shorter attention span and they also choose without prejudice. If they don't like it they move on.' …

Ferrier says: 'I think we are going to see a re-emergence of the tribe as smaller numbers of people geographically spread out are able to reconnect with each other through the net.'

The popularity of websites that act as bulletin boards for people to organise get-togethers is testament to that, says Ferrier …

[Director] Marc L'Huillier says tribes are alive and well, although he acknowledges that fashion and music no longer function as badges. He prefers instead to define groups by their 'values and aspirations'. The report's focus has lately shifted away from naming the tribes and more to identifying their needs and fears …

Amid all the arguments … there is one thing that everyone can agree on about the 'youth of today': they think their parents are cool.

More than a quarter of those aged 23 to 28 surveyed by Sweeney live with their parents; and 89 per cent of those aged 16 to 28 say they have a good relationship with their parents. Whatever happened to rebellion?

Naming, identifying and deconstructing youth tribes has been a mini-industry since Douglas Copeland coined the term generation X. Copeland's definition provided the broad brush strokes for a generation born between the 1960s and 1980s …

The dotcom years gave rise to the geeks and dorks. We have experienced the new lad, a benign local version of that great British export, the lager lout, and homeboys …

Research groups such as Spin Sweeney have recently been busily defining the younger generation Y.

Sweeney has christened burbanites, who dig their parents, religion and relationships; life mappers, who are focused on careers and financial security; and renegades, who 'reject responsible behaviour in favour of more adventurous pastimes'. Gen X slackers have morphed into gen Y drifters. Goths are still Goths.

The dominant group, according to the latest Spin Sweeney research, is the glitterazzi, who live by the creed 'Stress-free and all about me'.

Sydney Morning Herald,
18 January 2005



Figure 9.2 Goths and emos are just two of the many youth cultures that exist today

Influence of prevailing youth cultures

Youth culture is the term given to the practices of groups of young people that set these groups apart from the dominant or 'mainstream' society. Youth cultural groups are often distinguished by their distinctive forms of dress style and shared musical tastes, and are typically found in Westernised, consumer-based cultures. Many youth cultural groups are identifiable by a shared name, which is recognised both by members of the group and those outside it. Such names are generally associated with the musical taste and/or style of the youth cultural group; for example, rockers, punks, grungers, ravers and rappers.

Since the 1950s, youth cultures have often been regarded as a cause for concern by the mass media, with youth cultural behaviour being portrayed as a threat to social order and morality. New media, such as the Internet, have allowed for new avenues of global communication between young people. The Internet is giving rise to new forms of virtual youth culture, with Internet communication replacing more traditional face-to-face interaction as a basis for youth cultural membership.

Influence of global events and trends

Young people are adaptable and perhaps, of all the age groups, best able to make use of the new opportunities offered by globalisation (the process by which social institutions become adopted on a global scale). However, large numbers of young people have not benefited from this process. Globalisation has had an impact on youth employment opportunities and migration patterns, and has led to profound changes in youth culture and consumerism and in global youth citizenship and activism.

Young people today are faced with a variety of social situations that were not evident in the lives of their parents and grandparents. Issues such as higher levels of unemployment, heightened environmental awareness and a technological society alter young people's perspective of the world and their position in it. The way young people cope with these issues significantly affects their health status.

Globalisation can bring countless advantages to young people, such as better access to knowledge, communication with other young people from all around the world, and a chance to end racism and **xenophobia**. When people have the chance to communicate with those from other cultures, they can also gain a better understanding of other cultures and, in so doing, become more tolerant of others and open to what surrounds them.

The youth of today are the best-educated generation in terms of new information technologies; they benefit from economic growth; many travel around the world for work, studies, exchange projects and vacations; and telephone and the Internet enable them to stay in touch with friends and relatives abroad. On the other hand, many youth, especially in developing countries, have been left out of the digitisation and modernisation process and lack the economic power to benefit from the opportunities that globalisation offers.

Globalisation has numerous consequences for youth cultures. The increase in media streams has resulted in global consumerism. Through television, music videos and movies, US and European-produced content is increasingly

Critical inquiry

Read the article 'Meet the multividuals', then complete the following tasks.

1. In pairs, **identify** the tribes and their associated characteristics.
2. **Explain** why tribes are important to young people.
3. **Propose** why tribes assume particular characteristics.
4. **Discuss** how belonging to a tribe would influence a member's personal identity and health behaviour.
5. Imagine that you are a newcomer to the city and you find that no tribe best characterises your interests and values. Create a tribe that best describes your identity. **Describe** its clothes, music, personal values and interests and any other predominant visual characteristics.
6. a **Explain** the function that tribes serve for young people.
   b **Analyse** how this function has changed over generations.



Figure 9.3 Global issues, such as climate change, are important to young people

dominating entertainment around the world. Young people tend to adopt and interpret global products in terms of their own local cultures and experiences, thereby creating new **hybrid** (mixed) cultural forms whose meanings vary with local and national circumstances.

Young people around the world show concern about the negative consequences of globalisation, such as environmental **degradation** and unequal distribution of wealth. The anti-globalisation movement has expanded.

Influence of technology

For most children and young people, digital media, computers, mobile phones and the Internet have been a part of their upbringing and environment that they have taken for granted. Many rely on technology not just to keep in touch, but as a way of developing their identities, socialising and belonging to groups. Technology can play a positive, productive and creative part of young people's activities, development and social participation. Engagement with technology involves feelings as well as actions; above all it is a social activity that allows young people to feel connected to their peers.

Information and communication technologies (ICTs) have become important media through which children and young people learn about themselves and their relationships with others and the world and through which they construct meaning. ICTs provide powerful 'identity resources' for children and young people through two main mechanisms: they facilitate communication between people and they facilitate communication between people and websites. Through these processes, children and young people have access to new and complex expressions of identity, including 'consumption' identities, which are constructed through commercial websites. Young people also have access to new ways of expressing and communicating, which extend our understandings of text and literacy well beyond the traditional ones.

Critical inquiry

1. Young people, more than any other generation, have access to more information about local and global issues via the Internet and media. **Evaluate** whether this has a positive or negative effect on the health of today's young people.
2. Interview a grandparent, aged neighbour or other older member of the community.
   - a. **Discuss** how this person perceives the young people of today.
   - b. **Describe** how this person perceives the young people of his or her own generation.
   - c. **Outline** the similarities and differences in the perceptions of young people today and of those in the generation of the person interviewed.
   - d. **Discuss** what the person interviewed thinks has caused the differences.
   - e. **Describe** the positive memories the person interviewed had of being a young person.
   - f. **Describe** the negative memories the person had of being a young person.
   - g. **Explain** how these positive and negative memories affect this person's perception of young people today.

practical application

Influence of prevailing youth cultures

1 a View an episode of 'Happy Days', 'The Sullivans', 'The Brady Bunch' or another television show of the 1960s or 1970s in which the young people in previous times are characterised. Also view an episode from a later television show featuring present-day teens, such as 'Home and Away' or 'Neighbours'.

b Create a table similar to the one below. **Construct** the table on cardboard. Complete the table using the information you obtained from the task above. An example has been provided below to assist you.

Issues/Influences/Events	Earlier TV characterisation	Present-day TV characterisation
Relationships	Sexual activity is mainly kissing, hugging	Sexual activity includes sexual intercourse, etc.
Motivations		
Values		
Socio-cultural background		
Influence of technology		
Influence of family/peers		
Awareness of global issues (e.g. unemployment, youth suicide, environmental awareness)		

c Write a short article that could be included in the next school newsletter. The article should be written for parents and explain how life is different for young people today compared with life for previous generations.

2 a Consider how the differing perceptions of young people affect the way other groups act towards young people. Then copy and complete the table below.

Group	Positive perceptions	Negative perceptions
My perceptions of young people	Easy-going Other positive perceptions:	Gossips Other negative perceptions:
Teachers' perceptions of young people	Full of potential Other positive perceptions:	Noisy Other negative perceptions:
Police perceptions of young people	Potential to assist the community Other positive perceptions:	Unpredictable Other negative perceptions:
Parents' perceptions of young people	Loving Other positive perceptions:	Untidy Other negative perceptions:

b Write a speech about the positive and negative perceptions of young people in your community. In your speech, aim to inform your audience of the positive contribution that young people make in your community.

Research and Review

1 a In small groups, **discuss** how changing global environments and trends have affected young people of various generations.

b Highlight how these issues have affected the health of young people. For example, an increased awareness of climate change issues has led to lower emissions of greenhouse gases. The effects of increased youth unemployment and a technological society are other factors you could consider.

c Present your findings to the class.

Epidemiology of the health of young people

In 2007, there were 2.9 million people aged 15–24 years, making up 14 per cent of the total population. Young people have specific health concerns. Their health needs differ from those of adults and children. In comparison with these other age groups in the population, young people generally experience good health. Unlike adults, they are relatively free from the debilitating lifestyle diseases of adulthood; for example, cardiovascular disease and cancer. This is because the prevalence of these illnesses increases with age.

Young people potentially have a long life expectancy. However, young people constitute the only group in the population whose overall health status has failed to improve in the last 30 years. Motor vehicle accidents involving alcohol are the major cause of hospitalisation for those in this age group. Because of the experimentation and risk-taking behaviour of young people, their health status remains constant. This is an issue of concern because their morbidity and mortality from motor vehicle accidents and engaging in risk-taking behaviour is preventable.



Young people constitute the only group in the population whose overall health status has failed to improve in the last 30 years.

Patterns of morbidity and mortality

Life expectancy

There has been an improvement in life expectancy at birth over the last 20 years: a gain of 5.6 years for males and 4 years for females. Life expectancy has improved: on average, a boy born in 2002–04 would be expected to live to 78.1 years, while a girl would be expected to live to 83.0 years.

Mortality

During the period of 2004–06 the average number of deaths of young people aged 15–24 years was 66 per 100 000 for males and 28 per 100 000 for females. The main causes of mortality were 'external causes' and these deaths were much more common (70 per cent of all deaths in this age group) than among people aged 25 years and over (5 per cent).

Over the last century, the mortality rate among young people declined by around 80 per cent. Since the 1980s, death rates among young people aged 12–24 years has halved. The main reason for this decrease is the decrease in death due to injury, including poisoning. Deaths due to suicide and transport accident declined by 40 per cent and 35 per cent, respectively, between 1995 and 2004. Deaths due to drug-dependence disorder decreased from 142 deaths in 1997 to three deaths in 2004.

Table 9.1 People aged 15–24 years: underlying causes of death, 2004–06 (%)

Causes	Males	Females
External causes		
Transport accidents	33.5	25.2
Intentional self-harm	21.6	15.4
Accidental poisoning	5.0	5.0
Accidental drowning and submersion	2.0	0.6
Assault	1.8	2.3
Falls	1.4	0.6
Other external cause	10.0	9.1
All external causes	75.4	58.1
Drug-induced deaths	5.3	7.2
Neoplasms*	6.6	12.9
Other	18.0	28.9
All causes of death	**100.0**	**100.0**

* A neoplasm is a tumour or tissue containing an abnormal growth

ABS, Social Trends, 2008

practical application

Patterns of morbidity and mortality

1 **a** In groups, use butcher's paper and coloured markers to prepare a column graph that represents the leading causes of death for young people.

b On the butcher's paper, prepare a summary of points to **explain** how the health of young people compares with that of other groups in the population.

c Use cartoon sketches to illustrate the socio-cultural factors that contribute to these leading causes of death. For example, for motor vehicle accidents draw pictures of young males in old, unsafe cars; with lots of mates in the car; drinking alcohol before and during driving; speeding; not wearing seatbelts; and showing off.

d As a class, **discuss** how the promotion of some stereotypes may influence the health behaviour of young people.

Comparisons of health status with that of other populations throughout the life span

Patterns in self-ratings of health were similar for males and females but differed by age group. Generally, the proportion of people who reported excellent or very good health decreased with age. Indigenous Australians do not enjoy as good health as other Australians in all age groups. Australians who were aged 65 years and over and had a long-term condition rated their health as fair or poor. However, 30 per cent of those the same age without a long-term condition assessed their health as good. Over 90 per cent of young people rate their health as excellent, very good or good. More young males than females aged 15–17 years were in either excellent or very good health (85 per cent of males compared with 80 per cent of females).

Table 9.2 Self-assessed health status of young people aged 15–24 years, 2004–05 (%)

	15–17 years		18–24 years		15–24 years		
Health status	**Males**	**Females**	**Males**	**Females**	**Males**	**Females**	**Persons**
Excellent or very good	85.1	79.3	64.7	64.1	70.9	68.5	69.7
Good	11.3	15.7	28.0	27.9	22.9	24.4	23.6
Fair or poor	3.6	5.0	7.3	8.0	6.2	7.1	6.7
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

AIHW, Young Australians: Their Health and Wellbeing, 2007

Critical inquiry

1 Study Table 9.2, then complete the following tasks.

a **Calculate** the percentage of young Australians who assessed themselves to be in either excellent or very good health; good health; and either fair or poor health.

b **Identify** if more young males than females aged 15–17 years were in either excellent or very good health.

Disability

Two per cent of young people have a 'severe disability'. Young people are less likely to have a 'severe disability' than people in other age groups. In 2003, approximately 8.9 per cent of young people aged 12–24 years had a disability. The proportions of young males and females with a disability were very similar (9.0 per cent and 8.9 per cent, respectively). Chronic respiratory conditions, such as asthma, are the second highest cause of prevalent disability in those aged 0–24 years. Long-term conditions, such as arthritis and back pain, contribute to disability in older age groups.

Patterns of disease and injury

Patterns of disease and injury burden among young Australians are distinct from other age groups. For example, the leading causes of burden of disease and injury for all ages are circulatory diseases and cancers, while for young people aged 12–24 years the leading cause is injury and poisoning; for example, road traffic accidents. The exception to this is anxiety and depression, which ranks highly among young people and people of all ages as a cause of disease and injury burden.

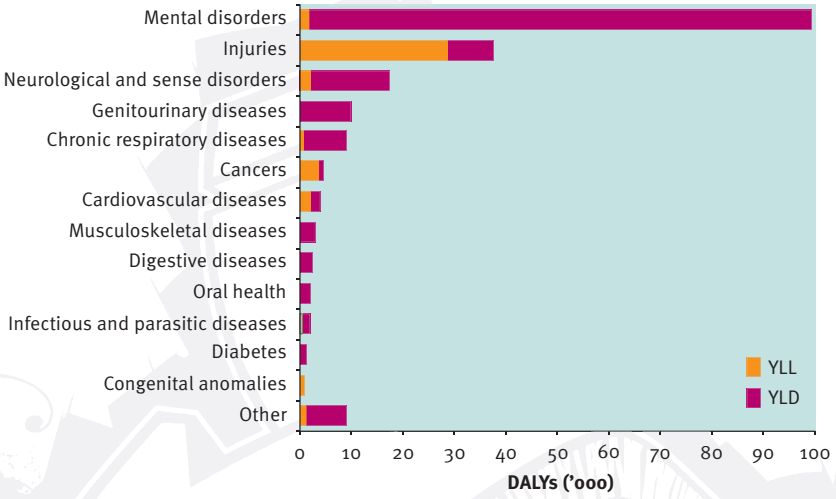
The leading burden of disease for young Australians was anxiety and depression: 17 per cent of the male burden and 32 per cent of the female burden. Injury was the second highest leading cause of disease. For young males, road traffic accidents (10 per cent), schizophrenia (10 per cent) and suicide and self-inflicted injuries (7 per cent) followed anxiety and depression as the leading causes of disease and injury burden. For females, asthma was the second highest cause of disease burden (7 per cent), followed by migraine (7 per cent) and 'other genitourinary diseases', such as chlamydia (6 per cent).

The prevalence of asthma among young people, although still higher than among the general population, declined from 16 per cent to 13 per cent between 2001 and 2004–05.

Between 1993–97 and 1998–2002, the rate of **melanoma** incidence decreased by 23 per cent for males and by 14 per cent for females.

Conditions such as asthma and hayfever are common in the younger age groups, whereas arthritis and hypertensive diseases (high blood pressure or related conditions) are common conditions for those aged 55 years and over. Long-sightedness and short-sightedness are common in most age groups.

Although cancer is generally more common among older age groups it is still one of the leading causes of death among young Australians. The most common cancers affecting young people in 2004 were melanomas, cancer of the testis and Hodgkin's disease.



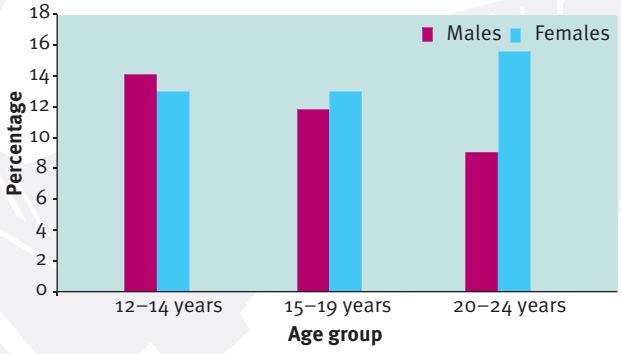
YLL: years of potential life lost

YLD: years of life lost due to disability

DALY: disability-adjusted life year

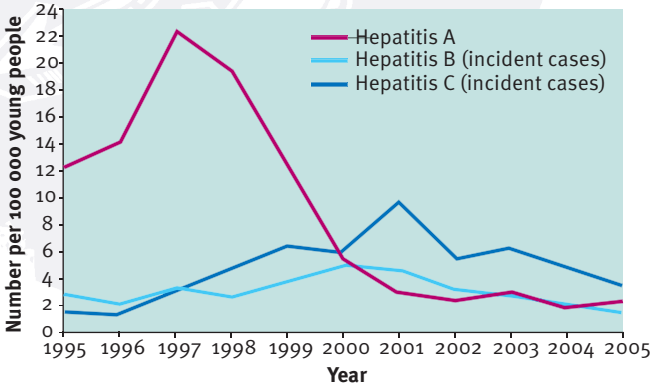
Source: AIHW, Young Australians: Their Health and Wellbeing, 2007

Figure 9.4 Burden of major disease groups for 15–24 year olds, 2003



Source: AIHW, Young Australians: Their Health and Wellbeing, 2007

Figure 9.5 Prevalence of asthma in young people aged 12–24 years, 2004–05



Source: AIHW, Young Australians: Their Health and Wellbeing, 2007

Figure 9.6 Hepatitis A, B and C notification rates for young people

Communicable diseases

The incidence of most vaccine-preventable communicable diseases is low. There has been a large decline in the notification rates for measles and rubella over the last decade and for meningococcal disease since 2003. Large declines have also been observed in notification rates for hepatitis A and B between 1995 and 2005. There has been an overall fall in the HIV notification rate since 1995, although a slight upward trend has been observed in recent years.

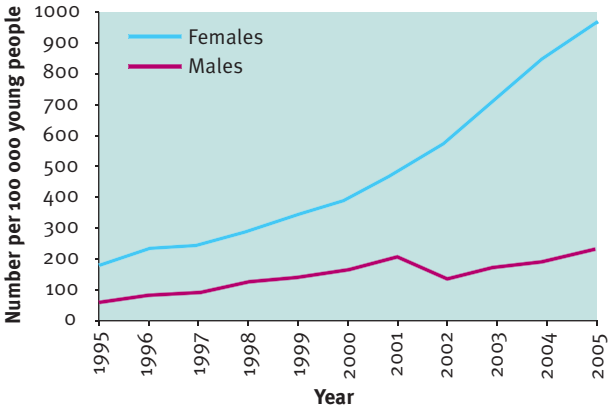
Large increases in rates of notification for pertussis (whooping cough), chlamydia and gonococcal infection (gonorrhea) occurred between 1995 and 2005. For chlamydia and gonococcal infection, this increase may be due, in part, to increased awareness and diagnosis.

Injury

Injury (including poisoning) continues to be the leading cause of death for young people, accounting for two-thirds of all deaths of young people in 2004. Transport accidents accounted for 45 per cent of all injury deaths, while intentional self-harm (suicide) accounted for 27 per cent of all injury deaths. Injury was also the leading cause of **hospital separation** for males and the fourth highest for females. Transport accidents (largely motor vehicle accidents) were the most common external cause of injury for males and intentional self-harm was the most common cause for females.

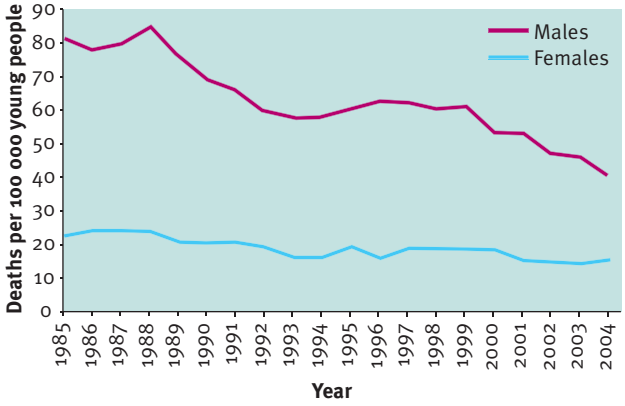
As mentioned, injury and poisoning is the most common cause of death in the age groups 1–14 years and 15–24 years. The changes in leading causes of death as age increases reflect both longer exposure to various environmental factors and the ageing processes. Among those aged 25–44 years, injury and poisoning is the leading cause of death in males, but cancer takes over as the leading cause of death among females.

Hospital separation refers to a period of care from admission to hospital through to discharge, transfer or death.



Source: AIHW, Young Australians: Their Health and Wellbeing, 2007

Figure 9.7 Chlamydia notifications



Source: AIHW, Young Australians: Their Health and Wellbeing, 2007

Figure 9.8 Trends in injury and poisoning deaths for young people aged 12–24, 1985–2004

Obesity

Overall, 25 per cent of young people in 2004–05 were overweight or obese. Obesity rates increased 17 per cent to 22 per cent for those aged 18–24 years since 2001. Coinciding with these increases since 2001, fewer than half of young people (46 per cent of males and 30 per cent of females) were meeting recommended physical activity guidelines in 2004–05.

The increased numbers of overweight and obese young people has also seen an increase in the incidence of diabetes. In 2007, 8 per cent of diagnosed diabetics were aged under 15 years.

Young Indigenous people

Young Indigenous Australians had higher rates of death, injury and some chronic diseases compared with other young Australians. During 2002–04, the death rate for Indigenous young people was almost four times the rate for other young Australians, and the injury death rate was almost five times that of other young people. Indigenous young people had higher hospital separation rates (a period of care from admission to discharge, transfer or death), injury (1.7 times the rate for other young Australians), asthma (1.3 times) and diabetes (more than 3 times). Young indigenous Australians were also more likely than other young Australians to experience health risk factors such as obesity, physical inactivity, smoking, imprisonment and lower educational attainment.

Rural and remote areas

A small proportion (2.3 per cent) of young people lived in remote and very remote areas in 2005. These young people had substantially higher rates of death and hospital separation for specific health conditions and were more likely to engage in certain risky health behaviours than young people in major cities.

Socio-economic status

The health and well-being status of young people varied significantly according to socio-economic status. Young people from the most disadvantaged areas were less likely to rate their health as excellent or very good. Also they were more likely to lack social support, be victims of assault and have lower Year 12 completion rates. Young people from the most disadvantaged areas have death rates almost twice as high as those from the least disadvantaged areas.

Critical inquiry

1. For each of the graphs on pages 180–1 develop a rhyme that **describes** the reasons for and trends in the health issue illustrated in the graph.
2. Critically **analyse** the health status of young people.
3. **Compare** the health status of young people with that of other populations in order to identify the generally positive picture of the health of young people.
4. **Identify** current areas of ill-health that are of greatest prevalence among young people.

practical application

Health status

1. In small groups, design a game that can provide players with knowledge and understanding of the health status of young people. The information presented in the game should compare the health status of young people with that of other populations in order to **identify** the generally positive picture of the health of young people.
2. Take up a carousel formation: two circles (an inner and an outer circle) of students facing each other. One circle assumes the negative viewpoint and the other circle assumes the positive viewpoint. Debate the following topic: 'Young people are healthy'. After 30 seconds, the circles rotate in opposite directions three places, viewpoints change, and the debate continues.
3. In pairs, after the debate above, **discuss** the characteristics of young people that contribute to their morbidity and mortality. Consider the following questions:
   a. **Identify** whether risk-taking behaviour is characteristic of all groups in the population.
   b. **Describe** the type of risk-taking that is undertaken by the over-25 age group in the population.
   c. **Explain** why this type of risk-taking is different from that of young people.

Research and Review

1. Research the following to determine whether the trends discussed on pages 179–82 and shown in the graphs and tables on those pages are still current:
   a. patterns of life expectancy and mortality of young people
   b. major groups of diseases for young people
   c. leading causes of disease and injury for young people
   d. prevalence of asthma in young people
   e. rates of notification for hepatitis A, B and C for young people
   f. notification rates of chlamydia for young people
   g. trends in injury and poisoning deaths for young people.
2. **Compare** the health status of young people with that of other populations throughout the life span.

The impact of the determinants of health on young people

A number of factors have an impact on the health of young people. They include individual, socio-cultural, socio-economic and environmental factors.

Individual factors

Psychological state

A person's psychological state and behaviour clearly affect each other and both can, in turn, lead to biological changes or disease. It is believed that certain diseases, such as asthma, may be influenced by psychological factors. There is also evidence suggesting that depression, social isolation and a lack of quality social support can directly lead to problems such as heart disease, independent of any causative behaviours, such as smoking or having a poor diet.

Health behaviours

Health behaviours are modifiable actions that affect health either positively (for example, physical activity) or negatively (smoking). Health behaviours of young people—including levels of physical activity, eating habits, drug use (tobacco, alcohol and illicit drugs) and sexual practices—are important determinants of their current and future health status. Adolescence in particular is an important stage of life. It is a time when young people are establishing an identity and autonomy, expressing intimacy and becoming comfortable with their own sexuality. Young people can be heavily influenced by their peers, and social pressures may play a part in their decision to experiment with smoking, alcohol and other drugs, as well as sexual activities. Young people's behaviour can affect their education and employment as well as their overall health and well-being. Health behaviours that account for the greatest burden of disease and injury among young people include tobacco smoking, physical inactivity, alcohol consumption, use of illicit drugs, unsafe sex and not consuming fruit and vegetables.

Health behaviours can be influenced by any number of determinants in combination with a person's individual make-up. For example, a person's level and pattern of physical activity can reflect that person's preferences modified by cultural and family influences. They can also be influenced by climate, availability of suitable spaces for exercise and an individual's personal resources. Further, it can be affected by the presence of disease or disability.



Health behaviours are modifiable actions that affect health either positively or negatively.

Figure 9.9 Health behaviours of young people include using sun protection

Sun protection

The strongest determinant of melanoma risk is ultraviolet (UV) radiation from sun exposure during childhood and adolescence. While the risk of melanoma increases with age, melanoma remains the most common cancer diagnosed among people aged 12–24 years. Despite this, the incidence rate of melanoma among young Australians has been declining. This may be due to public education campaigns raising awareness of skin cancer prevention and the need for sun protection, as well as the adoption of policy, guidelines and legislation relating to skin cancer protection measures, such as shade provision and 'no hat, no play' policies in schools.

Sun protection is an important health behaviour, having a strong link to later skin cancer occurrence. Adolescents tend to adopt sun protection behaviours less frequently than do adults and it is more difficult to achieve behaviour change in this group. Despite a high level of knowledge about the dangers of sun exposure, adolescents typically engage in relatively few sun protection behaviours.

Drug use

Illicit and licit drug use can cause both short-term and long-term health problems. Those who initiate drug use early are more likely to continue into future illicit and problematic drug use. Tobacco smoking is usually established during adolescence, and is often a precursor to other drug use. It is the leading cause of premature death and illness in the developed world. Alcohol use is common in most cultures and is an accepted part of adulthood. If misused, however, it is a contributor to injuries and long-term health problems.

Youth is a stage in life when many people begin to experiment with substances that can, particularly if misused, cause immediate and long-term health problems. In the short term, drug use in young people may result in dependence, withdrawal symptoms, psychotic disorders, amnesia (loss of memory) and hospitalisations due to acute intoxication and related injuries. In the long term, harmful drug use can lead to depression; infection with blood borne diseases; and liver, heart and brain damage. Alcohol and tobacco use, in particular, have been linked to a range of cancers and serious long-term health problems. Drug abuse has also been associated with family and relationship conflict, and legal and financial problems.

Many factors can put young people at risk of problematic drug use. Some of these occur before they reach adolescence, such as maternal drug use during pregnancy, early behavioural and emotional problems and early exposure to drugs. Other factors include peer antisocial behaviour, poor parental control and supervision, poor family bonding, and drug use among family members. Individual factors have also been associated with risky levels of substance use. These factors include a poor connection with family, school and community; academic failure; low self-esteem; and leaving school early.

Most adult tobacco users began smoking during adolescence. Those people who begin smoking early are more likely to continue smoking; thus, tobacco use among young people is a key predictor of adult smoking. The first drug used by young people is often tobacco, so understanding why young people begin smoking is also important when trying to reduce both tobacco smoking and other drug use. In addition to the increased risk of disease in later life, young smokers experience immediate adverse health effects. These include decreased physical fitness, greater susceptibility to respiratory illnesses and slower lung growth.

In the short term, high doses of alcohol severely impair brain function and can result in coma or death from direct intoxication. The immediate effects of excessive alcohol consumption include a lowering of inhibitions and impairment of motor, sensory and thought processes. When these effects are combined with the typical risk-taking behaviours associated with adolescence, the risk of serious injury and death is high. Young people are the group at greatest risk of alcohol-related harm, such as motor vehicle accidents, physical and sexual assault, falls, drowning and suicide.



Young people are the group at greatest risk of alcohol-related harm.

Eating habits

Adequate consumption of fruit and vegetables is a protective factor against many diseases, including coronary heart disease, hypertension, stroke, type-2 diabetes and many forms of cancer. Good eating habits are important during adolescence as this is a period of rapid increase in weight and height. Adolescence is an important period for calcium absorption and the optimum period for gaining bone density, in particular for girls. For young people who are still growing, sufficient nutritious food is needed to support growth and normal development.

An observed link between skipping meals and the development of overweight in young people suggests that a consistent meal pattern is important for healthy weight maintenance. This meal pattern includes regular consumption of breakfast, lunch and dinner. Skipping meals may also make it difficult for young people to meet daily fruit and vegetable consumption guidelines. Regular consumption of breakfast improves cognitive function at school, attentiveness and social interaction and helps to maintain a healthy body.

Adolescents and young people can make choices about the types of food they eat and social trends can influence their food preferences and intakes. Children and adolescents buy and consume foods from a wide variety of sources outside the home, including school canteens. There are many foods and beverages available in ready-to-eat or convenience form and relatively cheaply. Such conveniences are a great attraction for many young people and families with busy lifestyles. This can lead to decreased consumption of fresh fruit and vegetables and an increased consumption of packaged meals, processed snack foods and soft drinks.

Limited availability and high costs of fresh produce in remote locations is a barrier to the consumption of healthy foods. Young people living in major cities are more likely than those in other areas to consume the recommended daily serves of fruit. Young people living in inner regional areas are three times as likely as young people living in major cities not to eat fruit. Young people aged 12–18 years in major cities are less likely than those in inner regional and other areas to consume vegetables at recommended daily levels. This pattern is reversed for fruit consumption.



Figure 9.10 Young people living in major cities are more likely than those in other areas to consume the recommended daily serves of fruit

Overweight and obesity

Overweight and obesity in young people are linked to a range of immediate and long-term health problems. In the short term, overweight and obesity impacts on young people's psychological well-being, and increases the risk of developing cardiovascular conditions, asthma and type-2 diabetes. Long-term health consequences include adult obesity, increased rates of coronary heart disease, diabetes, certain cancers, gall bladder disease, osteoarthritis and endocrine disorders. Obesity in adolescence is also associated with social isolation, and lower educational and income attainment throughout life. Lack of physical activity and poor food habits are frequently cited as prime contributors to rising obesity levels in society.

Physical activity

Physical activity is important in maintaining good health. Regular physical activity reduces cardiovascular risk and improves risk factors, such as overweight and type-2 diabetes. It also helps protect against some forms of cancer and strengthens the musculoskeletal system. Taking part in physical activity also improves mental well-being by reducing feelings of stress, anxiety and depression. The National Physical Activity Guidelines for Australians outline the minimum amount of physical activity that should be taken by children, adolescents and adults to gain health benefits. Those who participate in lower-than-recommended levels of physical activity have an increased risk of mortality and morbidity from a range of diseases and conditions.

Sexual health behaviours

As young people enter adolescence and experience the changes associated with puberty, sexual health behaviours become an important part of their lives. With the commencement of sexual activities, teen pregnancies and sexually transmitted infections (STIs) become primary health concerns.

Sexual development is a normal part of adolescence. Though most adolescents go through these changes without significant problems, all adolescents need support and care during this transition to adulthood and some may need special help. Young people can be put at risk if they do not have the information, skills, support or access to health services to deal with problems they may encounter as they pass through adolescence. A supportive social environment is critical to healthy adolescent development. Important family and community factors that can prevent adolescents from engaging in unsafe or unwanted sexual behaviour include a strong relationship with parents, a connection to school and open communication with sexual partners.

The sexual and reproductive activities of young people are also of interest because they are related to the prevalence of STIs and pregnancy in young women. Teenage pregnancy is a concern due to high associations with a range of poor health and socio-economic outcomes. Teenage pregnancies are at increased risk of pre-term delivery, small-for-**gestational**-age babies and **neonatal** deaths. Teenage mothers often find it difficult to complete their education, are separated from the child's father, often have fewer financial resources than do older mothers and often the health of their children is worse.

Critical inquiry

1. **Examine** how a range of individual factors may impact on the health of young people.
2. **Propose** strategies to overcome the impact of individual factors.

Research and Review

1. Research the individual factors that have an impact on the health of young people. **Discuss** these factors.
2. Research the health behaviours that have an impact on and determine the health of young people in three of the following areas:
   - melanoma risk
   - tobacco smoking
   - binge drinking
   - unhealthy eating habits
   - skipping meals
   - physical inactivity
   - unsafe sexual health behaviours.

   Design a brochure that **outlines** the three areas.

Socio-cultural factors

Ethnicity

The physical health characteristics of young immigrants quickly resemble those of their peers within Australia. It is their mental health, however, that might pose a health concern. For young **refugees**, issues relating to torture and trauma experiences might arise in the form of school-related problems and depression. As young people move between countries, the support structures associated with extended families and social and community ties are often disrupted. These people may have experienced the loss of parents at an early age due to war or separation and experienced educational deficits from missed schooling. Such experiences can contribute to lower self-esteem, problems with self-identity and complications in peer relations. Associated symptoms of depression and anxiety can appear in young people. They consequently feel separated from their families and different from their peers.

Young people from a non-English speaking background might have difficulty accessing health services, be unaware of available services and distrust health professionals. Certain cultural factors may act as barriers for these young people, making them wary of consulting health services. In some cultures, for certain health concerns women can only consult female health professionals.



Figure 9.11 Cultural factors can act as barriers for young people with language difficulties



Aboriginality

Aboriginality is a significant factor in determining the health status of young people. Approximately 3.4 per cent of Australian youth are Indigenous Australians. The health status of these young people is poor in comparison with other Australians. They experience a higher infant mortality rate, a higher morbidity rate and a shorter life expectancy. Young Indigenous Australians experience multiple social risk factors (such as unemployment, racism, geographic isolation, inadequate housing, poor water supply and lower levels of education), all of which lead to a reduced health status.

The change from a traditional lifestyle is believed to have greatly affected the health status of young Indigenous Australians. Changing sexual practices have contributed to a high rate of STIs and a lower age of childbearing for young women. Drug use (such as sniffing petrol and glue) is a major cause of death among Indigenous youth in geographically isolated areas. Alcohol-related problems are the major health concerns of young Indigenous Australians. These problems include suicide, motor vehicle accidents, violence and abuse. The incidence of these problems differs between rural and urban regions. The close community links among Indigenous Australians also result in young people consulting health professionals more rarely. Family advice is often sought on matters relating to health.

Poor hygiene, poor living conditions and inadequate nutrition from an introduced diet with a high sugar intake result in anaemia, a variety of skin conditions and other diseases. Diseases of the respiratory system, eyes and ears are the most common disorders in young Indigenous Australians. Mental health is also affected by various social factors, such as unemployment and difficulties dealing with authority figures, including teachers and the police. Many young Indigenous Australians, particularly males, suffer from low self-esteem and feelings of marginalisation. These feelings have the potential to become mental illnesses and can be manifested as violence, aggression and suicide.

Gender

Gender is a significant social factor affecting health status. Young people often develop values, beliefs and behaviour that are closely associated with, and influenced by, traditional perspectives of masculinity and femininity. These perspectives may contribute to health behaviour that is harmful for the young person.

Young males, in validating their masculinity, may participate in risk-taking behaviour, such as drink-driving. They may also fail to seek the support of network members and health professionals when warning signs of reduced health status emerge. Young males are 90 per cent more likely to be the offender in abuse situations, and to administer self-harm by violent means. Young males are more likely to be involved in physical bullying whereas young females are more likely to be subjected to psychological teasing and social isolation. Young females are more likely than young males to develop eating disorders as they strive to compete with publicised ideal body images.

Sexual orientation

Establishing a sexual identity is an important process for young people, and sexual orientation affects the health status of young people. Young homosexual men are more likely to be the focus of **vilification**, more likely to develop eating disorders and more likely to suffer from stress-related illness (such as depression and self-harming behaviour). A significant proportion of teenage suicides are linked to confusion over sexuality. Lesbians have a higher incidence of alcohol and drug use than do their heterosexual peers.

Peer influence

During the transition from childhood to adulthood, young people become aligned with the values of their peers rather than those of their parents. This peer influence affects their decisions when choosing between health-enhancing and health-compromising behaviour. During this phase young people experiment with different ways of behaving. In their search for personal identity, young people become vulnerable to the values and ideas of their peers. The peer group becomes a powerful influence on decision-making and can significantly affect the health choices of young people. Peer modelling can be positive or negative. Peers can positively influence each other to participate in health-enhancing behaviour (such as exercise) or can be a source of pressure to engage in risk-taking behaviour, such as experimenting with smoking, consuming fast food or participating in petty crime.

Young people's perception of risk also contributes to the impact of peer influence. Young people often view themselves as experiencing events in intense ways and many believe that only other young people, not adults, can feel as passionately about issues as they do. This perception tends to align young people with their peers and increases the significance of peer influence.



Figure 9.12 Peer modelling can be positive or negative

Geographic location

Young people living outside metropolitan regions vary in their ability to access health care services and information. Specialist diagnostic and treatment services are often unavailable, and the culture of rural young people often prevents their accessing these health professionals. Issues of privacy and confidentiality in a close-knit community can result in young people choosing not to access health services in cases such as teenage pregnancy, alcohol and drug addiction, and depression.

Geographically isolated communities are associated with high levels of alcohol consumption, smoking, and accidents and injury. Young people in rural areas are exposed to a variety of hazards. Operating farm and mining machinery poses risks, and the need to drive long distances to a town or between properties results in a high road-fatality rate.



Figure 9.13 Operating farm machinery poses accident and injury risks

Social pressures, such as to develop a masculine identity, impact on young rural males, and they tend to participate in risky behaviour associated with motorcycles and farm vehicles. Their perception of risk as part of everyday life also leads to a greater involvement in unintentional risk behaviour. For young rural males the suicide rate is significantly high.

Research and Review

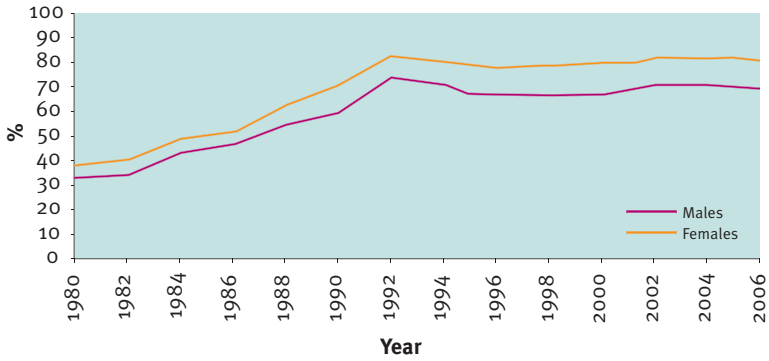
1. Research the socio-cultural factors that have an impact on the health of young people. **Discuss** these factors.
2. Research how the following factors have an impact on and determine the health of young people:
   - a ethnicity
   - b Aboriginality
   - c gender
   - d geographic location
   - e sexual orientation
   - f peer influence.

   Select one of these factors and write a short article about it for the school newsletter.

Socio-economic factors

Socio-economic status

When looking at the social and economic circumstances of young people, it is important to also consider the socio-economic status of their parents, since many young people share the same level of advantage or disadvantage as their parents. Young people have relatively low incomes and many young people are still dependent on their families for income support. This has implications for young people who require medical attention or have a need to purchase pharmaceutical products. With limited income, these services and products are not high priorities for young people.



Source: AIHW, Young Australians: Their Health and Wellbeing, 2007

Figure 9.14 Retention rates from Year 7 to Year 12

Young people from low socio-economic circumstances are more likely to smoke, drink alcohol, participate in drug-taking activities and have a poor diet. These factors all have negative implications for health status, particularly in establishing behaviour that contributes to the development of lifestyle-related diseases.

People who are socially and economically disadvantaged have higher rates of morbidity and mortality. Socio-economic disadvantage can have many forms, including low income; poor education; unemployment; limited access to health services; living in poor housing; and working in an unsafe, unrewarding or menial job. Alone or in combination, and over time, these stressful economic and social circumstances have an effect on health and well-being.

Education

As the number of low-skilled jobs in the employment market decreases, the importance of educational qualifications increases. Students who fail to complete Year 12 have fewer employment opportunities. They are more likely to experience extended periods of unemployment than are Year 12 graduates.

In 2004, students living in the most disadvantaged areas had a lower Year 12 completion rate than students living in the least disadvantaged areas (59 per cent compared with 79 per cent, respectively). The Year 12 completion rate for the most disadvantaged areas was also lower than the national average (59 per cent compared with 68 per cent).

In 2006, the retention rate to Year 12 was 75 per cent (69 per cent for males and 81 per cent for females). This is a substantial increase since 1980, when the national retention rate to Year 12 was 35 per cent. In 2006, retention rates were consistently higher for females than for males. Obtaining a qualification at any level is likely to improve young people's employment opportunities and their ability to compete for higher paid positions.

In Australia, individuals with higher levels of education report fewer illnesses and have better mental health than those with lower levels of education. People with lower educational attainment (no post-school qualification or a diploma/vocational qualification) rated their own health more poorly. They also reported a number of illnesses more often than those with a bachelor degree or higher. Education may directly impact on health by providing young people with greater knowledge and understanding about health, particularly an awareness of health risk and protective factors. For example, smoking, insufficient physical activity and obesity are less common among people with more education. Those who have completed higher education are more likely to have the knowledge and financial resources to access appropriate health services and information.

Employment

Education is often a key determinant of employment, and employment is a major determinant of income.

Education, employment and income are closely related: education is often a key determinant of employment, and employment is a major determinant of income. To become financially independent, young people need to be employed. In recent years many of the jobs available to young people have been either part-time or casual, and offer little in terms of career advancement.

There are significant links between the educational status of young people and the nature of their employment. In general, those who have completed higher education are employed in professional positions, whereas those with limited educational experiences and qualifications are employed in trades and as sales and service workers. One's employment affects one's health status.

Those with little education are more likely to be employed in positions that involve some risk, such as those that involve operating machinery or expose the worker to environmental hazards. Accidents and injuries are directly related to particular areas of employment.

The unemployment rate for young people is consistently higher than for all other population groups. In recent years, changes in post-compulsory education have delayed the entry of many young people into the workforce. Many young people are now undertaking training through TAFE, business colleges or government-initiated training programs.

Secure and satisfactory employment offers young people not only financial independence, but also a sense of control, self-confidence and social contact. In contrast, unemployment, insecure employment and unfavourable working conditions have all been associated with low self-esteem, feelings of depression and mental health problems, cardiovascular disease and drug and alcohol abuse.

Youth unemployment, particularly for extended periods, is associated with self-harm, suicide and attempted suicide among young men. In 2006, young people comprised 38 per cent of the unemployed population. Of the unemployed population, 22 per cent were aged 15–19 years and a further 16 per cent were aged 20–24 years. The unemployment rates for 15–19 and 20–24 year olds were 12.5 per cent and 6.3 per cent, respectively. These rates are much higher than the national unemployment rate of 4.4 per cent. Unemployment rates for young people have, however, shown a general decline over the last decade.

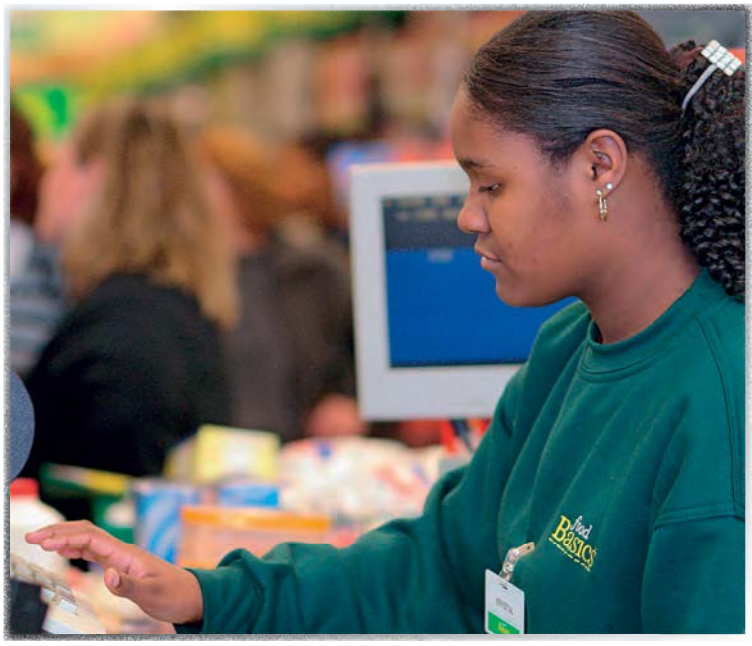


Figure 9.15 Employment offers financial independence, as well as a sense of control, self-confidence and social contact

Income

Regions with higher levels of income inequality (disparity between high and low incomes) had worse health status than those with lower levels of income. Higher personal incomes increase the ability to purchase health-related goods and services, such as better food, housing, recreation and health care. Higher personal incomes may also provide psychological benefits, such as a greater sense of control.

Young people taking on increasing levels of debt have become a concern in recent years. Types of debt they may take on include mobile phones, credit cards, car loans, fines, personal loans, rent arrears, gambling, HECS and Centrelink debt. A number of factors contribute to youth debt. These include social pressures that encourage spending, such as the credit mentality and the need to 'keep up' with peers and to 'belong'. In addition, credit is easily available to young people and often they are uninformed of the risks associated with taking on debt.

practical application

Employment

1 Consider how the nature of employment as a determinant of health has changed in recent years. Using appropriate software, design and create a flyer or webpage called 'Employment Futures'. The flyer or webpage should:
   - a include information regarding the current state of employment of young people
   - b **identify** the areas for employment prospects in future years
   - c **propose** tips for young people regarding education, skills needed and goal-setting.

Research and Review

1 Research the retention rates from Year 7 to Year 12 to determine whether the trends presented are still current.

2 Research the socio-economic factors that have an impact on the health of young people. Present your findings in a poster.

3 **Discuss** how the following factors have an impact on and determine the health of young people:
   - a socio-economic status
   - b education
   - c employment
   - d income.

Environmental factors

Environmental conditions can influence health both positively and negatively. For example, safe human-made environments and clean air, food and water are beneficial to health and well-being. Inadequate housing and exposure to unsafe water and environmental smoking can negatively affect health. On the other hand, the natural environment and natural disasters can be harmful, as can human-caused changes, such as land degradation, freshwater depletion and climate change.

Young people possess biological and behavioural characteristics that can place them at increased risk of exposure to environmental contaminants, relative to adults. For example, adolescents have higher **metabolic rates**, which means they consume more oxygen, water and food and may also inhale any environmental hazards, such as pollutants, at a higher rate. Their normal growth may be affected when exposed to pollutants at critical periods of development. Young people are also at a higher risk of exposure to certain environmental factors, such as air pollution, as they tend to spend more time outdoors than do adults, participating in physical play and sports activities.

Exposure to environmental tobacco smoke is associated with respiratory illness in young people. It may also cause them to experience decreased lung function, place them at increased risk of cardiovascular disease, and increase the frequency and severity of their asthma symptoms. It has also been associated with an increase in illness-related school absences. Young people in households with a smoker are more likely to take up smoking themselves. There is now greater awareness about the harmful effects of environmental tobacco smoke and more legislation to restrict smoking. As a result, smoking restrictions at home, work and school and in public places are becoming more common. The proportion of children who live in a household where the members of the family smoke inside decreased from 31 per cent in 1995 to 12 per cent in 2004–05.

Young people in households with a smoker are more likely to take up smoking themselves.

A number of links between health and housing are especially relevant to young people. Due to financial constraints, young people who have left home and no longer live with their parents are more likely to live in substandard or overcrowded dwellings. This places them at increased risk of poor health outcomes. In addition to passive smoking and overcrowding, a range of other environmental factors can have an impact on the health and well-being of young people. These factors include air and water quality, vectorborne diseases and food quality.



Figure 9.16 Smoking and passive smoking can impact on the health of young people

practical application

Impact of the determinants of health

1 a **Construct** scenario cards to illustrate the impact of the following factors on young people's health: individual, socio-cultural, socio-economic and environmental. Examine only one factor per card. On one side of each card use visual images, phrases, symbols and words to examine the factor. On the other side of the card visually represent strategies to overcome the factor.

b In pairs, use the completed cards to quiz each other on the impact of the factors and the strategies that can be used to overcome the factors.

Critical inquiry

1 **Examine** how a range of factors may impact on the health of young people.

2 **Propose** strategies to overcome the impact of a variety of the above factors.

3 Imagine you are a young rural person. Consider the individual, socio-cultural, socio-economic and environmental factors that affect your health. Prepare a concept map that **identifies** these factors.

4 As a class group, **discuss** the interrelated nature of the factors identified in task 3 above.

a **Discuss** how one factor relates to another.

b **Propose** explanations of how each factor might affect the health of young people.

Research and Review

1 Research the environmental factors that have an impact on the health of young people.

2 Research how the following factors have an impact on and determine the health of young people:

a housing
b unsafe water
c air pollution
d natural disasters
e climate change.

Outline your findings in a letter to your local government representative.

Developmental aspects that impact on the health of young people

According to developmental **psychology**, young people progress through a series of social and emotional 'growth tasks'. These tasks characterise the transition from childhood to adulthood. Each task is not specifically linked to a particular age, and young people will succeed at these tasks at different rates. The rate at which they do so will be determined by their particular social, economic, physical and emotional circumstances. The way in which these tasks are managed will significantly affect the health of young people.

Revising roles within relationships

As young people move from childhood to adulthood, the significance of those around them changes. Close links with family members can be tested as young people renegotiate their role as emerging adults. Parents might provide their son or daughter with opportunities to take on responsibilities, such as borrowing the family car, being in charge of younger siblings or holidaying with friends rather than with the family. These responsibilities alter the roles played by the young person as certain expectations are associated with the changing family role.

Peer groups become influential motivators in the behaviour of young people. As young people mature, they seek out friends who understand their concerns and who share similar interests. For some families this may be a difficult time, as young people 'disconnect' from family interests and develop close relationships with friends. It is important for family members to realise that, for young people, being attracted to their peer group can be a positive growing experience. Establishing a balance between friends and family is important, however, and young people need to be aware that their family is a support network. Family members can offer a young person advice and guidance regarding issues that concern young people.



Figure 9.17 Peer groups become influential motivators in the behaviour of young people

Critical inquiry

1 a **Critically analyse** how your relationships have changed since primary school.

b **Propose** how these changes have impacted on your health today.

Clarifying self-identity and self-worth

During the transition from childhood to adulthood young people are concerned with 'who they are'. An important developmental task for young people is establishing a sense of self. Certain questions about **self-identity** often preoccupy many young people. These questions may be 'what do I believe in?', 'what am I good at?' and 'where do I fit in?' To assist in answering these questions, young people need to form close relationships with a variety of people and learn to communicate their fears and concerns openly. Moving through this transitional phase is a positive experience for most young people as they discover their strengths and potential for personal growth. It is when young people question their ability to achieve, devalue their personal worth and fail to access support networks that this 'search for self' can become a negative experience.

An important developmental task for young people is establishing a sense of self.

It is important that young people have their opinions valued and that they see themselves as positive contributors to their family and to the community. Establishing a sense of **self-worth** means that young people are able to view themselves in a positive light and are able to recognise their strengths, abilities and purpose in life. As young people move from childhood to adulthood they develop new skills, renegotiate their roles with family and friends and question the values of society. In doing so, it is essential that young people realise that they have great potential to contribute to relationships and employment situations, and that they are valued as individuals. Some young people may devalue their abilities or see themselves as worthless for various reasons; for example, lack of employment or poor family relations. Such young people need support, encouragement and positive affirmation of their potential.

Critical inquiry

1 a Critically **analyse** who you are and how you would like others to view you.

b Give an oral presentation of your analysis.

Developing self-sufficiency and autonomy

Securing a part-time job, learning to drive, buying a car and taking responsibility for educational and employment pathways are all indications that a young person is developing a sense of **self-sufficiency**. Moving away from the family home to study at university or managing one's own financial affairs requires a degree of responsibility. Performing these life tasks demonstrates that young people are learning to operate as individuals who are acquiring certain skills.

As young people learn the necessary life skills, they move towards being independent from their parents and becoming more responsible for their own well-being. Being **autonomous** means that individuals are trusted to undertake tasks without guidance from someone in authority. For young people, this means that they learn to be responsible for their personal well-being and that adults in their lives take a less prominent role. This role involves being available to offer advice, support and assistance when needed.

Critical inquiry

1 a Reflect on your life and **identify** situations where you have become more self-sufficient and autonomous.

b **Explain** how you managed these aspects and the impact that they have had on your health.

Establishing education, training and employment pathways

Securing fulfilling employment is an important developmental task for young people because it has the capacity to affect many other aspects of life, such as the development of feelings of self-worth and self-sufficiency. In recent years, the nature of employment has changed. Employees are now required to be multiskilled, flexible in their approach to tasks and willing to undertake casual or part-time positions to gain experience in a competitive labour market.

For many young people, their dreams and ambitions regarding education, training and employment are fulfilled. Keeping their options open and setting realistic goals are essential skills for young people when planning for education, training and employment. University is not the only training and education option. Courses such as those offered by technical and further education (TAFE) colleges and business colleges and on-the-job training are also avenues to full-time employment. Many young people are securing positions after following these educational pathways.

Unemployment is a genuine fear for some young people who lack employment experience or formal training. Thirty per cent of unemployed youth are those who left school at 16 years of age with no immediate employment prospect, such as an apprenticeship. It is important that young people receive career advice and are guided in their selection of training, education and employment in an effort to match their abilities and personal qualities with a realistic ambition.



Figure 9.18 Developing self-sufficiency and autonomy gives young people a sense of achievement

Establishing personal support structures

According to developmental psychology, the transition from childhood to adulthood has often been labelled as a time of 'storm and stress'. For most young people, however, this transitional period is a positive one because they have sound support networks. Parents, older siblings, grandparents, teachers and peers can all assist young persons by listening to their fears and concerns, offering advice, providing guidance and supporting their decisions. A supportive network should consist of a variety of accessible people whom the young person trusts.

Professional support networks (such as counsellors in schools and 'help lines') have been established to support young people. They assist young people to gain a realistic perspective of problems, and offer advice when required. It is important that young people remain connected to their personal support networks in an effort to alleviate feelings of isolation and despair.

Determining behavioural boundaries

A sense of fear and concern is provoked in parents when young people question curfew times, swear and participate in risk-taking behaviour, such as speeding, binge-drinking and experimenting with sex. While developing their sense of autonomy, young people can challenge the existing behavioural boundaries established by their parents, teachers and employers. For many young people, this is a time for negotiation of rules as they are learning to be responsible for their own behaviour. It is important that young people and adults openly discuss these challenges to established rules and agree on compromises. For some young people, questioning the boundaries results in illegal activities, such as theft, violence, and drug and alcohol abuse.

Critical inquiry

1 As a class, **discuss** the following questions:
   - a How can successful management of developmental aspects assist in establishing good health in young people?
   - b What is the relationship between successfully managing these developmental aspects and health?

2 **Critically analyse** how young people's priorities and values relate to their health by considering questions such as:
   - a Is health a priority for young people?
   - b What would young people view as the indicators of good health?

3 **Discuss** if young people's view of health is different from that of other generations.



Figure 9.19 Determining behavioural boundaries can be challenging for young people and parents

practical application

Establishing personal support structures

1 In groups or pairs, debate the statement that 'young people today face greater problems than were experienced by previous generations'.

2 As a result of your arguments in task 1 above, prepare a letter addressed to a local politician. The letter should highlight the positive potential of today's young people. In your letter, **discuss** the needs of young people to be supported in their transition from childhood to adulthood. Your letter should:
   - a Refer to the need for support networks, job-training programs and realistic career advice.
   - b Highlight the fears of young people (such as rising unemployment and the social dangers of being young).
   - c Suggest ways that the community could assist young people.

Research and Review

1 a **Construct** a questionnaire and survey young people to determine what they believe good health to be.
   - b **Examine** the results of the survey and ascertain the indicators that young people associate with good health; for example, 'I don't drink too much' or 'I am never sick'.

2 **Construct** a rating scale to use as a 'priority meter'. On the meter, include a range of priorities, such as friends, family, school, work, money, house, health and car. Survey a variety of people of different ages, and ask them to rank these priorities in their lives.

what is good health for young people?

chapter summary

- The transition from being dependent children to independent adults is a period of rapid emotional, physical and intellectual transition for young people.
- Young people are diverse in terms of developmental stage, motivation, values, socio-cultural background and influence of family and peers.
- Youth culture is the practices of groups of young people (typically between the ages of 15 and 25) that set these groups apart from the dominant or 'mainstream' society.
- Globalisation has had an impact on youth employment opportunities and migration patterns, and has led to profound changes in youth culture, consumerism and in global youth citizenship and activism.
- Technology can play a positive, productive and creative part in young people's activities, development and social participation.
- In comparison with other age groups in the population, young people generally experience good health.
- Young people are the only group in the population whose overall health status has failed to improve in the last 30 years.
- Motor vehicle accidents involving alcohol are the major cause of hospitalisation for young people.
- Death rates among young people have halved, mainly as a result of decreases in death due to injury, including poisoning.
- Young people are less likely to have a 'severe disability' than are people in other age groups.
- The leading burden of disease for young Australians is anxiety and depression, while injury continues to be the leading cause of death for young people.
- Young Aboriginal and Torres Strait Islander people had higher rates of death, injury and some chronic diseases compared with other young Australians.
- Individual, socio-cultural, socio-economic and environmental factors have an impact on the health of young people.
- Young people progress through a series of developmental 'tasks'.

revision activities

1. **Describe** the nature of young people's lives.
2. **Describe** the impact of the determinants of health on young people.
3. **Outline** the developmental aspects that have an impact on the health of young people.
4. **Identify** current areas of ill-health that are of greatest prevalence among young people.

extension activities

1. **Critically analyse** key issues affecting the health of young Australians.
2. **Propose** the skills and actions that enable young people to attain better health.
3. **Examine** how a range of factors may have an impact on the health of young people and propose strategies to overcome these factors.
4. **Explain** what young people would view as the indicators of good health.

exam-style questions

1. **Outline** the degree to which young people are exposed to the risk factors for illnesses that present in later life. (6 marks)
2. **Discuss** how the diverse nature of young people's lives affects their health status. (8 marks)
3. **Describe** the impact that developing self-sufficiency and autonomy and determining behavioural boundaries have on establishing good health for young people. (6 marks)
4. **Investigate** how managing developmental aspects has an impact on the health of young people in Australia. (12 marks)
5. **Describe** how young people's lives today are different from the lives of young people in previous generations. (6 marks)

chapter 10

to what extent do australia's YOUNG PEOPLE ENJOY good health?

The major health issues that impact on young people

In this chapter you will examine the major health issues that impact on young people, particularly mental health issues. More specifically you will analyse the nature and extent of the major health issues; risk factors and protective factors; the socio-cultural, socio-economic and environmental determinants; and young people most at risk.

Mental health problems and illnesses

According to a World Health Organization report published in 2001, mental health is a state of well-being in which the young person realises his or her own abilities, can cope with the normal stresses of life, can work productively and is able to make a contribution to his or her community. Our mental health may be shown through our thoughts, feelings and behaviour and our relationships with others.

A mental disorder is a set of clinical symptoms or behaviours that interfere with the person's social, academic or occupational well-being. A number of mental disorders first become apparent in childhood and adolescence, and many disorders that are diagnosed in adulthood have their origins in childhood.





As with physical health, our mental health can change over time. Mental health can range from the best possible state of social and emotional well-being to the experience of mental illness at the other end of the spectrum. Somewhere in the middle of this continuum are mental health problems, which tend to be temporary and less severe than mental illness. There are many different types of mental illnesses, just as there are different forms of physical ill-health.

The causes of mental illness vary. Some are influenced by life experiences, while others are thought to be mainly biological or genetic in nature. The relative influence of genetics and life experiences (nature versus nurture) in the various mental illnesses is the subject of ongoing debate and research. In some cases, a mental illness is thought to be a result of the interaction between our inborn characteristics and the environment.

People can experience anxiety either to the level of a mental health problem or a mental illness. A mental health problem occurs when someone's thoughts, feelings or relationships have been affected negatively; for example, they are upset, sad, anxious or experiencing conflict. These are natural responses to negative events, which everyone experiences. A mental health problem indicates a disruption to a person's usual level of social and emotional well-being, but it is not the same as a mental illness. These feelings will usually resolve over time or when the situation improves, but a faster and more positive resolution may occur if the person seeks support from family, friends or a school counsellor or other professional.

Mental illness is a collective term for a range of medical conditions that change a person's thoughts, feelings, behaviour or relationships. The effects are more pronounced and long-lasting than for a mental health problem and they may not resolve without support or medical assistance. A diagnosis requires a certain combination of symptoms, of particular severity, to be present over time. People with a mental illness may benefit from counselling and practical support and/or may receive treatment, such as medication.

Some of the mental health problems and illnesses that young people may experience include:

- anxiety disorders
- depression
- conduct disorder
- eating disorders
- psychosis.

Health issues that young people are at risk of include:

- alcohol-related harm
- violence (such as bullying or sexual assault or domestic abuse)
- motor vehicle accidents
- sexually transmitted infections or pregnancy
- gambling
- cyber-bullying
- drink spiking.

Mental health problems tend to be temporary and less severe than mental illness.

WEB

Internet support on the topic of mental health problems and illnesses can be accessed via www.oup.com.au/pdhpe12

Table 10.1 Prevalence of selected mental disorders among young people aged 18–24 years, 1997

	Males		Females		Persons	
	Number ('000)	Percentage	Number ('000)	Percentage	Number ('000)	Percentage
Panic disorder	1.9	0.2	11.3	1.3	13.2	0.7
Agoraphobia	7.3	0.8	15.0	1.7	22.3	1.2
Social phobia	37.8	4.1	42.6	4.7	80.3	4.4
Generalised anxiety disorder	11.3	1.2	18.6	2.1	29.9	1.6
Obsessive–compulsive disorder	3.5	0.4	6.1	0.7	9.6	0.5
Post-traumatic stress disorder	30.9	3.4	61.0	6.8	91.9	5.1
Total anxiety disorders	***76.5***	***8.3***	***123.8***	***13.8***	***200.3***	***11.0***
Depression	24.6	2.7	91.6	10.2	116.2	6.4
Dysthymia	2.5	0.3	7.4	0.8	9.9	0.5
Total affective disorders	***26.4***	***2.9***	***97.1***	***10.8***	***123.5***	***6.8***
Alcohol harmful use	40.4	4.4	35.6	4.0	76.0	4.2
Alcohol dependence	110.2	12.0	38.3	4.3	148.6	8.2
Drug use disorders	85.1	9.2	32.0	3.6	117.1	6.4
Total substance use disorders	***194.8***	***21.2***	***94.4***	***10.5***	***289.2***	***15.9***
Total selected mental disorders	***249.4***	***27.1***	***232.2***	***25.9***	***481.6***	***26.5***
Total persons ('000)	**920.6**	**100.0**	**896.5**	**100.0**	**1817.1**	**100.0**

AIHW, Young Australians: Their Health and Wellbeing

Anxiety

Everyone experiences anxiety at times. Anxiety is the physical, mental and behavioural changes experienced in response to a threat or danger. Our brain registers a perceived threat and sends signals to the body to prepare for 'fight or flight'. It can also be accompanied by unpleasant feelings, such as dizziness, nausea and perspiration. Common symptoms of anxiety include:

- excessive and persistent worry
- restlessness and irritability
- crying or losing one's temper easily or frequently
- avoidance and procrastination
- disruption to sleep and eating patterns
- decline in academic performance
- truancy and school refusal
- increased use of alcohol or other drugs
- withdrawal from social activities.

Anxiety may be experienced differently in young people than in adults. Anxiety in young people can result in poorer performance at school, behavioural problems (such as withdrawal or aggression), poorer problem-solving skills, attention seeking behaviour and low self-esteem.



Figure 10.1 Anxiety cycle

Types of anxiety disorders

Panic attack

The symptoms of a panic attack start suddenly and last a few minutes, or may escalate for 10 minutes or more. They include shortness of breath, dizziness, chest pain, feeling faint, shaking, a dry mouth, muscle tension, a pounding heart, tingling fingers or feet, a feeling of choking, sweating, hot/cold flushes, an urge to flee, nausea, blurred vision, difficulty gathering thoughts, a fear of dying or a feeling of losing control or that the situation is unreal.

Agoraphobia

Some people who develop anxiety may also fear having a panic attack in a public place, where it may be embarrassing or difficult to seek help. Typical situations of concern may include crowded places, open spaces, buses, trains, enclosed spaces, travelling alone or being a long way from home.

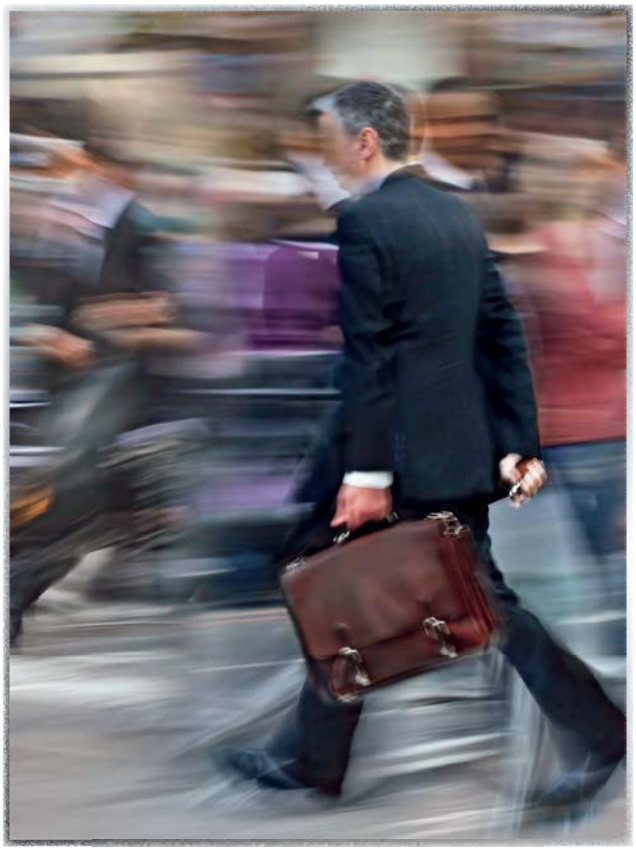


Figure 10.2 Agoraphobia is fear of having a panic attack in a public place

Panic disorder

A panic disorder develops once a person has had at least two unexpected panic attacks, followed by at least one month of concern and worry about having another panic attack. The panic attacks are not associated with any particular event or situation, but occur for no apparent reason. Panic disorder can occur with or without agoraphobia.

Phobia

A phobia is a consistent, irrational fear of a specific object, activity or situation. The fear experienced is so intense that it drives the person to try to avoid the situation completely. There are two main types of phobia: specific phobia and social phobia.

Specific phobia is a strong fear or avoidance of a particular object, activity or situation. The person may have a phobia of animals or insects (such as spiders), situations (such as flying), heights, blood or dentists, for example.

Social phobia involves a fear of embarrassment or humiliation in situations where a person is being watched. The fear is stronger than the usual anxiety experienced by people in response to social situations, such as public speaking. People with a social phobia fear that they will do or say something that others will judge as weak, crazy or stupid. Typical situations of concern include eating in public, using public toilets, being in a crowd, taking examinations or being watched at work.

Obsessive-compulsive disorder

Obsessive-compulsive disorder is a disorder in which a person experiences obsessions and compulsions to a degree that seems excessive and disrupts everyday life. Obsessions are intrusive, repetitive ideas, such as thoughts about being contaminated, doubts about locking a door, a need to have items in a certain order, or aggressive or horrific impulses. Compulsions are behaviours or rituals that a person performs to relieve the obsession, such as excessively washing one's hands; checking and rechecking items of concern; or repetitively praying, counting or going over certain phrases.

An obsession is an intrusive, repetitive idea while a compulsion is a behaviour or ritual that a person performs to relieve an obsession.

Generalised anxiety disorder

Sufferers of generalised anxiety disorder generally experience excessive worry, anxiety and apprehension that occurs for more days than not over at least six months. People with this disorder find it difficult to control their worry. They also have at least three of the following symptoms: restlessness or being keyed up, easily fatigued, difficulty concentrating, irritability, muscular tension or difficulty sleeping.

Post-traumatic stress disorder

People may develop post-traumatic stress disorder after being involved in or witnessing a traumatic event where they experienced intense fear, helplessness or horror. Examples include a combat or hostage situation, a natural disaster, an assault or a traumatic accident. After the event, a person with this disorder may re-experience what happened, through recurrent distressing dreams or memories.

Depression

Depression and anxiety (which can occur together) often begin during adolescence. These feelings can have a significant impact on behaviour and academic performance, whether they are temporary changes to well-being or more severe and long-lasting symptoms associated with a mental illness. Depression can limit a young person's social and work opportunities through its effects on mood and schooling. Young people who have feelings of depression can benefit from talking to a school counsellor or other professional for support.

Feelings of depression can show differently between individuals and throughout the lifespan. They can occur in relationship with other emotional or physical changes. A young person with depression may show feelings or behaviours such as:

- frequently being upset, sad, anxious or negative
- being irritable, angry or aggressive
- crying or losing one's temper easily
- becoming withdrawn and isolated from others
- becoming involved in risky or criminal behaviour
- using alcohol or other drugs
- having less energy and enthusiasm
- not enjoying things that the person usually found enjoyable
- declining academic interest and performance
- talking or writing about sadness, death, suicide or self-harm
- self-harming behaviour or suicide attempts.

Factors linked to depression include body chemistry (hormonal factors or brain chemistry), seasonal influences (for example, in winter), negative life events, stress, genetics or personality factors (such as negative coping styles). Depression is a complex group of illnesses and it is likely that, in most cases, a combination of individual, family, social and cultural factors is responsible. Research suggests that some people inherit a genetic susceptibility to depression and then become ill in response to negative environments or life events.



Figure 10.3 Young people who have feelings of depression can benefit from talking to a school counsellor or other professional for support

Types of depressive illness

Many people with feelings of depression do not have a depressive illness. Instead, their feelings will resolve with support or time. However, some people do develop a depressive illness.

Depressive illness is sometimes called a mood disorder.

Reactive depression

Reactive depression develops when people are reacting to a distressing situation in their lives, such as the failure of a close relationship or loss of a job. The reaction is more severe or persistent than the unhappiness we may all experience at some point in life. Symptoms of reactive depression often include anxiety and changes in sleeping or eating habits.

Endogenous or major depression

Endogenous or major depression can appear without apparent cause or be triggered by a distressing event. Features can include sleep disturbances, appetite or weight changes, sadness, irritability, loss of interest in work or hobbies, loss of sexual interest, fatigue, poor concentration, difficulty making decisions, guilt, poor self-esteem and suicidal thoughts. The symptoms are persistent and severe, significantly interfering with daily activities.

Depression with psychotic features

A person experiencing depression with psychotic features may have symptoms of depression and also experience psychosis, which is a cluster of symptoms in which the person loses touch with reality. Some people may stop eating and drinking, or may experience **hallucinations** (such as visions or voices) and/or **delusions** (such as believing they are being followed or persecuted).

Bipolar mood disorder

Bipolar mood disorder involves extremes of mood, with periods of very low or depressed mood alternating with periods of mania (extreme happiness, over-activity, rapid speech or lack of inhibition). These extreme moods can be very disruptive. People can also experience periods of psychosis.

Bipolar mood disorder was previously called manic depression.

Conduct disorder and oppositional defiant disorder

Conduct disorder (CD) is a recurrent and chronic pattern of behaviour displayed over six to 12 months during which the person shows a serious and blatant disregard for social norms or rules or for the rights of others. CD usually involves more persistent patterns of serious behaviours than **oppositional defiant disorder (ODD)** and is usually diagnosed at a later age than ODD.

Behaviour of those with CD may include aggression towards people or animals, property damage, serious breaches of rules, deceitfulness or theft. It normally affects all aspects of the person's life (such as home, school or work) and the community. A diagnosis of CD often occurs when such behaviour has come to the attention of law-enforcement authorities.

A person diagnosed with CD may:

- have lower-than-average intelligence
- be regularly absent from school
- only display guilt to reduce the likelihood of being punished
- have a troubled family life that involves regular conflict
- have low-esteem, but put on a 'tough' exterior
- be dishonest for his or her own personal gain
- blame others for his or her own wrongdoing
- show little **empathy** or compassion for others
- initiate physical attacks or bullying
- be threatening or intimidating
- be hostile or defiant
- begin engaging in sexual activity and/or substance use at a young age
- engage in illegal activity, such as theft, arson, break and enter, assault or rape
- have suicidal ideation or attempt suicide.

Both genetics and the environment have been linked to the development of CD. Young people are at greater risk if one or both parents have one of the following: alcohol dependence, depression, schizophrenia, anti-social personality disorder, **attention deficit hyperactivity disorder (ADHD)** or CD. CD appears to be more common in young people whose parents employ poor parenting practices, communicate poorly or with hostility, or are abusive or neglectful.

A young person diagnosed with ODD or CD will usually have significant difficulty coping with school life. The disorder can affect social interactions, learning, self-esteem and overall well-being. There is a strong link between disruptive behaviour and academic under-achievement. It is generally believed that academic problems are related to attention deficit, negative teacher and student relationships, regular absences from school and an overall lack of commitment to rules and conventions.

Young people with CD may stay out late without parental permission, skip school or run away from home regularly or for prolonged periods. There is a high rate of school dropout, delinquency and imprisonment among those with CD. Young people who exhibit CD are also more likely to have other problems later in life, such as depressive or anxiety disorders, antisocial personality disorder and substance use problems. Onset is usually from middle childhood through to middle adolescence and is rare after 16 years of age.

CD is more common in males than females. The estimated prevalence is thought to be in the range of 6–16 per cent for males and 2–9 per cent for females.

Eating disorders

Eating disorders are characterised by disturbed eating patterns in association with anxiety or distress and, sometimes, unrealistic perceptions of body shape and weight. It has been suggested that around 2–3 per cent of female adolescents or young adults meet the **diagnostic** criteria for the eating disorders **anorexia nervosa** and **bulimia nervosa**. Both disorders also occur in males but at a lower rate. The prevalence of binge eating disorder is estimated to be around 4 per cent across the population as a whole. It should be noted that many other young people have unrealistic body image ideals or engage in extreme behaviour in regard to eating without necessarily meeting the diagnostic criteria for a specific disorder. This behaviour can still be damaging physically and psychologically and is still considered a significant health issue. If such behaviour is not resolved, some of these individuals will go on to develop eating disorders, depression and other forms of mental illness.



Figure 10.4 Featuring very thin models in fashion media may cause some people to adopt irregular eating habits

Causes of eating disorders

There is no single causal factor in the development of eating disorders. An eating disorder is a complex medical and psychological condition that normally has multiple contributing factors. However, the following issues have been implicated or may affect an individual's risk of developing an eating disorder:

- individual characteristics—self-esteem issues, depression or anxiety, or perfectionism
- stress—difficult life events or an accumulation of stress without good coping strategies
- biological factors—physiological **predisposition** to changes in brain chemistry and mood
- interpersonal issues—difficult relationships, being bullied or difficulty expressing feelings
- family difficulties—difficulties with communication, difficult relationships, or poor parental body image or dieting behaviour
- cultural factors—ideals about body size and shape, media representation or marketing.

Types of eating disorders

Anorexia nervosa

Anorexia nervosa is a condition in which the person refuses to maintain normal body weight because of negative perceptions about the shape or size of his or her body. The person becomes intensely afraid of gaining weight and may go to extreme lengths to prevent weight gain, such as avoiding or severely limiting food intake and exercising excessively. As a result, the person loses a significant amount of weight or fails to put on an appropriate amount of weight as he or she grows. The person may also experience depression, anxiety, poor social functioning and an obsession with food or food preparation. Anorexia nervosa can cause organ damage and changes in body chemistry and can be life-threatening.

Bulimia nervosa

Bulimia nervosa is also associated with problems in the sufferer's perception of his or her body shape and weight, but the person frequently feels out of control around food. People with this disorder develop a pattern of **binge eating**. This may follow a period of restricted food intake or be triggered by a stressful event. During the period of binge eating, people with bulimia nervosa feel out of control, fearing that they cannot limit what or how much they eat. They often feel ashamed and become secretive about their behaviour. Later, they may use extreme measures to try to compensate for their behaviour and prevent weight gain. A person with bulimia nervosa may be underweight, of normal weight or overweight and so bulimia nervosa may be less noticeable than anorexia nervosa. This illness can also cause changes in body chemistry and damage to certain parts of the body.

Binge eating disorder

Binge eating disorder is characterised by periods of binge eating and discomfort that are often accompanied by feelings of guilt and shame. It differs from bulimia nervosa in that the person does not engage in damaging compensatory behaviour after eating. However, it is still psychologically and physically damaging.

Psychosis

Psychosis is a cluster of symptoms that occur in certain illnesses or physiological states due to a disturbance in brain functioning. A person may experience a single episode of psychosis or experience episodes more than once as part of a recurrent illness. Approximately 3 per cent of people will experience some form of psychosis during their lifetime.



Approximately 3 per cent of people will experience some form of psychosis during their lifetime.

Symptoms of psychosis can occur in a range of circumstances, including while suffering from a physical or mental illness, or during certain physiological states, such as starvation. There are a number of mental illnesses that may feature psychosis. They include schizophrenia, bipolar mood disorder and, less commonly, severe cases of depressive illness, such as major depression. Those types of illness in which psychosis is a common feature are sometimes grouped together and called *psychotic disorders*. Factors that have been associated with the onset of psychosis include biological factors, genetic factors, stress and substance use.

Psychotic illnesses frequently occur for the first time in adolescence or early adulthood. Sometimes they take time to emerge and early symptoms can be easily interpreted as relating to other conditions or situations. This means that there may be a lengthy period of behavioural change or difficulties prior to a diagnosis. Early changes associated with the development of psychotic disorders could include difficulty

concentrating, changes in thinking, preoccupation with odd ideas, mood swings or lack of emotional response, changes in behaviour or an increase in unusual behaviour, loss of energy and loss of interest in activities, withdrawal from friends and family, or a decline in academic performance. Several of these signs would also be consistent with unresolved personal problems, depressive illness, anxiety, substance abuse or a range of other difficulties.



Psychotic illnesses frequently occur for the first time in adolescence or early adulthood.

Features of psychosis

Some of the features of psychosis are discussed below.

Disturbed thinking and cognitive skills

A person with psychosis may have scattered thoughts that jump suddenly from one subject to another or a 'mental block' when thoughts are interrupted completely. The person's conversation can be difficult to understand and may seem fast and pressured. Thoughts and speech are often muddled and disjointed. People can also experience problems with memory, attention, learning, problem-solving, decision-making and abstract thinking.

Disturbed mood

A person with psychosis can experience changes in mood. He or she may find it hard to express feelings or may respond inappropriately, such as laughing at sad news. The person may feel numb and depressed or sometimes be prone to bursts of intense emotion. These mood changes can cause the person's motivation to drop, causing day-to-day tasks (such as personal hygiene, household chores, work or study) to be neglected.

Hallucinations

Hallucinations occur when someone senses or feels something that is not there, even though it seems very real to the person experiencing it. This can affect any of the five senses: sight, hearing, touch, taste or smell. Examples include hearing voices, seeing colours or visions, or feeling a crawling sensation on or under the skin. Hallucinations often cause feelings of confusion, worry or fear and can trigger unusual behaviour.

Delusions

A delusion is a false and sometimes bizarre belief that is not shared by others in that culture or environment. A person may feel the need to defend the belief, even if there is evidence against it. Delusions include having ideas of persecution or conspiracy; receiving special messages through radio, television or newspapers; feeling that one has a special relationship to a religious figure or famous person; or believing that private thoughts are being broadcast aloud.

Research and Review

1. **Explain** the difference between a mental illness and a mental health problem.
2. a. **Define** the term 'anxiety'.
   b. **Outline** the different types of anxiety disorders.
3. **Outline** the different types of depressive illnesses.
4. **Outline** the causes of eating disorders.
5. **Explain** the difference between anorexia nervosa and bulimia nervosa.
6. a. **Define** the term 'psychosis'.
   b. **Outline** the features of psychosis.

Extent of mental health problems and illnesses



Mental disorders are the leading contributor to the burden of disease and injury (49 per cent) among young Australians aged 15–24 years.

Mental health problems are emerging as one of the most significant health concerns about Australian youth. *The Mental Health of Young People in Australia*, published by the Commonwealth Department of Health and Aged Care, estimates that around one in six people (18 per cent) had experienced one or more mental disorders in the past 12 months, including an alcohol or substance abuse disorder. The survey reported on the well-being of children and adolescents aged 4 to 17 years. Fourteen per cent of children and young people experience mental health problems, with similar figures across all age and gender groups. Mental disorders were the leading contributor to the burden of disease and injury (49 per cent) among young Australians aged 15–24 years in 2003. Anxiety and depression are the leading specific causes for both males and females.

Young people who have not completed secondary education have a higher prevalence of mental disorders (35 per cent) than those who have post-school qualifications or have completed secondary school (just under 25 per cent). The survey results also indicate that unemployed young people and those not in the labour force were more likely to suffer from a mental disorder than are other young people.

Risk factors and protective factors

Risk factors do not *cause* illness. The presence of a risk factor does not necessarily mean that a person will have difficulties. However, risk factors tend to have a cumulative effect. Several risk factors interacting with each other will significantly increase the possibility of negative mental health outcomes. Risk factors in mental health include those listed in Table 10.2.

Table 10.2 Risk factors in mental health

Individual	**Family**
• Heightened fearfulness or anxiety • Withdrawal and avoidance of new situations • Irritability or aggressiveness • Argumentativeness and non-compliant behaviour • Reckless behaviour and poor understanding of consequences • Low intelligence • Poor language skills • Poor attachment to parents or caregivers	• Harsh and overly controlling parenting styles • Inconsistent supervision • Lack of warmth and affection • Lack of involvement in child's activities • Parental health problems, including physical or mental illness • Parental substance abuse • Family violence or conflict • Divorce or separation • Criminal behaviour in the family • Family stresses, such as single parenting • Lack of support • Unemployment or financial difficulties
Social	**School**
• A young person bullying others or being the target of bullies • Social exclusion and peer rejection • Being withdrawn • Difficulty engaging in play and group activities • Socio-economic disadvantage in the family or community • Social or cultural discrimination	• Inadequate behaviour management or supervision • Unsafe environments • Learning difficulties or academic failure • Poor attachment to school or centre • Inconsistent attendance • Difficult school transitions

Protective factors are factors in a person's life that promote mental health and well-being. They may serve to buffer risk factors, providing a cushion against negative effects. Protective factors in mental illness for a young person include having:

- secure relationships and attachments (such as with family, other adults and peers)
- at least one positive relationship with an adult (such as a parent, teacher or community member)
- positive expectations of self and hopefulness for the future
- a sense of independence and autonomy
- good communication skills
- intelligence
- good problem-solving skills
- well-developed social skills
- the ability to self-regulate behaviour and emotions.

Protective factors in a young person's environment may include having:

- a warm and supportive environment at home
- a supportive environment in school
- a sense of security through consistency with firm limits and boundaries
- opportunities for participation in a range of activities.

As noted below, **resilience** promotes social and emotional well-being in young people. Socially resilient young people may be more willing to seek help from others when they experience personal difficulties. This provides the young person with access to an important support network when life becomes difficult.

Good problem-solving skills help young people to think abstractly, reflectively and flexibly. Resilient young people can develop a range of alternative solutions for their problems and feel able to choose between them. They will tend to show their problem-solving and planning skills not only in academic tasks but also in their broader life choices. Resilient young people respond to others and to challenges in their life in a manner that is flexible and constructive.

Resilient young people also are independent and have a sense of **self-efficacy**. Self-efficacy also relates to a person's belief in his or her ability to make a difference, the capacity to make independent decisions and the willingness to take responsibility for the outcomes. This gives the person a sense of strength and a feeling that his or her actions can make a difference in his or her own life and in the lives of others, strengthening the person's self-worth.



Figure 10.5 Caring relationships promote resilience

Critical inquiry

1. **Discuss** the extent of mental health problems and illnesses in young people.
2. **Outline** the risk factors and protective factors significant to mental health in young people.
3. **Discuss** how resilience promotes social and emotional well-being in young people.

Resilience for social and emotional wellbeing

The term resilience is used in mental health to describe a person's capacity to cope with changes and challenges, and to bounce back during difficult times. …

Risk factors are circumstances or experiences which increase the possibility of a person developing a mental health problem or illness, such as having a parent with a mental illness, being bullied or abused, or experiencing a stressful life event …

[Some] young people, in spite of having a number of risk factors, adapt very well to life's changes and do not develop mental health problems. These people come to be described as resilient, able to bounce back even under difficult circumstances …

Being resilient … helps to promote social and emotional wellbeing. A person who is resilient and has positive social/emotional wellbeing is likely to show the following:

- the capacity for positive personal development in several domains, including emotionally, intellectually and creatively
- the capacity to form and maintain positive and respectful relationships with others
- the ability to identify and manage one's own emotions and to understand the feelings of others
- skills in communication, including assertiveness, empathy and negotiation
- the ability to solve problems, make informed decisions and accept responsibility for one's actions
- the capacity to set realistic but rewarding goals and to actively work toward these …

Response Ability website

Socio-cultural, socio-economic and environmental determinants of mental health

The causes of mental illness are not clear. Determinants can be individual (particular to the person), contextual (a product of the environment) or the result of the interaction between the person and the environment. The causes may be due to individual factors (such as prenatal brain damage and genetic factors), family or social factors (such as marital discord between parents and social isolation), school context (such as bullying and failure to achieve academically) or life events and situations (such as physical, sexual and emotional abuse).

Determinants can be individual, contextual or the result of the interaction between the person and the environment.

Socio-cultural determinants

Age

Young people are more likely than those in other age groups to experience a mental illness. The prevalence of mental disorders declines with age. In 2005, 27 per cent of 18–24 year olds had experienced a mental disorder, while only 6.1 per cent of those aged 65 years and over reported as currently experiencing a mental disorder.

Gender

Boys are slightly more likely to experience mental health problems than are girls. Males are twice as likely to experience substance use disorders (such as alcoholism and drug dependence and addiction) than are females. Females are nearly three times more likely to experience depressive disorders than are males.

Family structure

Changing social attitudes towards marriage and pregnancy choices have seen the structure of Australian families change over the last three decades. A supportive and stable family environment in which young people grow up is important for the healthy development and social and emotional well-being of young people. Studies have found that there is a higher prevalence of child and adolescent mental health problems among those living in low-income, step/blended and sole-parent families.

Aboriginality

Many Aboriginal and Torres Strait Islander people live in situations of socio-economic disadvantage, including homelessness, poverty or unemployment. Such settings are associated with higher levels of poor nutrition, excessive alcohol consumption, smoking and lack of physical activity. These factors contribute significantly to the incidence and severity of mental illnesses in individuals and the community. Nearly one in five (24 per cent) young Indigenous Australians are at high risk of emotional or behavioural difficulties, compared with 15 per cent of non-Indigenous youth. Indigenous Australian males are twice as likely as Indigenous females to be at high risk. Young Indigenous Australians are subjected to racism, placing them at high risk of emotional or behavioural difficulties; more than twice the proportion of those who had not experienced racism.

Growing up in areas where adherence to traditional culture and ways of life are strong may be a protective factor against emotional and behavioural difficulties in young Indigenous Australians. Living in high-occupancy households may also be protective as young people living in such households were half as likely to be at high risk of emotional or behavioural problems as those living in low-occupancy households.

A household is considered to have a high level of household occupancy if five or more people sleep in one bedroom, six or more people sleep in two bedrooms, and so on.

Factors that impact negatively on the social and emotional well-being of young Indigenous Australians include living in families that have experienced negative life events (such as illness or family break-up) and unpredictable environments (such as high levels of residential mobility). Past practices of forcibly removing Aboriginal and Torres Strait Islander people from their families continue to have an impact on young Indigenous Australians today. Twelve per cent of Aboriginal and Torres Strait Islander children aged 4–17 years are cared for by someone who was removed from his or her natural family. Children of these carers are more likely to be at high risk of emotional or behavioural difficulties and have levels of alcohol and drug use that are approximately twice as high as children whose Aboriginal and Torres Strait Islander primary carer had not been forcibly removed.

The first National Sorry Day was held on 26 May 1998: one year after the report 'Bringing Them Home' was put forward in May 1997. The report was the result of an inquiry by the Human Rights and Equal Opportunity Commission into the removal of Aboriginal and Torres Strait Islander children from their families. In 1992, the then prime minister, Paul Keating, acknowledged that 'we took the children from their mothers' at a speech in Sydney's Redfern. Those children who had been removed came to be known as the Stolen Generations. In 2008, Prime Minister Rudd, on behalf of the Australian Parliament, delivered the National Apology to the Stolen Generations. While the National Apology is important, there is still much more healing work to be done, both for the Stolen Generations and for the nation as a whole.



Figure 10.6 Prime Minister Rudd delivers the National Apology to the Stolen Generations

Ethnicity

Young people from different ethnic backgrounds, whether born in Australia or overseas, can experience particular difficulties in feeling caught between two sets of cultural standards and values. Life transitions that are part of young adult development can be more difficult to negotiate due to cultural views on sexuality, relationships, gender roles, education and employment. Social isolation can be a concern for young people from non-English speaking backgrounds or ethnic minorities. Making and maintaining friendships can be difficult due to language and cultural differences and bullying. Impediments to educational attainment can arise due to interruptions in schooling, language difficulties and cultural barriers. This may lead to fewer employment opportunities and lower socio-economic status.

Depending on the situation of the individual, such life challenges can be associated with poorer outcomes for young people from diverse backgrounds. These could include increased risk of suicide, risk-taking behaviours, increased vulnerability to drug or alcohol problems, anxiety, depression and poor self-esteem. These can result in withdrawal or aggression or expressing a negative feeling or impulse by behaving in a socially unacceptable way.

Geographic location

Young people living in regional communities may face a different array of social and emotional issues from their urban counterparts. Issues identified by rural youth as being of particular concern to them include isolation, few employment opportunities, lack of confidence in the future, few leisure activities, boredom and limited transport options. These young people also felt that such factors increased the likelihood of adolescents engaging in suicidal behaviour or risky behaviour, such as substance use and unsafe sexual practices.

Young rural residents are twice as likely to use alcohol as young people in metropolitan areas. **Amphetamine** use by young people is reported to be relatively common in rural areas and there is a particular issue with **inhalants**, such as petrol sniffing, in some remote indigenous communities. In some rural communities, cannabis smoking appears to be a part of the culture for young people and many are unaware of its illegal status and health effects.

Sexual orientation

Approximately 10 per cent of young Australians experience same-sex attraction. Same-sex attracted young people tend to be more sexually active than their heterosexual peers and, on average, are sexually active at a younger age; many are also sexually active with opposite-sex partners.

Same-sex attracted young people may feel torn between wanting to let others know about their feelings and denying or suppressing them for fear of rejection. There are also issues of grief and loss for some, who feel they may lose the respect and love of their family and friends.

Same-sex attracted youth living in rural and remote communities may face additional challenges through a lack of acceptance, support and information about safe sex and gay relationships, as well as through social and geographic isolation. For some individuals, such factors may contribute to depression, substance use and suicidal behaviour. Some young people may feel the need to 'escape' to a more supportive and less isolated community, or seek support and information via the Internet.

Same-sex attracted young people from non-English speaking backgrounds, particularly cultures where homosexuality is not accepted, may be more reluctant to disclose their sexual orientation to their parents and may subsequently receive less support from them. Young people who identify with religions that reject homosexuality can struggle to reconcile their religious beliefs with their personal feelings.



Figure 10.7 Approximately 10 per cent of young Australians experience same-sex attraction

Homophobia includes discrimination or abuse based on someone's homosexual identity or sexual orientation. It can negatively impact on the emotional and physical well-being of same-sex attracted young people. In schools, students who are known to be same-sex attracted may be more likely to experience bullying and have greater difficulty in connecting with others.

Socio-economic determinants

The major socio-economic determinant of mental health is poverty, including low levels of education, poor housing and poor income. Increasing and persisting socio-economic disadvantages for individuals and communities are recognised risks to mental health. The greater vulnerability of disadvantaged young people to mental health disorders may be explained by such factors as the experience of insecurity and hopelessness, rapid social change, and the risks of violence and physical ill-health. A climate that respects and protects basic civil, political, socio-economic and cultural rights is important to mental health promotion.

Environmental determinants

Environmental determinants of mental health include socio-economic circumstances because those from a socio-economically disadvantaged background often live without the basic freedoms of security and have a limited ability to take action and make choices. These people often do not have access to adequate food, shelter, education and health. Socially isolated and disadvantaged young people have a poorer health status.

Young people who are refugees and **asylum seekers** deal with multiple environmental risk factors. Post-traumatic stress disorder is one of the major mental health problems experienced by refugees. The disorder is caused by the impact of war and war-related traumas; for example, the experience of torture, beatings, killings or rape in their country of origin. The post-migration environment may pose difficulties, such as bureaucratic procedures, poor living conditions, discrimination and low levels of social support. This can lead to additional mental health problems and increase the risk of post-traumatic stress disorder symptoms among traumatised asylum seekers. War-related traumas can also create psychiatric vulnerabilities in young people of traumatised and depressed parents.

Young males in some rural and remote communities experience an elevated rate of suicide. A number of contributing factors have been proposed for this. Isolation, rural poverty and the availability of firearms have all been suggested.

practical application

Protective factors in mental health

Using the information from the section above, prepare a wall chart on 'Resilience and protective factors for mental health problems and illnesses' for teachers to display in their classrooms.

Critical inquiry

1 a **Explain** why some young females suffer from low self-esteem.
b **Identify** the social factors that have an impact on the perception by young females of their abilities and body image.

2 **Discuss** the coping strategies young females use when dealing with stress.

3 **Describe** how a teacher could support young females in developing a positive self-image.

4 **Critically analyse** the health promotion program Youthbeyondblue, a youth depression awareness campaign:
a **Outline** the aims of the campaign.
b **Describe** how the program is funded.
c **Identify** the target audience.
d **Identify** who is involved.
e **Discuss** why the campaign was established.
f **Evaluate** the effectiveness of the campaign by examining its achievements.

WEB The Youthbeyondblue website (see Critical Inquiry task 4) can be accessed via www.oup.com.au/pdhpe12

Research and Review

1 **Outline** the following determinants of mental health:
a socio-cultural
b socio-economic
c environmental.

Alcohol consumption

Many young people experiment with alcohol. In the short term, excessive use of alcohol among adolescents can lead to falls, accidents (including motor vehicle accidents), risky sexual behaviour and violent behaviour. In the longer term, alcohol dependency can lead to loss of control of one's life. Heavy ongoing use of alcohol can lead to damage to the pancreas and liver (**cirrhosis**), stomach ulcers, **cognitive** impairment and an increased risk of some cancers. Many young people continue to use alcohol casually throughout their adult life without significant health problems.

Around one-quarter of teenagers put themselves at risk of short-term alcohol-related harm at least once a month.

Around one-quarter of teenagers put themselves at risk of short-term alcohol-related harm at least once a month. The proportion was higher among females (28.3 per cent) than males (24.5 per cent). In 2005, 25 per cent of students reported being recent drinkers; that is, having had an alcoholic drink in the last seven days. The percentage of recent drinkers generally increased as the age increased, from 9 per cent among students aged 12 years to 42 per cent among students aged 17 years. Although in previous years the proportion of males who were recent drinkers was higher than for females, in 2005 there was no significant difference between males and females. Students most commonly reported themselves to be 'non-drinkers' (50 per cent) followed by 'occasional drinkers' (23 per cent), 'party drinkers' (18 per cent), 'light drinkers' (6 per cent) and 'heavy drinkers' (1 per cent).

Social factors (such as gender, unemployment, Aboriginality and education) affect the likelihood of using alcohol, the levels of use and the consequences of use. In recent years, young females have increased their use of alcohol. Marketing companies have developed advertising strategies that promote alcoholic drinks to appeal to young women, and it has become more socially acceptable for young women to drink alcohol. The risk of alcohol and other drug-related problems among Aboriginal young people is high. This is a result of parent models of excessive use of alcohol, and hazardous use by young Aborigines.

Table 10.3 Alcohol consumption associated with harm among young people

	Short-term harm		Long-term harm	
Gender	**Risky**	**High-risk**	**Risky**	**High-risk**
Males	7 to 10 standard drinks on any one day	11 or more standard drinks on any one day	29 to 42 standard drinks per week	43 or more standard drinks per week
Females	5 to 6 standard drinks on any one day	7 or more standard drinks on any one day	15 to 28 standard drinks per week	29 or more standard drinks per week

AIHW, Young Australians: Their Health and Wellbeing, 2007

Health initiatives targeting youth alcohol use include 'Drink, Drunk: The Difference is U', 'Rethinking Drinking: A Resource for Secondary Schools' and the introduction of proof-of-age cards. It is important that young people understand relevant health information (such as standard drinks and blood-alcohol concentration) and are able to access health services if needed.

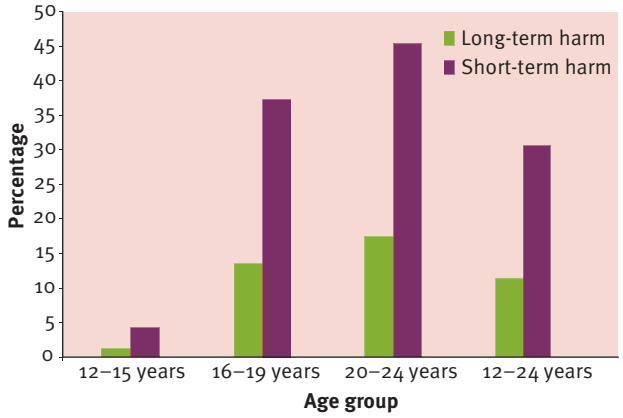
Binge drinking

Binge drinking is a characteristic form of alcohol consumption for many young people. The 2005 Australian Secondary Students' Alcohol and Drug (ASSAD) survey found that in any given week, approximately one in 10 young people aged 12 to 17 years reported binge drinking or drinking at risky levels (seven or more drinks for males and five or more for females). One in five 16 and 17 year olds drank at risky levels.

Binge drinking is especially harmful for young females because they drink higher-content alcoholic drinks. It is also harmful because they have a different ratio of muscle to fat in the body compared with males, leading to a higher blood alcohol concentration when the same amount of alcohol is consumed.

Risky levels of alcohol consumption are seven or more drinks for males and five or more for females.

This pattern of drinking is harmful both in the short term and in the longer term because it has severe health consequences. Short-term physical consequences include vomiting; dizziness; unconsciousness; dehydration; and reduced sexual inhibitions, which may lead to sexually transmitted infections and unwanted pregnancy. Long-term physical consequences include liver and brain damage and nutritional deficiencies. Emotional consequences include loss of self-respect, being isolated by one's peer group, being the subject of gossip and loss of parental trust. There are other social consequences, including the economic cost of alcohol-related problems (such as injury, death, violence and crime). Accidents and injury due to alcohol consumption are prevalent in young people. The economic cost to the community of alcohol-related problems is enormous.



Source: AIHW, Young Australians: Their Health and Wellbeing, 2007

Figure 10.8 Proportion of young people who drink at risky or high-risk levels and thus face short-term and long-term harm

Research and Review

1. **Describe** the nature of alcohol consumption by young people.
2. **Outline** the short-term harms associated with alcohol consumption.
3. **Outline** the different categories of alcohol consumption that young people identified.
4. **Describe** the social factors that may affect the likelihood of young people using alcohol.
5. **Define** the term 'binge drinking'.
6. **Outline** the ways in which binge drinking can be harmful.

Binge drinking: a blight on Australia's young

AMA [Australian Medical Association] President, Dr Bill Glasson, said today that binge drinking is on the rise among young Australians and the health effects of this blatant alcohol abuse can stay with many of them throughout life.

Dr Glasson said binge drinking is a blight on Australia's young that can take lives, cause physical and mental harm, and lead to events and consequences that affect innocent bystanders and passers-by.

'Binge drinking by our kids is a major problem for families and communities,' Dr Glasson said.

'The prevalence of alcohol use among young people has increased to dangerous levels in the past decade, and much of it is binge drinking.

'There is a lot of peer pressure coercing young people into dangerous and harmful alcohol drinking habits.

'It is a problem that must be addressed by young people, their families, communities and governments.'

According to the Victorian Youth Alcohol and Drug Survey, the current generation of drinkers starts younger, drinks more, and indulges in binge drinking to a greater extent than any previous generation.

Ten years ago, the estimated cost to the Australian community of the harmful effects of alcohol was around $4.5 billion a year. But kids are now starting to drink alcohol more regularly on average at 14 years of age. Many of them are unaware of the harm caused by binge drinking and don't know how to avoid the risks associated with alcohol.

According to the American Medical Association's report, 'Harmful Consequences of Alcohol Use on the Brains of Children, Adolescents, and College Students', the brain goes through dynamic change during adolescence, and alcohol can seriously damage long-term and short-term growth processes.

Frontal lobe development and the refinement of pathways and connections continue until age 16, and a high rate of energy is used as the brain matures until age 20.

Damage from alcohol at this time can be long-term and irreversible.

In addition, short-term or moderate drinking impairs learning and memory far more in youth than adults. Adolescents need only drink half as much to suffer the same negative effects.

'Heavy drinking, which is not limited to our young people, is becoming increasingly socially acceptable—but it shouldn't be,' Dr Glasson said.

'Kids learn by example. Parents and other role models in the community need to be aware that their often dangerous behaviour is being copied by children and teenagers.'

Binge drinking is defined as heavy drinking over a short period of time, or drinking continuously over a number of days or weeks.

The AMA defines binge drinking as drinking, on any single occasion, significantly more than the low-risk levels advised by the National Health and Medical Research Council.

Dr Glasson said binge drinking is a problem for drinkers of all ages, but we need to target the young abusers because the health dangers are more pronounced and to stop the habit before it becomes entrenched in their behaviour.

'The AMA will work with the government and the liquor industry to paint binge drinking as unhealthy, unattractive and antisocial,' Dr Glasson said.

During the holiday period, the AMA is calling on the alcohol industry, the Federal Government and the general public to do their bit to reduce the harm caused by alcohol.

Australian Medical Association website, 22 December 2004

Critical inquiry

1. **Analyse** the socio-cultural, socio-economic and environmental determinants of binge drinking.
2. **Discuss** why binge drinking is particularly dangerous for young people.
3. **Propose** strategies you could provide to the AMA and government to combat binge drinking in young people.

practical application

Alcohol consumption

Design a creative visual presentation that targets Year 12 end-of-school celebrations and promotes the safe use of alcohol. Use any type of ICT to create your presentation. The presentation should be based on a harm-minimisation approach, which uses strategies that reduce physical, social and emotional harm.

Violence

Violence is the use of physical force to injure somebody or damage something. It takes many forms and is unacceptable behaviour.

Bullying

Bullying is defined as the repeated oppression of a less powerful person by a more powerful person or group. Bullying might be physical (including punching or kicking someone or flushing someone's head in a toilet bowl) or psychological (including name-calling, isolating and gossiping). To be considered bullying, rather than a disagreement or violence, an imbalance of power needs to exist between the bully and the bullied. This imbalance in power might be as a result of physical size, chronological age, group numbers or psychological perception.



To be considered bullying, rather than a disagreement or violence, an imbalance of power needs to exist between the bully and the bullied.

It is difficult to ascertain the number of young people who are bullied frequently because the available statistics include those for children as well as young people. According to Ken Rigby from the University of South Australia, in Australian schools every week one in six students is bullied and one student in 10 engages in persistent bullying. One student in eight is continually **victimised**. Some students are both bullied and bullies. The most commonly reported form of bullying is verbal harassment. Young females are more likely to inform their friends if they are bullied, whereas young males are more likely to conceal that they are being bullied.

Differences between genders exist with respect to frequency of bullying and the type of bullying. Teasing and name-calling are experienced equally by both young males and young females. Males are bullied more frequently, and physical bullying is more common among males. Females report being the victims of psychological bullying, such as exclusion from a friendship group or being the subject of gossip or teasing.

Some young people remain unaffected by a bullying experience. The differences in reaction to being bullied can be attributed to the frequency and intensity of the bullying and to the age of the young person being bullied. The more frequently the young person is bullied, the more likely it is that the person will be affected, both in the short term and the long term.

There are a wide range of factors that can cause or sustain bullying behaviour. These include social **prejudice** related to race, sexual orientation, socio-economic differences, gender and so on, but are not limited to such factors. In addition, there are individual characteristics that are strongly influenced by both genetic and environmental factors; the latter being especially associated with negative parenting and other experiences in **dysfunctional** families.

For many young people who are frequently bullied there are both short-term and long-term health consequences. These include low self-esteem, depression, suicidal tendencies, self-harm and physical symptoms. Absenteeism can also be a direct consequence of being bullied.

It is important that young people feel confident to inform others of bullying episodes, and that they learn appropriate, constructive arguing techniques. Feeling supported by trusted networks of peers and family assists in alleviating the negative emotions associated with being bullied. Peer-mentoring programs (such as 'Peer Support') have been utilised in many schools as an avenue for young people to discuss their problems and feel supported.



The Peer Support website can be accessed via www.oup.com.au/pdhpe12



Figure 10.9 Young people need to feel confident to inform others of bullying episodes

Sexual assault

Most sexual assaults are committed by males known to the victim. The motive for the assault is usually to inflict harm and assert power over the victim. Many cases of sexual **assault** are not reported to police or health workers. Many young persons who are victims of sexual assault fear that they will not be believed or that they are in some way responsible for encouraging the assault. Feelings of shame and guilt are initial responses to sexual assault. It is important that young people in this situation be believed, have their feelings validated and be made to realise that the fault lies with the offender.

According to a National Child Protection Clearinghouse report published in 2004, in Australia almost half of all cases of sexual assault reported in 2002 involved a child. In about 75 per cent of cases the victim knew the offender; however, the majority of those known offenders were not family members. Girls are approximately three times more likely than boys to be the subject of sexual abuse.

Sexual assault on young people has both short-term and long-term consequences for the victim. In the short term, the young person might fear pregnancy and the contraction of sexually transmitted infections. The person might also experience anger, depression and loss of sexual interest. Long-term consequences include dysfunctional sexual relationships, self-harming behaviour, depression and lack of self-esteem.

Sexual harassment

Sexual **harassment** is defined as being any unwanted verbal or physical behaviour of a sexual nature. There are several types of sexual harassment: subtle, explicit and criminal. Subtle harassment includes such behaviour as name-calling and making sexual comments regarding body shape or size. Explicit harassment includes showing photographs of a sexual nature and making obscene telephone calls. Criminal harassment involves physical contact, such as sexual assault.

Harassment is characterised by an imbalance of power. The predominant offenders are males in positions of power, such as an employer, teacher or relative. Young people also sexually harass each other. Comments about the length of someone's legs or the size of a girl's breasts can also be forms of sexual harassment.

Young people should be aware that harassment is unacceptable, and that they have the right to challenge and report such behaviour. Young people might be placed in situations where they feel that their employment status is threatened if they report sexual harassment. It is important that young people feel confident to seek help from trusted adults, and that they develop assertiveness skills to deal with unwanted sexual comments and behaviour.

Harassment is characterised by an imbalance of power.

practical application

Sexual harassment

1. In small groups, **describe** examples of sexual harassment in schools or places of employment.
2. Design a sexual harassment policy for your school.
3. Design a workshop for Year 9 students that would assist students in identifying experiences of sexual harassment and procedures for dealing with harassment incidents.
4. If your school already has a sexual harassment policy, **evaluate** its effectiveness by examining current practices.

Homophobic vilification

Homophobia is an irrational fear or intolerance of homosexuality and behaviour that is perceived to be different from traditional gender roles. Fear and hatred of homosexuality that is expressed as verbal or physical abuse of homosexuals is termed *homophobic vilification*. A study conducted by La Trobe University in 2002 found that:

- 38 per cent of participants reported unfair treatment on the basis of their sexuality
- 44 per cent of participants reported verbal abuse and 16 per cent reported physical abuse because of their sexuality.

The study also identified that school was the most dangerous place for young people to be in terms of exposure to homophobic vilification. Of the young people surveyed, 74 per cent who were abused experienced this abuse at school. Of those abused at school, 80 per cent were young men and 48 per cent were young women.

In most physical attacks on homosexuals, the offenders are groups of young males aged 16–20 years.

Homophobic vilification can be in the form of name-calling or can be physical, such as 'gay-bashing'. In most physical attacks on homosexuals, the offenders are young males aged 16 to 20 years. In the majority of cases, these homophobic attacks involve groups of three or more offenders. The vilification can result in physical injuries, robbery, long-term feelings of insecurity and, possibly, depression.

Homophobic **abuse** has a profound impact on young people's well-being. Those who had suffered abuse felt less safe at school, home, on social occasions and at sport. They were also more likely to **self-harm**, report a sexually transmissible infection and use a range of legal and illegal drugs. Those who had suffered abuse were also more likely to have talked to someone about this and to have accessed a support organisation. However, in 2002, young people felt safer at school than they did in 1998. They felt the most safe at home and the least safe at sporting events. These young people responded in many ways to homophobia: there were many negative health outcomes but many reported being stronger and more determined because of it.

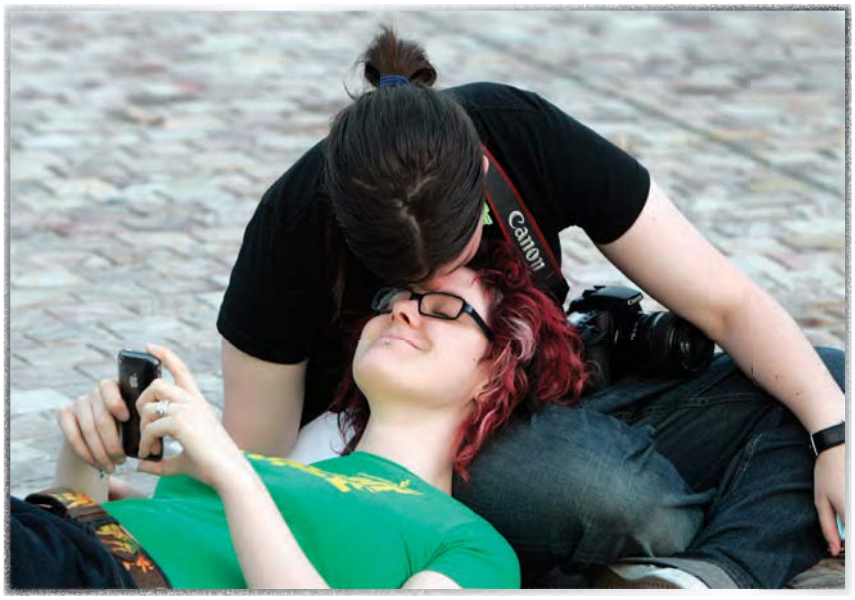


Figure 10.10 Many young homosexuals report being stronger and more determined because of their experiences with homophobia

Domestic abuse

Domestic violence is an abuse of power in which one partner in a relationship (usually male) uses violence or threats in order to control the other partner. Domestic abuse includes physical, sexual, psychological and social abuse. Physical abuse includes breaking of bones, punching and using weapons. Sexual abuse can involve being forced to undertake, or watch, sexual activities. Psychological abuse might involve being insulted and threatened. Examples of social abuse include locking the partner in the house, preventing the partner from using the telephone, refusing to allow the partner to drive the car or controlling the partner's financial affairs.

There is evidence of higher levels of violence against overseas-born and Aboriginal young women. These groups are further disadvantaged by their isolation, Indigenous values and the failure of health services to meet their needs.

Often young people view domestic violence. Being in a household where bashings and verbal abuse occur repeatedly has the potential to affect the health of the young person. Depression, low self-esteem, difficulty in forming and maintaining relationships, and a low level of confidence in social situations are all reported as consequences of domestic abuse. Cycles of domestic abuse can be created. As young persons become adults, they are more likely to be perpetrators of abuse if they have experienced domestic abuse themselves. This applies particularly to males.

Critical inquiry

1 Design a health-promoting schools program for young people most at risk of homophobic vilification. As part of the program design a range of posters that could be placed around the school and that:

a Break down myths about homosexuality.

b **Identify** the key people in a support network.

practical application

Violence

Design a series of posters to raise awareness of the range and types of violence that young people may experience.

Research and Review

1 Using current and relevant library sources:

a **Identify** the age and gender trends in bullying.

b **Explain** the social factors that contribute to these trends.

2 Design a poster that **outlines** the risk factors and protective factors of bullying. The poster can be placed around the school to raise awareness of these factors.

Road safety

Motor vehicle accidents represent the greatest cause of unintentional death and injury in young people. The identifiable causes of motor vehicle accidents in young people are poor perception of risk, thrill-seeking, exposure to **environmental hazards**, inexperience and alcohol consumption.

There were 455 deaths of young people aged 12–24 years due to transport accidents in 2004; a rate of 13 per 100 000 young people. Of these deaths, 90 per cent were a result of traffic accidents involving a motor vehicle. The transport accident death rate decreased by 35 per cent between 1995 and 2004: from 20 to 13 deaths per 100 000 young people. Within the 12–24 age group, the death rate increased with age and was higher for males than for females. Over one-quarter of all deaths due to transport accidents in 2004 were of young people.

A variety of factors increase the risk of mortality and morbidity from motor vehicle accidents. The influence of the male gender role has a significant influence on risk behaviour. Some young males feel societal pressure to conform to expected gender roles. This might involve running red lights, speeding or doing 'doughnuts' to impress their peers and validate their ability to 'handle' a car. The presence of

Table 10.4 Transport accidents and assault death rates for young people aged 12–24 years, 2004

		Number			Rate per 100 000 young people		
External cause	Age (years)	Males	Females	Persons	Males	Females	Persons
Transport accidents	12–14	19	8	27	4.4	2.0	3.2
	15–17	60	28	88	14.4	7.0	10.8
	18–24	252	88	340	25.2	9.3	17.5
	12–24	331	124	455	7.1	17.9	12.6
Assault	12–14	0	0	0	0.0	0.0	0.0
	15–17	2	1	3	0.5	0.3	0.4
	18–24	13	8	21	1.3	0.8	1.1
	12–24	15	9	24	0.8	0.5	0.7

AIHW, Young Australians: Their Health and Wellbeing, 2007

passengers can influence the driving behaviour of young males, particularly in their first year of driving. Young females are more likely to be the victim of a passenger accident, because young males tend to drive.

Differences exist between socio-economic groups in relation to motor vehicle accidents. Young people from low socio-economic backgrounds are more likely to be involved in motor vehicle accidents. Driving less-roadworthy cars, consuming alcohol and achieving lower levels of education are contributing factors to motor vehicle accidents in this group.

Young Indigenous people are more likely to be involved in motor vehicle accidents than are non-Indigenous young people. Lack of education, unemployment and financial disadvantage—together with high alcohol consumption among young Indigenous males—results in more motor vehicle accidents among this group.

Young rural people are more likely to be involved in motor vehicle accidents than are young people in larger urban areas. This is due to a combination of factors, which include:

- lack of alternative transport
- large distances to travel between properties or towns
- higher speed limits on rural roads
- personal over-confidence (due to driving from a younger age and on under-populated roads and adopting the relaxed driving attitudes common in rural areas).

There is also a range of personal factors that predispose young people to motor vehicle accidents. These include:

- poor perception of risk (leading to dangerous behaviour, such as making risky turns)
- limited experience (crashes are more likely to occur in the first few months of driving)
- personal priorities that take precedence over health and safety
- lack of seat-belt use
- poor vehicle condition
- greater risk behaviour (such as speeding and use of alcohol and other drugs).



Figure 10.11 Poor perception of risk is one of the personal factors predisposing young people to motor vehicle accidents

practical application

Road safety

1. Design a series of posters that illustrate the trends and prevalence of road safety for young people. Your posters should illustrate statistical data in the form of graphs.
2. Write a letter to your local member expressing your concerns regarding the risk to young people of mortality and morbidity from motor accidents.

Research and Review

1. **Describe** the nature of violence relevant to young people.
2. **Outline** the range and types of violence young people may experience.
3. **Define** the following terms:
   - a sexual assault
   - b sexual harassment
   - c homophobic vilification.
4. **Describe** the nature of motor vehicle accidents relevant to young people.
5. **Outline** the range and types of road safety accidents young people may experience.
6. **Outline** the factors that make young rural people more likely to be involved in motor vehicle accidents than are young people living in larger urban areas.

Sexual health

The sexual and reproductive activities of young people, the prevalence of sexually transmitted infections (STIs) and pregnancy in young women are closely related. According to a National Centre in HIV Epidemiology and Clinical Research report published in 2005, annual notification rates of HIV, **chlamydia** and gonorrhoea have all increased between 2000 and 2004. This poses an increasing health problem for young Australians. In 2005, half the STI notifications were for young people aged 12–24 years.

Sexual orientation

As a part of sexual exploration, many young people participate in same-sex intimate relationships and sexual behaviour. These interactions are motivated by increasing sexual desire and curiosity. However, it is important to differentiate between a homosexual experience and homosexual orientation. Approximately 20 per cent of young males have experienced orgasm during same-sex activity, and 12 per cent of young females have experienced sexually stimulating experiences with other females. These experiences are part of sexual exploration, and the majority of these young people will identify as heterosexuals in their adult life.

For young people who are grappling with their sexual orientation, this life stage can be confusing and distressing as they are faced with the heterosexual expectations of their parents, teachers and peers. Young people who identify as homosexuals and **bisexuals** often become isolated and withdrawn and exhibit depressive and self-harm behaviour.

Sexual exploration

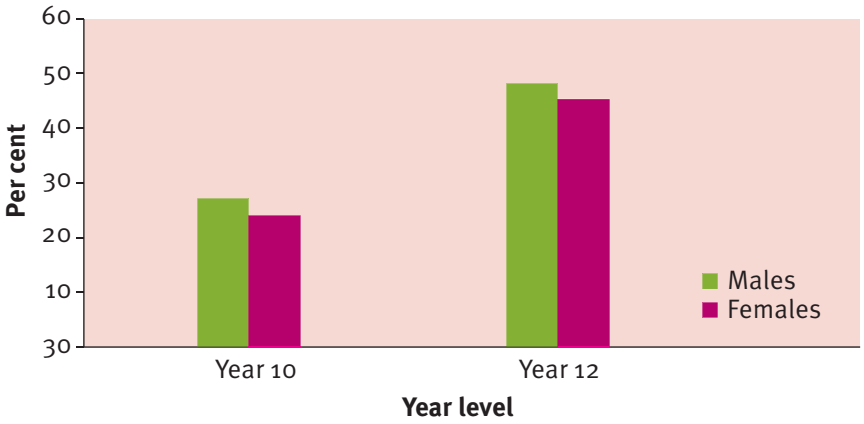
The time between childhood and adulthood is characterised by an exploration of sexual identity. For some young people, this 'sexual awakening' can be a confusing time. Although they might be physically ready to engage in sexual activity, they might not be prepared emotionally or cognitively to cope with the consequences and responsibilities of their experiences, such as pregnancy and STIs.

Sexual exploration involves young people learning about, and understanding, their sexual organs and the physical changes that they are experiencing. Kissing, sexual fantasy, masturbation, petting, oral sex and sexual intercourse are part of this sexual learning process.

Sexual experience

In 2002, a national survey of secondary students and sexual health was conducted and found that a large proportion of students had experienced some form of sexual activity, such as deep kissing, genital touching/being touched or giving/receiving oral sex. Year 12 students were found to be more likely to have experienced each type of sexual activity.

Twenty-six per cent of Year 10 students and 47 per cent of Year 12 students reported that they had had sexual intercourse. Both in Years 10 and 12, slightly more males than females reported having had sexual intercourse. Between 1992 and 2002, the proportion of young people in Years 10 and 12 (in government schools) who had had sexual intercourse increased from 35 per cent to 42 per cent. This was an increase from 23 per cent to 32 per cent among Year 10 students and an increase from 48 per cent to 55 per cent among Year 12 students.



Source: AIHW, Young Australians: Their Health and Wellbeing, 2007

Figure 10.12 Proportion of students who have ever had sexual intercourse

Table 10.5 Proportion of Year 10 and Year 12 students by sexual attraction, 2002 (%)

	Males		Females	
Sexual attraction	**Year 10**	**Year 12**	**Year 10**	**Year 12**
Attracted only to people of the opposite sex	94.7	96.4	91.0	91.4
Attracted to people of both sexes	2.4	2.2	6.9	5.7
Attracted only to people of the same sex	1.2	0.7	0.1	0.6
Not sure	1.7	0.6	2.0	2.3
Total per cent	**100.0**	**100.0**	**100.0**	**100.0**

AIHW, Young Australians: Their Health and Wellbeing

Table 10.6 Reported number of sexual partners for sexually active students, 2002 (%)

	Year 10		Year 12		Total	
Frequency	**Males**	**Females**	**Males**	**Females**	**Males**	**Females**
No sex in the past year	9.7	2.9	9.0	4.3	9.3	3.7
1 person	42.0	56.6	56.0	65.0	49.9	61.5
2 people	15.6	18.0	19.4	17.1	17.8	17.4
3 or more people	32.7	22.5	15.6	13.6	23.0	17.3
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

AIHW, Young Australians: Their Health and Wellbeing

Sexual attraction

The majority of students (93 per cent) surveyed in the 2002 survey reported that they were sexually attracted to the opposite sex only. In 2002, half of sexually active male students in Years 10 and 12 had reported having sexual intercourse with one sexual partner in the previous year, as did 62 per cent of female students. Year 10 students were more likely than Year 12 students to report having had multiple partners in the last year. A higher proportion of males in Years 10 and 12 reported having more than one sexual partner during the previous year (41 per cent) compared with females (35 per cent).

Sexual behaviour

There are particular social factors associated with the age at which sexual intercourse begins. Young people from low socio-economic backgrounds are more likely to participate in early intercourse. Indigenous Australian females experience first intercourse at an earlier age than their non-Indigenous Australian peers. The frequency of sexual activity is lower among young females than among young males. Males are more likely to participate in, and support, multiple relationships, whereas females are generally involved in only one sexual relationship at a time.

Contraception use

One in four Year 10 and almost half of Year 12 students have had sexual intercourse, and 38 per cent of young people have had multiple sexual partners. Given these statistics, an important related health behaviour is contraception use to avoid unwanted or unplanned pregnancies, and condom use to avoid STIs. A high proportion of young people at risk of unplanned pregnancy used some form of **contraception** (90 per cent of 16–19 year olds and 94 per cent of 20–29 year olds). The main forms of contraception used by young people aged 16–19 years and 20–29 years were the contraceptive pill and condoms. Approximately 5 per cent were using withdrawal as a method of contraception.

Condom use

Sexually active young people may be at risk of STIs. Condom use is the most effective method of protection against STIs among sexually active people. In the year before the survey, 66 per cent of Year 10 students and 42 per cent of Year 12 students always used a condom. In contrast, 6 per cent of Year 10 students and 11 per cent of Year 12 students never used a condom. Young men in both year levels were slightly more likely to use a condom than were young women.

A particular concern was that over half the students who used contraceptive pills as a form of contraception did so without using a condom to protect against STIs. Year 12 students were more likely than Year 10 students to use the contraceptive pill without also using a condom.

In relation to the most recent sexual encounter, 72.4 per cent of young people in Year 10 and 56.6 per cent of those in Year 12 reported using a condom. Condoms appear to be primarily used for contraception rather than STI prevention. At their last sexual encounter 10 per cent of students reported using withdrawal for contraception.

Pregnancy and contraception

One student in 20 (6 per cent) reported having had sex that resulted in a pregnancy. The use of condoms and other forms of contraception is common, with 65.8 per cent of sexually active young people in Year 10 reporting that they always used condoms. This was lower among Year 12 students (51.8 per cent), which may be accounted for by higher rates of use of the oral contraceptive pill by young women in this group.

Young women from low socio-economic situations had a greater incidence of pregnancy. They were also more likely to continue their pregnancy and parent their child than those from a higher socio-economic background. For some young people, becoming pregnant might result in their discontinuing their education. This creates significant consequences for future employment prospects and financial security. Pregnancy in young women is often a result of sexual inexperience and a lack of understanding of their reproductive cycle.

The impact of pregnancy varies, depending on whether the young mother chooses abortion, parenting or adoption. Compared with older women, young women have higher complication rates during pregnancy and are more likely to suffer from premature delivery and labour complications. A young mother is twice as likely to have an underweight baby.



Figure 10.13 Valuable skills for a young parent include learning to access available health services and information

For young women who choose to parent their babies, difficulties accessing housing and financial support can create problems. If the parents of the young person do not accept the pregnancy, they might withdraw their support. The biological father of the child faces a decision regarding the possible acceptance of marriage and family responsibilities. It is essential that young people be supported in their choices regarding pregnancy and parenting. Valuable skills for a young parent include learning to access available health services and information, developing coping skills and seeking assistance from supportive networks.



It is essential that young people be supported in their choices regarding pregnancy and parenting.

practical application

Sexual health

1 The school principal is concerned about the sexual health of the school's students. She has asked you to write an article for the next school newsletter that:

a **analyses** the sexual and reproductive activities of young people

b **outlines** the prevalence of sexually transmitted infections

c **proposes** safe sexual practices.

Abortion

Abortion involves removing the foetus from the uterus by medical procedures. Deciding to abort a pregnancy can be a traumatic decision, or a relief, for a young woman. Young people must be aware of their options regarding pregnancy and if, after careful consideration, they choose abortion, it is essential that the young woman consult a qualified medical practitioner. Seeing the problem in perspective and seeking help are important health skills when dealing with such a decision as abortion.

Australia has a relatively high rate of teenage pregnancy, and approximately 26 in every 100 known pregnancies are terminated. Continuing with teen pregnancy carries social risks, including interruption to school education, reduction in career prospects, potential poverty and social isolation. There is greater need for social and economic policies that support teenage and single mothers with regard to income, housing and social support. There is also a need for schools, universities and workplaces to provide environments that provide for motherhood and for social attitudes that value motherhood.



Two steps forward and one step back? Australian secondary students' sexual health knowledge and behaviours

By Paul A Agius, Sue Dyson, Marian K Pitts, Anne Mitchell and Anthony MA Smith

[The following report investigates the] changes in the sexual health knowledge and sexual and risk behaviours of year 10 and 12 Australian school students between 1992 and 2002…

Analysis of data from the three [surveys] shows high levels of knowledge concerning human immunodeficiency virus/ acquired immune deficiency syndrome [HIV/AIDS], but a small but consistent decline since 1992. Knowledge about sexually transmitted infections and hepatitis remains poor. In 2002, there was an increase in the number of students reporting ever having had sexual intercourse, and this was most pronounced for year 10 students. The number of young men in year 10 who reported having three or more partners had doubled since 1997 to 33 per cent. More year 10 young women also reported having intercourse with three or more partners. Consistency of condom use has improved over time; however, 39 per cent still report condom use only sometimes.

[From the results we can conclude that] school-based sexual health education provides a critical basis for ensuring that young people begin to experience sex safely and with an appropriate knowledge base …

Between 1992 and 1997 in Australia, we observed no increase in the proportion of 16- to 18-year-old students who were sexually active and a decrease in the number of partners reported by sexually active students. There was also an increase in the consistency of condom use during this period.

The picture that emerges from these data is one of stable or declining levels of sexual behaviour and small increases in safer sexual behaviour among young people. There are still, however, high numbers of young women and men who are not using protection when engaging in sexual activity. The present article significantly extends our understanding of the changes in young people's sexual cultures in Australia by comparing the results of the 2002 Australian Survey of Secondary Students and Sexual Health with the results of the 1992 and 1997 surveys. …

In the face of the HIV pandemic, secondary schools were urged to place more emphasis on this area and, consequently, good levels of knowledge about HIV/ AIDS were demonstrated in the 1992 survey. In the early 1990s, regular media attention to HIV undoubtedly also contributed to young people's awareness of HIV transmission. There has, however, been some slippage in knowledge about HIV/ AIDS, perhaps because, in general, attitudes toward HIV have changed, and other concerns such as hepatitis and sexually transmitted infections have consumed more community concern as an HIV epidemic among young people in Australia was turned away. This shifting priority may be reflected in the increase in knowledge about STIs and hepatitis that has occurred since the first survey in 1992. This increase, however, must be seen in the context of still unacceptably low levels of knowledge about hepatitis and STIs, which will continue to be a challenge for educators and those concerned with health promotion. This is especially so because of the sexual behaviour of young people, which remains an ongoing cause for concern. Fewer young people were sexually active in 1992 and 1997, however in 2002, more young people reported ever having had sexual intercourse, and a considerable number continue to use condoms inconsistently or not at all. Young men and women in year 10 are of particular concern, as their engagement in sexual activity has increased markedly since 1997 …

Although knowledge about STIs is not in itself a sufficient basis for behaviour change, it is a necessary precursor to safe behaviour. Young people clearly need this information to enable them to make informed decisions about their behaviour before they become sexually active. The gender differences in STI knowledge point to the need for consideration to be given to gender-specific programs to ensure that both young women and young men are appropriately provided with the knowledge and understanding they need to minimise risk. This provision of knowledge needs to take place within programs that are informed by a social model of health and that allow them to explore the social context of sexual decision-making, including the opportunity to interrogate gender expectations. The findings also lead us to consider the issues associated with teaching young people biological information about various STIs without making the links between transmission, sexual relationships, and personal decision-making. It is clearly important to ensure that the information is personalised and has greater relevance to the lives of young people at a time when they increasingly need to take responsibility for their sexual safety.

Journal of Adolescent Health, Vol. 38, No. 3

HIV/AIDS and blood borne viruses

Human immunodeficiency virus (HIV) attacks the body's immune system and results in the person being susceptible to infection and diseases, such as pneumonia, cancer and nervous system disorders. Although in Australia the incidence of HIV/AIDS is decreasing, the number of young people participating in risk behaviour that exposes them to HIV transmission is increasing. Unprotected sexual activity and sharing needles for **intravenous** drug use are the primary risk factors for contracting HIV/AIDS. Young people are highly susceptible because their use of condoms for protection during intercourse is inconsistent. Young females report that they feel there is a stigma attached to carrying a condom 'in case' of an unplanned sexual encounter, and are therefore less likely to do so. The incidence of blood borne diseases, such as hepatitis B and C, is increasing in Australia's youth population. With increasing intravenous drug use, more young people are likely to be infected by these diseases. Attitudes towards people with HIV and hepatitis C are generally positive. However, attitudes towards injecting drug users and injecting drug use are generally negative.

Sexually transmitted infections

Lack of safe sex practices is particularly high among young people. Low levels of confidence in initiating condom use and incorrect health beliefs result in young people participating in high-risk sexual behaviour. Young people are at risk of becoming infected with STIs due to their lack of knowledge of the signs and symptoms of STIs and their low perception of risk.

The consequences of being infected with an STI vary, depending on the severity of the disease and the young person's ability to cope with the problem. Young people might be embarrassed to seek medical treatment. Decreased fertility, infection of partners and future sexual dysfunction can be consequences of contracting an STI.

The most commonly treated STI in sexually active adolescents is chlamydia, followed by gonorrhoea, herpes simplex virus (HSV) and genital warts. The increasing incidence of these STIs indicates that some teenagers are careless about 'safe sex'.

Area health services are developing a variety of projects aimed at reducing the incidence of STIs in young people. The Teen Screen Youth Outreach Project is an example of a health program that focuses on sexual health education for young people living on the Central Coast of NSW. Summer Safari is a joint project of NSW Health and the HIV and Sexual Health Service and utilises peer-education strategies to teach young people aged 14–24 years about safe sex, STIs, contraception and pregnancy.

WEB More information about the Teen Screen Youth Outreach Project and Summer Safari can be accessed via www.oup.com.au/pdhpe12

Critical inquiry

Argue the need for sex education in schools and what type of sex education is required.

Research and Review

1 **Define** the following terms:
   - a sexual orientation
   - b sexual exploration
   - c sexual experience
   - d sexual attraction
   - e sexual behaviour.

2 **Outline** the range and types of contraception used by young people.

3 **Identify** the unsafe sexual practices that put young people at risk.

4 **Summarise** the sexual health knowledge and behaviours of young people during 1997–2002.

5 **Outline** the type of blood borne viruses to which young people are exposed.

6 **Identify** the most commonly treated sexually transmitted infections affecting young people.

Body image

Your body image is how you perceive, think and feel about your body, but this may have no bearing at all on your actual appearance. For instance, it is common in Western nations for women to believe they are larger and fatter than they really are. Only 16 per cent of women are satisfied with their body weight. Nearly half of all women of normal weight overestimate their size and shape.

The transition from childhood to adulthood is a time of increased risk for developing poor body image and distorted perceptions of body dimensions. It is also a time of rapid physical growth, which results in increases in height, weight and body fat. This normal growth period creates anxiety in some young people as they become preoccupied with their changing body shape, and as peer and media influence promotes dieting and weight loss.

Disordered eating patterns (such as skipping meals) can begin during this developmental stage. 'Perfectly proportioned' stereotypical media images or 'waiflike' models create social pressures that may affect the eating and dieting habits of young people. The most frequently reported explanations for eating disorders suggest that they are due to a combination of social circumstances and personal vulnerability in the sufferer. This vulnerability stems from a perceived poor body image, confusion over changing role expectations (as the young person negotiates the transition from childhood to adulthood) and a 'perfectionist' personality. Consequences of these eating

disorders are both physical and psychological. They include those identified in Table 10.7. Important skills needed by young people are identifying early warning signs of these disorders and accessing the appropriate services. Schools have a central role in developing these health skills in young people.

Table 10.7 Consequences of eating disorders

Physical	Psychological
• Cessation of menstruation • Irregular heart rhythm • Increased body hair • Reduced sex drive • Seizures and kidney failure as a result of prolonged use of laxatives • Osteoporosis • Fertility damage • Tooth decay from regular vomiting	• Low levels of self-esteem • Depression • Suicidal tendencies • Reduced work output and concentration levels

Research and Review

1 **Identify** the social issues that contribute to poor body image and eating disorders.

2 **Describe** the consequences of body-image problems.

Gambling

Problem gambling is the inability to resist gambling impulses, which results in disruption or damage to several areas of a person's social, vocational, familial or financial functioning. Excessive gambling is used to describe a level of gambling that is considered to be higher than an individual can afford relative to the individual's disposable income and which produces financial strain.

More than one-quarter (26.4 per cent) of all problem gamblers are aged under 25 years. The rate of problem gambling among young people (3.5 per cent to 8 per cent) is significantly higher than the prevalence rate for the general population (2.15 per cent). For young people, the effects of problem gambling can include bankruptcy, housing crisis and homelessness, depression, suicide, relationship difficulties and trouble with the police directly attributable to gambling. Young people sometimes experience the loss of friendships and family relationships due to arguments and loss of trust directly related to gambling behaviour. While it appears that problem gambling is a major issue for young people, research shows that they don't often seek help for the problem. This may be because of shame and stigma, fear they will be denied help and held responsible for the effects of their gambling, or because problem gambling can be hidden and support services don't raise the issue.

Another aspect of problem gambling that is significant for young people is the impact of gambling by a parent or carer. For every individual with a gambling problem, it is estimated that another five to 10 people are adversely impacted. When a parent or carer has a gambling problem, the young people in that family can experience financial stress and poverty, added responsibility for 'adult' duties in the home, increase in frequency and level of arguments and tension, family violence and breakdown, and homelessness. It is reported that young people growing up in a home with a problem gambler display similar characteristics to those who are living with family violence.



For every individual with a gambling problem, it is estimated that another five to 10 people are adversely impacted.

Cyber-bullying

Young people today are increasingly using technology and have been labelled 'the digital generation'. This increased use of technology has seen the emergence of **cyber-bullying** as an issue that needs to be to addressed.

In an Australian study conducted in 2005 over one-quarter of the participants said they knew someone who had been bullied using technology. Of those surveyed, 11 per cent identified themselves as cyber-bullies and nearly 14 per cent as targets. Most targets were bullied by texting, followed by chat rooms then by email. With the number of adolescents who have access to the Internet and mobile phones expected to rise to well over 1 million, it could be predicted that the number of incidents of cyber-bullying will also rise.

It seems that more girls than boys may be involved in cyber-bullying as they are more likely to communicate regularly by email and texting. While younger children in primary school report more face-to-face bullying by peers than do adolescents in secondary school, it would also seem that cyber-bullies are older. This is because younger children do not use the technology for communication with their peers as much as do older students.

The consequences of face-to-face bullying have been shown to be increased levels of depression, anxiety and **psychosomatic** symptoms in victims. The bullied students also feel more socially ineffective and have greater interpersonal difficulties, together with higher absenteeism from school and lower academic competence. Even though the consequences for the victims of cyber-bullying have not been fully researched, it would seem that they could be even more severe than those experienced by victims of face-to-face bullying. Although bullying by physical violence can only be threatened, not conducted, by technology, research has shown that verbal and psychological bullying may have more negative long-term effects.

The rise of cyber-bullying

By Phil McKenna

… Gail Jones, a 15-year-old Briton, took her life after receiving, at one point, 20 silent calls on her mobile phone every 30 minutes. Her father, Glyn, suspects a final call in the middle of the night pushed her over the edge.

[This is an] extreme but far from unique example of the devastation wrought by cyber-bullying. Internet usage by children has increased enormously since … [Gail Jones died] in 2000, so it's likely that online bullying—which includes sending threatening messages, displaying private messages and posting embarrassing video footage and photos on the internet—is also increasing … [As] online communication evolves from chatrooms and instant messaging to social networking, the venues where bullying occurs are becoming more central to young people's lives—and more public …

[It] is becoming clear that aspects of online communication encourage people to act aggressively, prompting them to do things they wouldn't dare try in real life.

The ability to reach more people, and the always-on culture of the internet, means cyber-bullying can have an even more detrimental effect on the victim than the conventional variety. 'It's schoolyard bullying taken to the next level,' says Justin Patchin, a criminologist at the University of Wisconsin. A 2006 [UK study] … found that for one in eight young people, cyber-bullying is even worse than physical bullying.

One reason for this is the sheer number of people who can view anything posted online. 'It would be bad enough to be cyber-bullied by one kid when nobody else knew about it, but a video seen by hundreds or thousands of your peers could be devastating,' says Robin Kowalski, a psychologist at Clemson University in South Carolina …

Another reason why cyber-bullying is so harmful is its sheer relentlessness, says John Carr, chair of the Children's Charities' Coalition for Internet Safety in London. 'When I was a kid, playground bullying stopped when the bell rang and you went back inside or went home,' he says. 'With cyber-bullying it is 24/7, 365 days a year. There is no escape.' An adult can simply turn off the computer, but that's not really an option for today's teens, who depend on the internet to keep in touch with peers. 'This is the always-on generation,' says Kowalski. 'This is how they communicate.' …

The internet doesn't just amplify the effect of bullying. The option to stay anonymous when online means people can write things they wouldn't dare to if their identity were known …

Anonymity can also amplify bullying's negative effect on the victim. 'The psychological ramifications of not knowing who's attacking you can be maddening,' says Kowalski. 'The bully could be your best friend, a sibling or half the school.' … [Nearly] half of the children she interviewed didn't know the identity of their cyber-bully.

The lack of face-to-face contact might tempt bullies to new levels of cruelty. 'On the playground, seeing the stress and pain of the victim face to face can act as an inhibitor to some degree,' explains Carr. 'In cyberspace, where there is no visual contact, you get more extreme behaviour.' …

So what can be done? Led by Ruth Aylett of Heriot-Watt University in Edinburgh, a consortium of European researchers recently developed role-playing software called FearNot!, which gets children to empathise with a victim of bullying.

After watching a short animation of a child being bullied either in the playground or online, the viewer is asked to help the victim by typing advice into the computer …

John Halligan, father of [a] boy who killed himself after being harassed online, continues to lobby for cyber-bullying legislation that specifically targets children. He also talks to school groups and runs a website chronicling the events that led to his son's death. 'It won't bring Ryan back,' he says. 'But it's helping a lot of Ryans out there who are still alive and don't know where to turn.' …

'Most kids think the cyberworld is a place that adults don't enter, so it's harder to get caught cyber-bullying,' says Dr Marilyn Campbell, a psychologist at Queensland University of Technology.

A recent survey headed by Campbell reveals that cyber-bullying is a growing problem in Australia. Of the 120 Year 8 students surveyed, 14 per cent said they had been cyber-bullied and 25 per cent knew of someone who had been. And while 11 per cent of the students admitted they had cyber-bullied, 70 per cent of these had never bullied anyone face to face.

'That's why it's vital to try to get involved in your child's online life,' adds Campbell. Talk to your child about the places they visit online and the activities they are involved in. Teach them never to post anything that they wouldn't want the whole world to read.

Reader's Digest Magazine, February 2008

Study reveals motivations for drink spiking

A nationwide study into drink spiking found 43 per cent of drink spikers had added alcoholic shots or substances to beverages 'for fun.'

According to the RMIT study, respondents were also motivated to increase their chances of engaging in consensual sexual activity.

'Most perpetrators reported that they did not drink spike to gain control of a person, but 29 per cent thought it would "put people in the mood" for consensual sex,' said psychologist and study author, Bridget McPherson.

'In addition, 21 per cent stated it was easier for them to approach people for sex if the victim was drunk or drug-affected.'

The study, which was undertaken with 805 Australians aged 18 to 35, also found respondents who spiked drinks shared similar beliefs …

'They also failed to accept responsibility for other people's safety, and didn't seem to care or think about the consequences of what could happen.

'The study also found 46 per cent of victims' drinks were spiked at a nightclub and 25 per cent at a bar.'

Ms McPherson said drink spiking is occurring to a significant degree in Australia.

'We live in a culture where alcohol is viewed as a fun, bonding experience and because of this mindset, people appear to be less likely to seriously think about the consequences of drink spiking in Australia.

'To reduce this problem, we can use this research to develop prevention programs for potential perpetrators of drink spiking, emphasising the physical and psychological consequences,' she said.

Australian Psychological Society, 27 September 2007

Drink spiking

The term **'drink spiking'** refers to drugs or alcohol being added to a drink (alcoholic or non- alcoholic) without the consent of the person consuming it. Unless someone has actually seen someone else put a substance into his or her drink, or had blood and urine tests that returned a positive result, it is very difficult to know for certain whether a drink has been spiked. Effects of drink spiking include memory loss, nausea, vomiting, unconsciousness and dizziness.

There is currently no way to determine the exact number of drink spiking incidents that occur within the community. Over a 12-month period during 2002–03, between 3000 and 4000 suspected incidents of drink spiking were reported to police in Australia. Approximately one-third of these incidents involved sexual assault. Between 60 and 70 per cent of these incidents involved no additional victimisation. Between 15 and 19 suspected drink-spiking incidents occurred per 100 000 persons.

Drink spiking appears to be a complicated phenomenon that can occur in a variety of locations, and against a variety of victims. There are a variety of different spiking additives. There may be various reasons for drink spiking and it may result in a number of different effects and consequences.

The majority of reported drink-spiking incidents have no associated criminal victimisation, indicating that 'prank spiking' may be a common motivation for drink spiking. Between 20 and 30 per cent of incidents reported to police involve sexual assault, and it is estimated that about one-third of all drink-spiking incidents are associated with sexual assault. About 5 per cent of incidents involve robbery. Two-thirds of suspected drink-spiking incidents occur in licensed premises; although for sexual assault victims the location is equally likely to be at the victim's or offender's home or another location. Many victims do not know who the offender was. Drink spiking can be perpetrated by strangers or known acquaintances; with incidents involving sexual assault more likely to occur with a known offender. Unfortunately, the vast majority of incidents of drink spiking are not reported to police.

Critical inquiry

Discuss how cyber-bullying or drink spiking has an impact on the health of young people.

to what extent do australia's young people enjoy good health?

chapter summary

- Mental health is a state of well-being in which a person realises his or her own abilities, can cope with the normal stresses of life, can work productively and is able to make a contribution to his or her community.
- Mental illness is a collective term for a range of medical conditions that change a person's thoughts, feelings, behaviour or relationships.
- Anxiety is the physical, mental and behavioural changes experienced in response to a threat or danger.
- Bipolar mood disorder involves extremes of mood, with periods of very low or depressed mood alternating with periods of mania.
- Eating disorders are characterised by disturbed eating patterns, in association with anxiety or distress, and sometimes unrealistic perceptions of body shape and weight.
- Features of psychosis include disturbed thinking and cognitive skills, disturbed mood, hallucinations and delusions.
- Sexual harassment is defined as any unwanted verbal or physical behaviour of a sexual nature.
- Homophobia is an irrational fear or intolerance of homosexuality and behaviour that is perceived to be different from that associated with traditional gender roles.
- Domestic violence is an abuse of power in which one partner in a relationship (usually male) uses violence or threats to control the other partner. Domestic abuse includes physical, sexual, psychological and social abuse.
- HIV attacks the immune system of the affected person's body, making the person susceptible to infection and diseases.
- Blood borne diseases include hepatitis A, B and C.
- A person's body image is how that person perceives, thinks and feels about his or her body; it may have no bearing on the person's actual appearance.
- Problem gambling is the inability to resist gambling impulses that results in disruption or damage to several areas of the person's social, vocational, familial or financial functioning.
- Drink spiking refers to drugs or alcohol being added to a drink without the consent of the person consuming it.

revision activities

1. **Outline** the major health issues that have an impact on young people.
2. Select two of the major health issues studied in this chapter and **analyse** each by examining:
   - a. the nature and extent of the issue
   - b. risk factors and protective factors
   - c. the socio-cultural, socio-economic and environmental determinants
   - d. young people most at risk.

extension activities

1. **Analyse** two major health issues that have an impact on the health of young people.
2. **Discuss** an emerging health issue that is relevant to young people.
3. **Examine** the nature and extent of two major health issues relevant to young people.
4. **Discuss** the extent to which Australia's young people enjoy good health.

exam-style questions

1. **Assess** the influence that social factors have on the health status of young people. (12 marks)
2. In this chapter, you have studied two major health issues that affect the health of young people. **Explain** how these health issues affect the groups of young people most at risk of poor health outcomes. (12 marks)
3. **Describe** the nature and extent of two major health issues. (6 marks)
4. **Analyse** the risk factors and protective factors for two major health issues. (10 marks)
5. For two major health issues, **discuss** how health determinants can be individual, contextual or the result of the interaction between a person and his or her environment. (8 marks)

chapter 11

what skills and actions enable YOUNG PEOPLE TO ATTAIN better health?

In this chapter you will analyse the skills that can assist young people to enjoy good health. You will reflect on your own personal health and health behaviours and propose actions for better health. You will also evaluate a range of strategies that have been implemented by government and non-government agencies that target major health issues impacting on young people.

Skills to attaining better health

Adolescence and young adulthood are critical stages for emotional, social and physical growth and development. It is a time during which young people can be particularly vulnerable and require timely and integrated support to ensure that they are able to reach their potential.

Build self-concept

Self-worth

In the process of establishing a personal identity, it is important that every young person accepts himself or herself as a unique individual who is of value and worth. This involves the person recognising his or her personal abilities, talents and limitations, and having a perception of being an





important contributor to the family, peers and community. The self-worth of every person is influenced by the way that others perceive that person. Affirming the personal identity of a young person is important in supporting the creation of that person's self-worth.

Healthy body image

Accepting body shape and maintaining a realistic perception of body dimensions is an essential component of developing a healthy body image. People who are happy with their appearance have enhanced feelings of self-worth, and a sense of satisfaction with their bodies and their physical capabilities. Empowering young people with personal efficacy skills assists in overcoming barriers in the development of positive perceptions of their bodies.

Self-efficacy in personal skills

Those with self-efficacy in personal skills believe that they have the necessary skills to cope with problems and to overcome barriers in achieving positive health outcomes. Encouraging self-efficacy involves empowering young people by teaching them how to make decisions, and how to improve their sense of internal and personal control. Examples of self-efficacy include feeling confident that weight will be lost or that one's willpower is strong enough to resist smoking. Believing in oneself and in the ability to negotiate problems contributes to creating a positive self-image.

The Butterfly Foundation
Supporting Australians with Eating Disorders

Figure 11.1 The Butterfly Foundation is a community-based charitable organisation that supports eating disorder sufferers and their carers

Critical inquiry

Access the Butterfly Foundation website. **Evaluate** how the DoveBodyThink program enhances the self-concept of young people.

WEB The Butterfly Foundation website can be accessed via www.oup.com.au/pdhpe12

Developing connectedness and support networks

Relationships give young people support, happiness and a sense they belong and have a role to play in society. They also mean young people have support networks in place that they can call on for help during hard times. Social **connectedness** exists for young people when they have positive relationships and the skills and opportunities to make friends and to interact constructively with others.

Connectedness with the community

Feeling a part of a community at school, work, leisure or church, for example, can assist in increasing the **self-concept** of young people. Feeling unsupported or isolated from peers or adults can increase the risk of health-compromising behaviour, such as drug use, risk-taking and self-harm. If young people 'connect' with a community, and maintain close relationships with members of that community, their sense of having a purpose in life increases, as does the likelihood of young people accessing the community in times of despair.

Positive interpersonal relationships

Developing a supportive network is crucial in assisting young people to deal positively with life events. Interactions with networks allow young people to moderate their anxiety and adjust their perspective of stressful situations. Positive interpersonal relationships also help young people to develop a sense of self-worth. Young people who experience family relationships that are warm and supportive and promote self-esteem are more likely to be able to cope with significant life issues. Young people

are more likely to develop positive interpersonal relationships if their families encourage them to participate in decision-making and provide them with appropriate levels of responsibility and a sense of personal control.

Close friends and peer group are also important sources for positive relationships. The peer group provides friendship, companionship and valuable support. The peer group can be a forum for discussing interests, beliefs, values and fears, as well as a source of information and intimacy.

Effective positive relationships with peers and family members are essential during the transition from childhood to adulthood. **Coping skills** require open communication with trusted others, such as parents, siblings and peers.



Figure 11.2 World Youth Day volunteers

Critical inquiry

1 The NSW Youth Health Policy identifies health priorities, guides program development and ensures better health outcomes for young people throughout New South Wales. Access the NSW Youth Health Policy website. **Critically evaluate** the policy in terms of:

a giving responsibility to young people

b encouraging the participation of young people

c valuing the contribution of young people.

WEB The NSW Youth Health Policy can be accessed via www.oup.com.au/pdhpe12

Participation in community activities

Feeling a valued part of school, work or community activities can enhance the self-esteem and sense of purpose of young people. Having their opinions heard and valued, and being provided with opportunities to contribute to school and community decisions, allows young people to develop a sense of responsibility and to experience feelings of control. Feelings of 'connectedness' to an activity or project can assist young people to cope in stressful situations.

Identifying the need for support, and seeking help

During a young person's life, situations that cause distress and anxiety will arise. Recognition of the early warning signs of compromised health status is an important skill to develop. Having knowledge of the signs and symptoms of poor health, whether physical or mental, will assist in recognising when something is wrong.

Adults and peers who recognise signs of poor health in young people might need to assist the young person in accessing appropriate health services. Young people also need to be able to gauge their own health status, and to develop the strategies to seek help for themselves. Understanding health information, and being able to seek appropriate health services, requires health literacy skills.

Knowing when and how to seek help is a learned skill. Schools and community health professionals can assist young people in learning to recognise when support is needed, and how to access the appropriate support.

Overcoming barriers to support

Lack of confidentiality and privacy can be a barrier to seeking health services for some young people. In situations of suspected pregnancy, when seeking contraception or when suffering from depressive illness, young people might not consult their family doctor from fear that family members might be informed. For many young people, accessing medical services without their parents' knowledge is difficult if they share a Medicare card with their family.

Language and culture can also act as barriers to support. For some young people, their Indigenous values might not allow certain medical procedures to be undertaken by males. They can be restricted in seeking support by a lack of understanding of the health issue and a lack of knowledge of the support that is needed.

Interpreters and peer education are ways to overcome these barriers. Young people can be encouraged to seek support if they know that a health service allows young people to access assistance and advice without the consent or knowledge of family members.

Receiving support

When poor health status is identified in young people, it is important that support be received. Being able to accept that support positively is a necessary and vital aspect of improving health status. A whole range of support services is available for young people to help with health issues. These include specialist help lines that deal with specific issues, such as eating disorders, abuse, sexuality, drugs, self-harm, bullying and bereavement.

Establishing a mentor relationship

Establishing a positive relationship with a trusted adult or older person (such as a teacher, counsellor, coach or grandparent) will assist young people to deal effectively with health issues. The adult in this relationship can offer advice, be a friendly listener or be a source of support when needed. Establishing a supportive network is essential for young people. The network should consist of a variety of people whom the young person trusts, and who are readily available by phone or in person.



Figure 11.3 Father Chris Riley (left), the founder of Youth Off The Streets, is a mentor to many young people

Research and Review

Outline a range of help lines and websites that provide support services for young people to access.

Developing resiliency and coping skills

Coping skills enable young people to be self-reliant, solve problems and make informed choices that enhance health. Young people with a strong sense of their own effectiveness and ability to cope with the circumstances in their lives are likely to be most successful in adopting and sustaining healthy behaviours and lifestyles. Resilience refers to the ability of a person to cope with living in spite of stresses.

Seeing problems in perspective

Ensuring that events stay in perspective is sometimes a difficult task. Examination pressures, family disruptions and relationship conflicts can cause young people to view situations out of proportion, and to develop feelings of being overwhelmed. Discussing these feelings with trusted network members (such as peers, family members and teachers) can assist in maintaining a sense of perspective. Other people's views and comments might help in rationalising the negative feelings associated with a problem. By suggesting alternatives or compromises, the network member can assist in helping the young person to see the problem in perspective.

practical application

Addressing worry with problem-solving

1 a Write down one situation that is really worrying you.

b Brainstorm for solutions. Make a list of possible steps you can take to improve or correct the situation.

c **Evaluate** each idea:

- Which ones are not possible? Put an X next to those.
- Which ones would be difficult to implement? Put a question mark next to those.
- Which ones could you do right now? Put a Y next to those.

d Set specific dates. Make a contract with yourself to do all the Y things.

e When you have completed the Y things, go on to the more difficult things (those you marked with a question mark). Make a contract with yourself to do those.

f Now maybe some of the X things don't look so hard. If there are any you think you could manage, make a contract with yourself to take that action.

Positive thought habits

Positive self-talk strategies can be employed to assist in maintaining positive thoughts. Stressful life events can create negative feelings, so the ability to focus on the positive aspects of a situation can be a useful skill. Visualising yourself in positive scenes, and talking the problem through in a 'self-talk' situation, can assist in seeing the bright side of the situation. Even when events appear to be unpleasant, self-talk and **visualisation** can help to maintain a positive outlook. Remembering and confirming that you are a valuable individual with many strengths and much potential is an example of **positive self-talk**. Telling yourself that you can deal effectively with a problem and that you have the appropriate skills to access help if needed is an example of positive thought.

Self-talk strategies can be used to help maintain positive thoughts.

Distancing and disengaging

Often stressful life events seem all-engaging, and much of our time is spent thinking about the problem and 'rehashing' the conversations or events related to the problem. An important skill for young people is to learn to disengage from the problem. For some problems there are no immediate solutions, and feelings of anxiety rise as we continually think 'If only I had done this …'. Learning to accept that problems with no apparent solution do exist, and accepting that we have dealt with a problem at the time, in the manner that we did, is an important life skill. Becoming consumed with feelings of guilt because the problem was dealt with ineffectively can lead to depression and poor health. Developing the ability to 'separate from the problem' helps to put the problem into perspective. Consulting with network members, and discussing the problem, will also help to resolve those lingering negative emotions.

Taking on guilt for the comments of others can also be an issue. In stressful situations, people sometimes 'project' their own frustration and anger and release these feelings by accusing and belittling another person. It is important that young people learn how to recognise these situations and disengage. This requires them to think to themselves, 'This is not about me; this is about this person's anger'.

Developing a sense of purpose

Having a purpose in life is important to everyone. Knowing that we are valued, and that we can contribute in a positive way to our family, school, friends and community assists in developing our sense of purpose. Being involved in leisure activities, learning hobbies, assisting in community projects and undertaking volunteer work are all ways to contribute to life. Feeling that we are needed and valued is particularly important. When young people have feelings of despair it is often associated with not having a sense of purpose. This can cause worrying questions to arise, such as 'Why am I here?' and 'What skills do I have?' If prolonged, this type of self-questioning and negative thought can lead to feelings of low self-worth and associated health problems, such as depression.

High rates of youth unemployment, dissatisfaction with career choice, lack of economic stability and poor family relations can lead to feelings that there is no positive future or purpose in life. Through participation in community and leisure activities, young people can create a sense of purpose in their lives.



Figure 11.4 An important skill for young people is to learn to disengage from the problem

Recognising and rewarding personal success

When our strengths and personal abilities are not recognised or valued, our sense of self-worth declines, and our ability to deal with stressful situations is reduced. Young people have energy, enthusiasm and great potential for achieving positive life tasks. Successfully tackling a difficult maths problem and gaining a driver's licence are both personal successes. Having the skills to resolve conflict by discussing the issue calmly, or supporting a friend who needs someone with whom to talk, are indications of personal success. To be successful, it is not necessary to win a race, be placed first in a subject or gain a community award. Young people, and those closely associated with them, need to recognise their skills and personal qualities and affirm them frequently. Feeling that we are successful contributes to a positive self-image and an increased ability to cope with life events.

practical application

Developing resiliency and coping skills

1 Construct a personalised relaxation CD or playlist tailored to meet your needs. Be creative, develop your own approach to develop relaxation or coping mantras, or visualise images that you find uniquely peaceful or calming. Use your own voice to record positive thoughts.

2 a In small groups, **discuss** ways that young people effectively deal with stressful life events. **Identify** the personal strategies that are mentioned. Review the section on 'coping skills'.

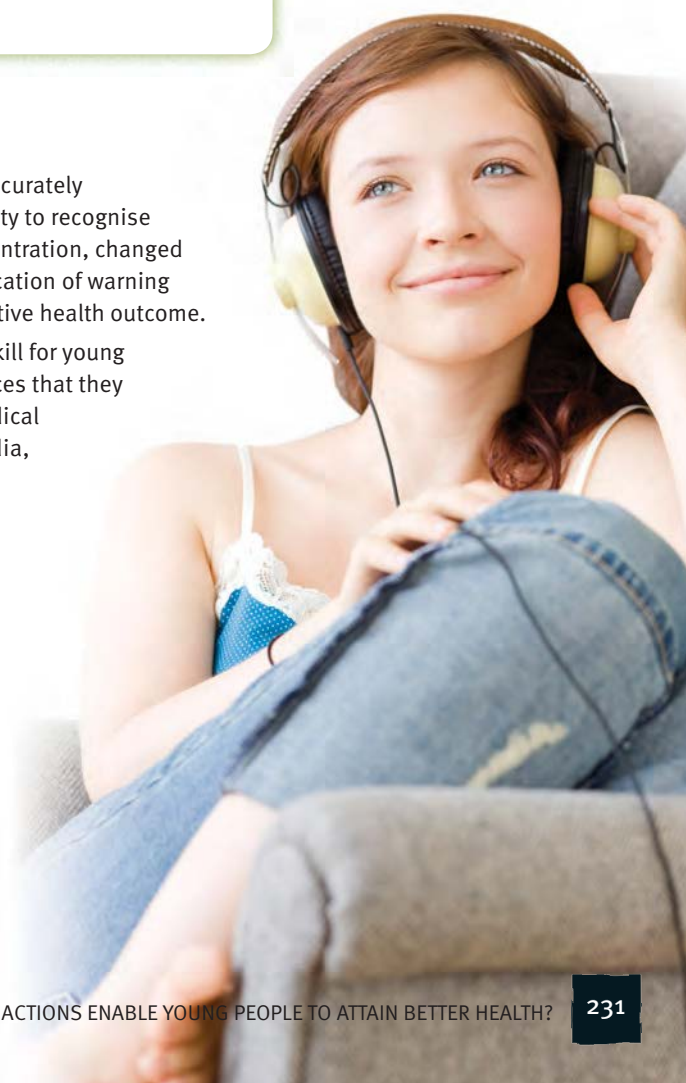
b Utilise this information by designing a pamphlet that provides 'Tips for coping' for young people.

c Leave a section in the pamphlet blank, and suggest that young people design their own personal process for coping with stressful occurrences, based on the information in your pamphlet.

Develop health literacy skills

It is essential that young people develop the ability to understand and accurately interpret health information. Lack of education leads to a decreased ability to recognise indications of poor health status. These indications include lack of concentration, changed eating habits, poor sleep patterns and altered motivation levels. Identification of warning signs can assist in early intervention and increase the likelihood of a positive health outcome.

Developing the skills to access appropriate health services is a vital skill for young people. Being aware of a range of health agencies and the relevant services that they provide can assist a young person in need of counselling, support or medical treatment for themselves or others. Health promotion agencies, the media, health personnel and school health programs all have the opportunity to increase the awareness of available services among young people.



practical application

Developing health literacy skills

Access the websites of the organisations discussed on page 232 and develop a series of workshops for Year 12 students to present to Year 7 students as part of a peer-support program. The workshops should analyse meaningful and realistic situations and develop skills that can assist young people to enjoy good health.

The websites of the organisations discussed here can be accessed via www.oup.com.au/pdhpe12

Sources of health information and support

Reach Out

Reach Out is a web-based service designed to inspire young people to help themselves through tough times. Reach Out aims to improve young people's mental health and well-being by providing support, information and referrals in a format that appeals to young people.



Figure 11.5 Reach Out aims to improve young people's mental health and well-being

Headspace

Headspace is Australia's National Youth Mental Health Foundation. The organisation aims to deliver improvements in the level of mental health, social well-being and economic participation of young Australians aged 12–25. Headspace funds centres across the country that help young people access local service providers. These centres focus on integrated service response for young people.



Figure 11.6 Headspace is Australia's National Youth Mental Health Foundation

Orygen Youth Health

Orygen Youth Health is made up of a specialist youth mental health service, a research centre and a range of education, training, **advocacy** and health promotion activities. The overall goal of Orygen Youth Health is to integrate knowledge gained from clinical practice and research activities to implement, and advocate for, high-quality mental health services for young people.

Kids Helpline

Kids Helpline is a nationwide 24-hour telephone and online counselling service specifically for young people aged between 5 and 25 years. The service is free and anonymous.



Figure 11.7 Kids Helpline is a free and anonymous service

Kids in Mind

Kids in Mind provides a range of services and programs attending to the emotional and psychological health of children, young people and their families. The Kids in Mind website provides online information that can assist children, youth, parents, carers, referrers, researchers, students and staff in making informed choices about mental health and well-being.

MindMatters

MindMatters is a resource and professional development program to support Australian secondary schools in promoting and protecting the social and emotional well-being of members of school communities. The program operates nationally in secondary schools. It considers a range of mental health and well-being determinants, including the significance of cultural context.

Critical inquiry

By examining a health-promoting schools project, consider the role of the school in developing health literacy in young people. Suitable projects include 'Rethinking Drinking' (available through ACHPER) and 'MindMatters'. How can PDHPE lessons, whole school programs and community links assist in equipping young people with the essential skills to access appropriate health services and recognise indications of when help is needed?

The Rethinking Drinking and MindMatters websites can be accessed via www.oup.com.au/pdhpe12

Develop communication skills

Communication is a two-way process between a sender of information and a receiver of information. To be effective, communication involves communicating to others that you have heard their position or opinion.

Arguing constructively

Young people need to develop the ability to argue constructively in an effort to develop and maintain positive relationships with peers, adults and community members. Part of arguing constructively is knowing how to keep a problem in perspective and using language that highlights how the young person feels. The development of positive relationships is inhibited by comments such as 'You made this happen' or 'It's your fault'. Important skills in arguing constructively include:

- learning to discuss the facts of the situation
- controlling emotive outbursts
- not blaming others.

A whole school approach aims to reach everyone in the school, including pupils and staff, and develop good links with the community and families it serves.

Negotiation and compromise

As young people experiment with life's experiences and develop a personal identity, situations arise that call for negotiation and compromise. As young people approach adulthood, the negotiation of rules with parents forms part of everyday conversations. Negotiation skills include staying calm, presenting facts and feelings logically and attempting to understand the other person's opinion. Young people often negotiate curfew times, party rules and allowances with their parents.

At times, negotiations need compromise. The compromise might be on the part of the young person or the adult. Allowing young people to undertake part-time jobs might be a compromise to the alternative of their leaving school altogether. Young people also need to learn to negotiate and compromise with their peers. Simple decisions, such as choosing a video or deciding who will drive to a party, can involve negotiation and compromise. Young people need to learn that compromise does not involve a win/lose situation.

At times, negotiations need compromise.



Figure 11.8 Negotiation skills include attempting to understand the other person's opinion

Conflict resolution

At times, negotiation and compromise fail between adults and young people. Skills involving **conflict resolution** are then needed. Resolving conflict involves a mature approach to the problem. Conflicts can often be quickly resolved by talking through the issue in an open and non-judgmental manner. An important aspect of conflict resolution is trying to respect the other person's opinion and feelings. The resolution process is not assisted by remaining angry and showing feelings of hostility to the other person. Further distress will be caused by avoiding the problem by staying away from school or by making excuses not to discuss the problem.

Being empathetic

Being **empathetic** involves mentally trying to 'feel' the situation of others as they feel it. This might involve listening to a young person while that person shares his or her experiences or problems, and trying to understand the person's feelings. When trying to resolve bullying, for example, encouraging the bully to feel empathy with the victim can often assist the bully to understand the other person's emotional responses. Mentally placing ourselves in the situation of another person helps us to perceive that person's understanding of the situation.

practical application

Communication skills

Consider homophobic vilification as a health issue. In small groups, design activities that assist young people to use social problem-solving skills.

Access health services

Adolescence is a time when youth begin making independent choices concerning their own health and health care. Their experiences will have lifelong effects on their health choices and adult health status, so it is important that the care they receive is timely, appropriate, easily accessible and affordable. Examples of good health practices are discussed below.

Parents

Parents need to make preventative health care a priority, and take children for regular check-ups and immunisations. Parents can assist their children by establishing open lines of communication with them to talk about health. They can also act as an advocate for adolescent health at school and in the community.

Schools

Schools can support student health by providing skills, knowledge and understanding of health issues relevant to young people. Schools can provide preventative programs through health education, physical education, health services, nutrition services, health promotion for staff, counselling and psychological services. They can also support student health by encouraging a healthy school environment and involvement by parents and the community. Schools can also institute a program of health instruction for students and serve as hosts for community providers to locate their physical and mental health services within school grounds.

Community health care providers

Providers can make their services 'teen friendly' by:

- promoting regular preventative health visits
- seizing health promotion opportunities
- ensuring access to primary caregivers with skills, experience and interest in adolescents
- offering comprehensive screening and counselling for high-risk behaviours
- protecting the confidentiality of their teen patients
- teaching parents and other caring adults how to support adolescent well-being.

practical application

Access health services

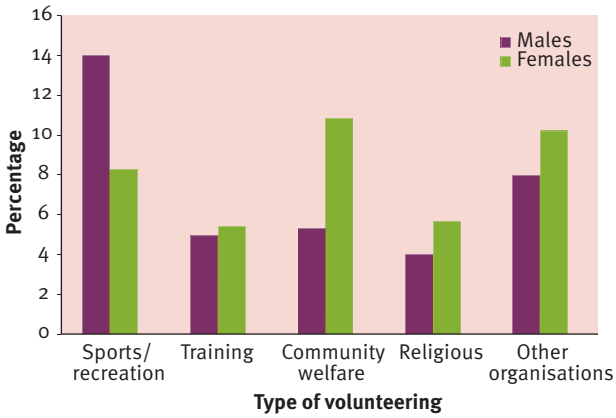
Investigate health services that can be accessed by adolescents in your local area. Design a brochure that can be distributed to students in your school via an email newsletter to inform them of the services available to them.

Community service and involvement

Young people are encouraged to perform community service. During adolescence, young people are faced with many developmental tasks, including establishing independence and an identity. At this time, teenagers take their first steps away from dependence on their parents towards establishing the independence they will have as adults. They must learn about responsibility, decision-making and the consequences of their inevitable, and hopefully small, acts of rebellion. A good volunteer service program will give teenagers the opportunity to develop their decision-making skills and take responsibility for their performance.

Young people are not just developing into adults; hopefully, they are developing into productive adults who are prepared for work. There has been some concern that high schools have not effectively taught adolescents the skills they will need to enter the workforce. While high schools can integrate essential work-readiness skills into their curriculum, most experts agree that well-designed work experiences (paid or volunteer) are important contexts for reinforcing these skills.

Participation in social and community life is an important aspect of life for most people, and provides social and psychological benefits that are important for well-being. Volunteering is one form of community participation that not only provides young people with social contact and learning opportunities, but also provides a valuable contribution to many community and welfare organisations.



Source: AIHW, Young Australians: Their Health and Wellbeing

Figure 11.9 Proportion of young people aged 18–24 years engaging in unpaid volunteer work, 2002

practical application

Community service and involvement

1 a Using relevant and current local community directories and websites, **identify** the variety of local services that are designed for young people to participate in.

b **Describe** the services identified.

Creating a sense of future

Resilient young people tend to have plans that are realistic, positive and achievable. They tend to be orientated towards achievement, and have educational aspirations.

Establishing a purpose

Establishing a purpose in life is assisted by making plans for the future, discussing dreams and hopes, and feeling a part of a group or a community. Young people maintain a sense of purpose by participating in leisure pursuits or hobbies, by developing positive relationships with others and by planning for future education, training or employment.

When young people experience unpleasant life situations and the associated negative emotions it is often difficult to think positively, and they sometimes question why they are here. It is important that they communicate their feelings of distress to trusted others, and think positively about plans for the future. This will help to ensure they maintain a sense of purpose in their lives.

Identifying challenges and opportunities

Being a young person involves negotiating an array of challenges in life. Challenges and opportunities are provided by learning to relate to an intimate partner, by establishing financial independence, by becoming self-sufficient and by planning for employment. Young people have the potential to achieve in life. An element of risk is involved in challenges, such as changing residences or being promoted at work. However, it is important that young people recognise that this risk-taking can provide positive opportunities in their lives.

Critical inquiry

1. The students at your school have expressed a desire to establish a Well-being Committee. As part of the committee you have been asked to write an article for the school newsletter to present at the next meeting. The article needs to **analyse** the skills that can assist young people to enjoy good health.
2. **Critically analyse** your own personal health and health behaviours, including both positive and negative influences, and indicate future courses of action for better health.

Research and Review

1. **Outline** the skills young people need to attain better health.
2. **Define** the term 'connectedness'.
3. **Identify** the different types of support networks available for young people.
4. **Outline** how young people overcome barriers to support.
5. **Define** the term 'coping skills'.

Actions targeting health issues relevant to young people

The health of young people has been identified as a target health improvement area. Actions targeting health issues relevant to young people include the development of quality health services, bringing together leading experts from a range of disciplines to strengthen public health research and developing effective policies and **interventions** to improve health and well-being.

Social action

Social action is associated with the strategies and tactics needed to coordinate community action in ways that are purposeful and suited to the specific health issue in order to achieve the desired outcomes. An example of social action may involve a group of school students designing and undertaking a community-building project, such as a drug-free under-age dance party, a cultural festival for refugees or an Aboriginal public garden.

Social action is an important part of well-being, and can have positive health effects. Young people without social support have higher rates of morbidity and mortality than those with social networks. People within a social network may play a role in health promotion and positively influence the health-related behaviours of others. In addition, a broad social network may increase a young person's resources and knowledge, allowing them to gain access to quality health services. Social support may also have positive psychological or emotional effects, helping people to better cope with stress and illness.

Strategies that have been implemented to improve health include creating a more supportive environment and strengthening personal actions. It is important that there continues to be a focus on building effective partnerships across the health, education, social and economic sectors. Actions to target health issues relevant to young people may promote intersectoral awareness of the developmental, social and health needs of children and young people.

Legislation and public policy

The health of young Australians is promoted and protected with specific health policies and legislation. For example, existing legislation gives young people access to confidential consultations with their doctor from the age of 14.

Traditionally, young people have not been given high priority in the planning of health services. This is due, in part, to their perceived good health and also to the assumption that their health needs can be

catered for adequately within either adult or child health services. However, there are specific health problems, distinct needs and concerns relevant to young people that differ from those of children or adults. If young people are to achieve optimum benefit from the health system, it is essential that services be provided that are appropriate to their needs. The consequences of behaviours adopted by young people have an impact on their health status as adults. The health system alone cannot achieve improvement in health status given the number of complex and inter-related factors that have an impact on health. Therefore, an intersectoral approach is required which recognises that the health system has a responsibility to advocate with other sectors on behalf of young people.

The NSW Youth Action Plan identifies health priorities, guides program development and ensures better health outcomes for young people throughout New South Wales. There has been significant research undertaken that can inform best health practice. The best practice principles for youth participation seek to encourage and support young people to participate in government decision-making and in implementation of the NSW Youth Action Plan. The principles also encourage young people to provide input into the development of programs and services that impact on their lives.

NSW Youth Action Plan: the way forward—supporting young people in NSW

Helping young people to reach their full potential is a high priority for the NSW Government. We recognise that young people need support to maintain good health and wellbeing, access to education and strong community networks …

On 14 November 2006 the Premier launched the State Plan to guide the delivery of Government services in NSW over the next 10 years …

The Plan is for all young people in NSW, and it recognises that young people are a diverse group whose needs differ according to their background, age and interests.

To ensure that young people had a say in the Plan, we went out and spoke to many young people and youth organisations across NSW …

The NSW Government wants young people to have opportunities for rewarding and positive lives, now and in the future.

Specifically, we want young people to:

- have opportunities to contribute to the decisions and processes that impact on their lives
- enjoy positive and nurturing relationships with family and community, where they are valued, respected and supported
- engage in education and training that is relevant and prepares them, in all their diversity, to succeed in the modern world
- know and understand their rights in the workplace
- lead healthy lives
- engage in positive artistic, sporting and recreational activities that enhance their physical, emotional and social development and wellbeing
- feel safe and be safe.

NSW Youth Action Plan website

Critical inquiry

1 Study the 'NSW Youth Action Plan' above:

a **Identify** the priorities identified in the plan.

b **Outline** the best practice principles in youth participation that the NSW Government recognises.

Health promotion initiatives

Improving the health of young people requires intervention at a number of levels in order to achieve the best possible outcomes. Initiatives should:

- promote social equity and health promotion
- adopt collaborative approaches
- involve consultation, participation and empowerment of participants
- promote evidence-based practice.

Examples of health promotion initiatives can be found on the NSW Health website. They include:

- 'Move It Groove It'
- 'NSW youth alcohol action plan'
- 'Suicide: we can all make a difference'
- Youth NSW
- 'Making mental health better for children and adolescents'
- 'Prevention initiatives for child and adolescent mental health'.



Figure 11.10 Youth Week celebrates the success and accomplishments of young people

WEB

The NSW Youth Action Plan and NSW Health websites can be accessed via www.oup.com.au/pdhpe12

Table 11.1 Ottawa Charter action areas applied to motor vehicle accidents

Ottawa Charter action area	Actions to increase health status
Developing personal skills	• Undertake a defensive driving course • Be assertive and decline a lift with a drunk driver • Learn about standard drinks
Creating supportive environments	• Encourage supportive peers who elect to drive you to a party and not drink • Take a cab-charge voucher to a party where you will be drinking
Strengthening community action	• Organise a minibus to collect students from a dance party
Reorienting health services	• Implement education and health promotion campaigns, such as 'Drink, Drunk—The Difference is U'
Building healthy public policy	• Use RBT • Encourage use of seat belts • Enforce use of P-plates • Build traffic calming devices

practical application

Actions targeting health issues

1 Choose a health issue of relevance to young people. **Apply** the principles of the Ottawa Charter (see Table 11.1) to increase the health status of young people in the chosen area. As an example, the issue of motor vehicle accidents has been done for you in Table 11.1. After considering this example, draw up your own table for the health issue of your choice.

2 Design a health promotion campaign for a health issue of relevance to young people. Include:

a PDHPE lessons for a school setting

b education for staff, parents and the wider community.

Consider including a selection of the following: newsletters, morning announcements, guest speakers, poster displays and radio and television commercials.

Research and Review

1 **Evaluate** a range of strategies that have been implemented by government and non-government agencies that target two major health issues impacting on young people.

2 **Propose** strategies to create a positive future for young people. Include individual and community strategies.

what skills and actions enable young people to attain better health?

chapter summary

- The self-worth of every person is influenced by the way that others perceive that person.
- Accepting body shape and maintaining a realistic perception of body dimensions is an essential component of developing a healthy body image.
- A person with self-efficacy believes that he or she has the necessary skills to cope with problems and to overcome barriers in achieving positive health outcomes.
- Feeling part of a community at school, work, leisure or church, for example, can assist in increasing the self-concept of young people.
- Positive interpersonal relationships also help young people to develop a sense of self-worth.
- Feeling a valued part of school, work or community activities can enhance the self-esteem and sense of purpose of young people.
- Establishing positive relationships with trusted others (such as parents, siblings or peers) will assist young people to deal effectively with health issues.
- Possessing skills that allow access to appropriate health services is vital for young people.
- Being empathetic involves mentally trying to 'feel' the situation of another person as that person feels it.
- Participation in social and community life is an important aspect of daily life and provides social and psychological benefits that are important for well-being.
- Young people without social support have higher rates of morbidity and mortality than those with social networks.

revision activities

1. **Outline** the skills that can assist young people to enjoy good health.
2. **Describe** how young people can develop connectedness and support networks, resiliency and coping skills and health literacy skills.
3. **Outline** the communication skills that young people should develop.
4. **Outline** the actions that target health issues relevant to young people.

extension activities

1. **Discuss** the skills and actions that enable young people to attain better health.
2. **Critically analyse** your own personal health and health behaviours, including both positive and negative influences, and indicate future courses of action for better health.
3. **Analyse** the actions that target health issues relevant to young people.
4. **Evaluate** a range of strategies that have been implemented by government and non-government agencies that target two major health issues impacting on young people.

exam-style questions

1. **Analyse** how social problem-solving skills can be used by young people to attain better health. In your answer, refer to two health issues you have studied. (12 marks)
2. **Analyse** why developing both a sense of connectedness and creating a sense of future can enable young people to attain better health. (10 marks)
3. For one health issue you have studied, critically **analyse** the skills and actions that enable young people to attain better health. (10 marks)
4. **Clarify** how social action can support young people in Australia to attain better health. (8 marks)
5. **Analyse** a health promotion program designed to enhance the health of young people. Refer to one health issue you have studied. (12 marks)



outcomes

A student:

H12 analyses the influence of socio-cultural factors on the way people participate in and value physical activity and sport

H16 devises methods of gathering, interpreting and communicating information about health and physical activity concepts.



option 2

Sport and physical activity in Australian society

coming up This Option addresses the social and cultural aspects of sport and physical activity in Australian society. It guides students to an understanding of how social class, gender and the development of sport as a commodity influence values and beliefs about sport and physical activity. Through case studies, students will examine the nature of sport, how sport has changed over time and how sport has different meanings for different groups of people. Students will examine Australia's national and regional identity, as well as the connections between politics and sport and the nature of media coverage for male and female athletes.

FOCUS QUESTIONS

- How have meanings about sport and physical activity changed over time? ..... [page 242]
- What is the relationship between sport and national and cultural identity? ..... [page 256]
- How does the mass media contribute to people's understanding, values and beliefs about sport? ..... [page 268]
- What are the relationships between sport and physical activity and gender? ..... [page 274]









chapter 12

how have meanings about SPORT AND PHYSICAL ACTIVITY changed over time?

In this chapter, we examine the origins of Australian sporting history. Australia's British heritage and the values associated with **sport** in colonial Australia in the nineteenth century are explored. The concepts of amateur and professional sport are compared with the meanings that we allocate to these terms today. A historical overview of women's participation in sport is also presented. Sport has increasingly become a commodity and, with the involvement of sponsors and advertisers, a big business. The various consequences of this relationship are analysed in this chapter.

The beginnings of modern sport in nineteenth-century England and colonial Australia

Sport, as it is known in Australia, was 'invented' in Britain to serve specific social purposes. Gender, social class and ethnicity were underlying issues that drove the formation of sporting associations and clubs. These factors determined who would participate in sport, and in which sports they would be allowed to participate. Even in its infancy, sport was a popular pastime in colonial Australia.





Links with manliness, patriotism and character

In nineteenth-century England, sport was viewed as a 'manly' pursuit. It was believed that by participating in **physical activity** the ideals of the English country gentleman were fulfilled. Public schools in Britain adopted this belief and encouraged their boys to play team games and learn the social qualities of leadership and courage, which were associated with being male. Schoolmasters viewed these games as distractions from youthful sexual experimentation and rebellion against the authority of the school.

Games were incorporated into boys' public schools because it was believed that participating in sport built 'social character' and provided discipline. These attributes were prerequisites for upper-class social life and it was essential that the male children of the socially privileged acquired these skills. Physical activity for girls, by contrast, was promoted largely for health reasons.

It was also accepted that playing games, particularly cricket, could develop Christian values. Cricket provided a social education for its participants and this concept became known as '**muscular Christianity**'. Among the working classes, Anglican priests of the Christian Socialist movement encouraged children to participate in sports as a means of moral and physical salvation. The concept of the body as the temple of the Holy Spirit was of importance and, as such, young boys were encouraged to remain fit and healthy.

Sport in nineteenth-century Australia was originally organised by publicans around public houses, which were viewed as a space reserved for males. Gambling, drinking and violent behaviour were associated with sport. The typical 'Australian' image in the colonies was of being male, heterosexual and Anglo-Saxon, and the qualities associated with this image—physical toughness and **resilience**—were highly valued. A sports version of 'mateship' developed. This included loyalty to teammates, and playing hard, but within the rules.

The colonials were believed to be, and often proved themselves to be, more physically robust than their British counterparts. Working-class sportsmen were often admired for their muscularity and physical strength.

Being successful as sporting entities was of paramount importance to the colonies. It is of interest that international cricket matches, which were first held in 1877, were considered to be 'tests' between nations—long before there was any Australian nation—and the outcome reflected significantly on Australia's developing identity as a nation. The emerging nation's success was often measured by the result of a sporting match.

International victories in cricket, football, rowing and pedestrianism (foot-racing) were influential in rectifying any colonial feelings of inferiority to Britain. These contributed to the fostering of national pride and brought Australia increased recognition and status.

Edward 'Ned' Trickett was Australia's first sporting hero. He won the world sculling championship in England in 1876.

WEB

Websites that will give you a starting point to research the origins of a variety of sports can be accessed via www.oup.com.au/pdhpe12

practical application

Meaning of sport

Imagine you are a journalist for an Australian newspaper in the nineteenth century. Using Publisher or another similar program, prepare a newspaper report that highlights a chosen sporting match or event. In your report, use the 'language of the day'. **Describe** the event or match in terms of manliness, patriotism and the building of character.

Research and Review

1 Research a variety of sports that were played in Australia during the colonial years. Utilise the information from pages 242–3 and other resources to complete the following tasks about each sport you research:

a **Identify** who the sport was played by.

b **Describe** its purpose.

The meaning of amateur and professional sport

Sport in colonial Australia had different meanings for different social groups. The class system that existed in the colonies mirrored that of England, with the dominant class being those with social and economic power. Sports pursued by those with a private school education, a respectable profession and an established family reputation included cricket, tennis, golf, rowing, yachting, hunting and horse-racing. Sport was ruled by appropriate codes of behaviour, and its purpose was to keep the upper class occupied. Most distinctively, however, sport was divided according to **amateur** or **professional** status.

The construction of the concepts of amateurs and professionals excluded the working classes from the clubs and games of the upper classes. A definition of an amateur according to the Victorian Amateur Athletic Association in 1890, was:

> … one who has never competed for a money prize, staked bet, or declared wager, or who has not knowingly and without protest competed with or against a professional for a prize of any description or for public exhibition, or who has never taught, pursued or assisted in the practice of any athletic exercise as a means of livelihood or for pecuniary [monetary] gain.
>
> B Stoddart, *Saturday Afternoon Fever*, Allen & Unwin, Sydney

This definition obviously excluded members of the working class from attempting to gain membership of clubs. Those who used their athletic skill for profit, or as a source of income, were considered by the upper class as being 'unfit for membership'. This definition was developed by those with social power to assist in maintaining the distinction between the social classes, and to guarantee the codes of conduct and playing conventions associated with 'gentlemanly' behaviour. Being an amateur was seen to be associated with moral superiority, and to be a training ground for other areas of life. It was not seen as a means of livelihood.

In cricket matches, players were labelled as 'gentlemen' or 'players', depending on their social status. 'Players' were those of doubtful social and moral origins who used their physical skills to gain a prize, whereas the 'gentlemen' were classed as amateurs. On tour, these two groups lived in separate accommodation, and entered the field from separate gates. In England, clubs employed players to bowl—a task considered to be manual labour—whereas the gentlemen batted.

It is important to note, however, that the gentlemen were paid for their participation in the game, but still maintained their amateur status. It is clear, then, that the term 'amateur' was related more to a person's social status than to a strict interpretation of whether or not the person was paid—with a player being viewed as one who worked with his hands for economic gain.

The concept of 'amateurism' was developed to protect the middle and upper classes from the 'invasion' by the working class into the leisure-time activities of the more privileged. The Western Australian Turf Club raised the gate fee during the depression of the 1890s, a strategy that, as reported by B Stoddart in *Saturday Afternoon Fever*, was seen by the working class as a 'manoeuvre to purify the social image of race day'. The leisure pursuits that called for wealth, time and space became the possession of the upper and middle classes. Membership of ruling bodies of clubs or associations (such as the amateur athletics clubs) was socially restricted. Without sufficient social standing it was impossible to become a member of a club board.



Figure 12.1 The working classes were excluded from amateur athletic association competitions.

Undertaking sport for a 'profession' was viewed as undesirable by the social pillars of society and, as a result, several influential gentlemen organised amateur athletics clubs in the late 1860s. The purpose of these clubs was to 'raise the tone of athletics, which was advocated as healthy, manly and moral' (R Cashman, *Paradise of Sport: The Rise of Organised Sport in Australia,* Oxford University Press, Melbourne).

Critical inquiry

1 **Compare** the meaning of the concepts of 'amateur' and 'professional' in the nineteenth century with their meanings today.

2 a **Describe** how the upper class manipulated the term 'amateur' to protect their games from working-class intrusion.

b **Outline** the importance of this to the upper class.

3 a The middle class began the rise of a puritan sporting ethos that claimed that a gentleman played only for the love of the game. Conduct a debate with your classmates on the following topic: 'Athletes today should play purely for the love of the game'.

b At the conclusion of your debate, **construct** a PMI (positives, minuses and interesting points) chart to summarise your thoughts.

Women's historical participation in sport

Women played a marginal role in the development of sport in colonial Australia because sport was often violent, and was associated with public houses ('pubs'). In addition, sporting clubs were frequently formed as an extension of the male domain of the workplace.

Life in the colonies mirrored the harsh physical environment. The settlers highly valued the qualities associated with the ability to survive in this environment, such as endurance and strength. These qualities were associated with being male. Despite this idea of physical activity being a masculine pursuit, women did participate in a range of sporting events.

Participation in sport for women was based on social class, as it was for men. For upper-class women, it was essential that their femininity be maintained when they participated in sport, and that they adhere to appropriate codes of conduct. Sport for women often meant undertaking a supportive or decorative role. This may extend to simply watching their husbands participate or, if they did play, doing so without any displays of exertion. Upper-class women in the nineteenth century participated in physical activity as a source of recreation and relaxation, rather than for **competition** and performance. The book *Australian Etiquette*, published in 1885, commented that lawn tennis 'affords ladies a training in graceful and charming movements' (R Cashman, *Australian Sport: The History of Sport in Australia Through Time*, Random House, Sydney). It was only in the late 1800s, with the establishment of amateur tennis associations, that participation became competitive for women.

In the early colonies, women participated in sport for the social aspects and the emphasis was on fashion. Suitable sports included cup days at the horse races. Activities such as tennis, golf, croquet, archery, rowing and sailing were undertaken by those with sufficient time for recreation, access to the necessary equipment and the social contacts for participation. Tennis courts were initially privately owned and located at residences in fashionable suburbs. Women played tennis by invitation only, and often joined their peers for a social day.

The first female sportswoman to be idolised by the newly federated nation of Australia was swimmer Annette Kellerman, who won the inaugural women's swimming competition in 1902.



Figure 12.2 Participation in tennis did not become competitive for women until the late 1800s, with the establishment of amateur tennis associations

Bathing was viewed as an acceptable sporting pastime for women because it was segregated. Bathing machines were used at many beaches to ensure privacy from the male observers. However, beginning in 1839, community baths were established throughout the colonies. A fee of sixpence was charged to visit the facility and women from the lower classes were therefore less likely to attend. In 1912, at the Stockholm Olympics Australians Fanny Durack and Mina Wylie won gold and silver medals respectively in the 100-metre freestyle swimming event. This was the first time Australian women competed at the Olympic Games and can be viewed as an example of women overcoming the many hurdles and restrictions of the day to successfully compete in the sporting domain.

In the nineteenth and early twentieth centuries, golf was one of the few sports that women undertook competitively. Clubs were established throughout the colonies by 1895. Ladies could be only 'associate' members, however, because club members believed that women were supposed to be 'socially minded', not competitive. Since they were 'associates', women had little power in club politics and fewer club privileges than full members. Women's play was limited to certain days, and women were often excluded from the clubhouse. This practice still continues at some golf clubs today.

Physical activity for working-class women was in the form of athletics, because this sport involved no financial outlay. On public holidays, picnic races were common, and 'pedestrianism' (walking races) was contested for financial gain. In 1881, the journal the *Bulletin* reported that for a 'women's tournament, prizes of £50, £25 and £10, as well as a gold locket to the neatest and best-dressed, were offered' (R Cashman, *Australian Sport: The History of Sport in Australia Through Time*, Random House, Sydney). Working-class women also competed in boxing for prizes.

A bathing machine was a carriage where a woman changed into her bathing costume. The carriage was then pushed out beyond the water's edge where the woman could enter the water in privacy.

Girls in government schools were instructed in drill and **callisthenics**, which were aimed at improving their ability to adhere to instructions and become compliant workers. For daughters of the socially elite, participation in team games at school was meant to teach the modest qualities required of young women. Dancing was considered an appropriate activity because it was a social skill required for later life.

Yet participation in sport was largely viewed as a male activity, and barriers to women's participation included:

- the media's limited recognition of women in sport
- Victorian-era puritanical (morally rigid) values
- club membership rules
- attitudes held by the medical profession
- women's restrictive clothing, such as long dresses and ornamental hats, which was unsuitable for participation in strenuous activity.

The rise of competitive female sports trespassed on the previously all-male domain of sport. The media trivialised women's sport by reporting on the fashion and social aspects of the event, rather than on the performance and results. The all-male medical profession of the time fostered the belief that strenuous exercise would be detrimental to the reproductive organs of women. In contrast, 'light exercise' was considered to be healthy and of assistance in childbirth. Baron Pierre de Coubertin, the founder of the modern Olympics, was a proponent of this notion and strongly campaigned against women participating in the Olympic Games. The moralists of colonial society preached of the evils of women who concentrated on sporting performance rather than devoting themselves to their home and families.



Figure 12.3 Fanny Durack, pioneering Australian sportswomen

Critical inquiry

1 **Outline** how participation in sport in the nineteenth century differed for women and men.

2 **Contrast** the situation for women in the nineteenth century to that of today in terms of ability to participate in sport.

3 a **Discuss** the barriers that exist to discourage women from participating in sport in today's society.

b **Propose** a variety of strategies to overcome these barriers to participation.

practical application

Women's historical participation in sport

1. Set up the class in a carousel formation by making two circles (an inner and an outer circle) of students facing each other. One circle assumes the negative viewpoint and the other circle assumes the positive viewpoint. Begin a debate (see topics below). After one minute, the circles rotate in opposite directions three places, the viewpoints change and the debate continues. Debate the following topics using the carousel formation:
   - a Sporting opportunities for women have not changed.
   - b Women who play sport neglect their family duties.
   - c Sport is a male domain.
2. Examine the photographs in this chapter that are associated with women and their participation in sport and physical activity. Using this information as stimulus and Microsoft Publisher or a similar program, design a cover for a book to be entitled *A History of Women in Sport*.

Research and Review

1. Use this text and other resources to complete the following tasks about women's sport in Australia in the nineteenth century:
   - a **Identify** the sports in which women participated.
   - b **Explain** the purpose of physical activity for women.
   - c **Discuss** the ways in which sport and physical activity were different for the different social classes, and different for men and women.
   - d **Identify** the strategies used to discourage women from participating in sport.

   Share the above information with the class. Present it in a format that would be suitable for use as revision or summary notes. Some examples include a mind map or podcast.
2. Create a timeline displaying the historical link of women's participation in the modern Olympic Games.

WEB A website that will give you a starting point when researching historical perspectives relating to women in sport can be accessed via www.oup.com.au/pdhpe12

Sport as a commodity

Australian sport has changed from being a leisure pursuit to being a business venture.

The development of professional sport

Sport in Australia has developed as a **commodity**. Many athletes today are paid millions of dollars per year for their participation and their **endorsements** of products. Sport and its participants are now products themselves, available to be bought and sold. The value of an athlete in marketing the products of sponsors improves with the athlete's sporting achievements. An example of this relationship is Australian swimmer Stephanie Rice and underwear manufacturer Davenport. Rice became an overnight success after her 2008 Beijing Olympics campaign where she became a triple gold medallist and world record holder. She had signed a **sponsorship** deal with Davenport prior to the Olympics and, with her results, the value of this partnership has boomed since the Olympics:

> … the swim star has also been crowned a promoter's dream—after adding a reported 48 per cent increase on annual sales of Aussie undies label, Davenport. The pool princess' manager Chris White told a sports conference Rice generated $3.2 million in media coverage for the brand since her signing in June this year.
>
> 'Stephanie Rice in Who magazine, sends Davenport sales up', *Daily Telegraph*, 10 October 2008



Figure 12.4 Many athletes are paid to endorse certain products

Some sporting teams are now owned by corporations or by individual businesspeople. In the National Rugby League, for example, actor Russell Crowe and businessman Peter Holmes a Court own South Sydney Rabbitohs.

Sporting logos are used to sell an enormous range of products, including T-shirts, mugs and caps. For the media, such commercialisation involves bidding for the privilege of covering various events.

With this change in focus, the values associated with sport have radically changed. Elite sport today requires time and support that can be sustained only by substantial financial resources. In this context, the old distinctions between 'amateur' and 'professional' no longer have meaning.

However, the concept of 'pay for play' has been evident from colonial days. Wealthy businessmen financed many of the intercolonial cricket matches, and publicans often hosted bouts of boxing because the establishment would certainly benefit from the associated drinking and gambling activities. Players were keen to capitalise on their physical abilities and gain economic security by winning a prize. Businessmen were quick to recognise the opportunity for financial gain from paying spectators. The practice of enclosing sections of sporting fields became common, and gate entrance fees were charged. Charges were levied when the crowds entered a stand or enclosure, and space was leased for booths supplying refreshments.



Figure 12.5 NSW Swifts: a professional sporting team

Once clubs began to make profits from gate takings, working-class players in rugby union and the Victorian Football Association—both 'amateur' sports—looked for some compensation for missed working days and injuries. Because the amateur clubs would not pay them, the NSW Rugby League and Victorian Football League were formed as breakaway professional organisations in the late nineteenth century. The main purpose of these new organisations was to provide entertainment for spectators of the game. Although players were originally paid very little, both codes are now involved in million-dollar contracts with players, television companies and a range of high-profile sponsors. Professional sport has become big business. This path has been followed by other sports, including soccer, cricket and rugby union.

Most 'professional' team sports with high-paying sponsors and players on contracts to play as their source of employment are male dominated. In 2008, one of the most popular female team sports in Australia, netball, launched the ANZ Championship, which is a Trans-Tasman national competition. Attracting key sponsors has for the first time allowed these athletes to become professional, be paid for playing and not have to juggle sport as well as other employment to earn a satisfactory income. The year 2008 also saw the launch of the W-League, which is the national women's soccer competition whose major sponsor is Westfield. Women's soccer is seen as one of the fastest emerging sports for women.

Individual sports, such as tennis and golf, have also become big business on an international scale. Sport and players have had to change to accommodate the need of sponsors and television viewers. The format of many games has changed and in many sports, players undertake sport as a job rather than a recreational pastime. Players have become 'saleable' and are traded between clubs. The nature of many games has changed to accommodate promotion and prime-time television viewing. In the AFL, for example, umpires must wait until they see the flashing light signal prior to bouncing the ball after a goal is scored. This signal signifies that the television channel broadcasting the game has completed its run of advertisements and is ready for play to be viewed again. The NRL has scheduled games for Friday nights, which is seen as prime time television viewing. The large viewing audience provides exposure for sponsors in the form of advertising.

practical application

Professional sport

Design a storyboard or create a vodcast that illustrates how sport has changed as a result of professionalism. In doing so, depict the athlete as a product.

Sport as big business

Sport in modern Australian society is big business. Sport is now considered to be a consumer product and an industry. Stadium entrance fees, sponsorship deals, product endorsement, advertising and public shares in sporting clubs are commonplace. Numerous sporting clubs operate as companies with shares on the stock market. Many companies seek to be associated with certain players who are seen as figures of public respect. Legislation has intervened in sport: it dictates rules for player sales by using contracts, salary caps, recruitment zones and transfer payments. Club loyalty payments prevent players from playing for the highest bidder.



Soccer nets $16m from budget

By Ray Gatt and Nicole Jeffrey
Soccer was the big winner in the Rudd Government's Federal Budget with the sport to receive $16 million in funding over the next two years.

The funding honours a promise made by the previous Howard Government which announced last September it would provide the extra money on top of the $16m the code already receives from an existing four-year agreement.

The money will be used to help kick-start the Women's National League, promote 'participation in and support for football in Australia' and to help funding of Australia's national men's and women's teams from juniors to seniors.

The sports facilities that will be redeveloped include the Cricket Centre of Excellence in Brisbane ($17.5m), Campbelltown Stadium ($8m), Newcastle's EnergyAustralia Stadium ($10m), Penrith Football Stadium and the adjoining Howell Cricket Oval ($5m), the Bradman Museum at Bowral ($6.5m) and Punt Road Oval in Melbourne ($2m) …

The Australian, 15 May 2008

Where a run is worth $3000 and the wickets paved with gold

By Peter Lalor
… Cricket has seen nothing like the Indian Premier League and the players' bank accounts have seen nothing like it either.

At least two of the Australians have earned $3000 or more per run scored. And it didn't matter what sort of run …

Ricky Ponting went for a relatively modest $400,000 when sold at auction in February to the Kolkata Knight Riders, a franchise so wealthy its pads, gloves, helmets and God knows what else appear to be plated with gold.

The Australia captain was no doubt a little put out to learn his trusty all-rounder Andrew Symonds was bought for $1.35 million by the Deccan Chargers, but did not complain too loudly.

In the end, Ponting has emerged as the highest paid Australian batsman when earnings are worked out on a rupees-per-runs-scored basis …

He admitted he would have liked to have scored more runs and that his impact 'wasn't that great'. Ponting played four games, made two golden ducks and scored just 39 runs for the tournament. For that, he earned a massive $3663 for every run, or $142,000 for the four games he played.

Symonds earned $3000 for each of his 161 runs, but won't be complaining about the lazy $500,000 he earned for just four appearances with the Deccan team …

However, Symonds' and Ponting's rupees-per-run looks positively pitiful when compared to the earnings of Bollywood heart-throb Brett Lee.

The paceman was bought for $900,000 at auction and earned more than $320,000 for his brief stint with the Punjab side. Lee managed only four wickets in the four games, which means his Bollywood boss paid him $80,000 per scalp.

The Australian understands each player was paid on a pro rata basis for the games played and received 10 per cent of that amount for each game they did not play.

Matthew Hayden ($134,000) and Michael Hussey ($125,000) both bring home more for two weeks' work than most Australians get for two years …

… players return to Australia to prepare for the West Indies tour, where they will earn almost $13,000 a Test and $5000 a one-day international.

It must seem like volunteer work to those who have drunk from the IPL's ruby-encrusted goblet.

The Australian, 2 May 2008

Critical inquiry

1 a **Outline** the changes made by various sports to make them more entertaining and saleable.

b **Discuss** the consequences for these sports and for the individual athletes involved in these sports.

2 Use the newspaper articles on page 249 to assist you to **explain** the links between sport, money and business.

Research and Review

1 Design a mind map that illustrates how sport has changed as a result of sport developing as big business.

2 **Describe** how the media is associated with the changing nature of sport.

Sponsorship, advertising and sport

Being an elite athlete is a full-time commitment that requires rigorous training and competition. These demands allow athletes little time to undertake any other form of work. The cost of purchasing equipment, travelling to competition venues and paying coaches is such that elite athletes must seek sponsorship. Sponsorship might be in the form of uniforms, equipment, scholarships or competition fees. Examples of such sponsorship include:

- Adidas sponsored the casual attire of the 2008 Australian Olympic team.
- Speedo provided free use of its LZR race suit to any swimmer at the Beijing Olympics.

Associated with sponsorship are corporate expectations, whereby the athlete is required to continue at an elite level and be a source of corporate identification and success. US swimmer Michael Phelps, crowned the greatest Olympian of all time when he won eight gold medals at the 2008 Beijing Olympics, had as one of his sponsors the global corporation Visa. Phelps left Beijing prior to the Games finishing to complete sponsorship commitments in London. This may be seen as an example of an athlete fulfilling corporate expectations of him. The athlete and his or her sponsor have a two-way relationship. The sponsor provides the athlete with resources. In turn, the athlete provides exposure for the sponsor and its product. This relationship can be very lucrative. Another of Michael Phelps's sponsors during his Beijing Olympics campaign was Speedo. After Phelps won eight gold medals Speedo provided him with a $1 million bonus.

For the corporate sector, sponsorship aims to generate further business through the endorsement of products by athletes or sporting clubs. This is done by displaying logos and through signage and media advertising. This corporate marketing strategy is sometimes linked with community ventures,



Figure 12.6 Adidas sponsored the casual attire of the 2008 Australian Olympic team

such as the NAB AFL Auskick program for junior Australian Rules football players. These commercial changes in sport have resulted in the development of an industry of sports marketing agencies that promote products, including supporters' banners, beanies, scarves, T-shirts and flags.

For the player, sponsorship involves contractual agreements with clubs and corporations. Conflicts can occur when athletes are sponsored by one company as an individual, and by another company as a member of a club or team.

Sponsorship is closely linked with media coverage, and those sports that receive live television coverage become very popular. These sports attract further corporate interest because they are able to draw large-scale media attention, whereas sports receiving less publicity obtain fewer corporate sponsors and less government funding.

Advertising deals require athletes to take on a share of responsibility. Athletes are required to sign contracts that link their names with a product or corporation, and this involves athletes conforming to a certain image. Examples of Australian athletes who are associated with products include Grant Hackett and Libby Trickett with Uncle Toby's, Brett Lee with Sanitarium Weet-Bix and Stephanie Rice with Davenport, Channel Seven, Telstra and Speedo. Examples of international athletes and their associated sponsorships include golfer Tiger Woods with Nike, Tag Heuer, Gillette and Gatorade and tennis player Roger Federer with Nike, Rolex, Gillette, Wilson and Mercedes-Benz. High-profile athletes such as these are often associated with premium brands.

To be marketable, athletes must conduct themselves in a particular manner. They must be seen by the public to be 'clean' and fair, and as people who follow the rules and achieve at an elite level. Athletes who perform poorly, or who are associated with scandals, quickly lose their positive media profile, and their advertising contracts. AFL player Ben Cousins—former Premiership captain, All Australian player and Brownlow Medallist—is one such case. After a series of drug-related incidents involving the police, Cousins was sacked by the West Coast Eagles Football Club in 2007 and banned from playing football in 2008 for bringing the game of AFL into disrepute.

Some women athletes, in particular those from sports that have traditionally lacked media coverage, have chosen to pose for calendars or magazines to attract sponsorship deals for their sport. Such an occurrence took place in the lead up to the 2000 Olympics when members of the Australian Women's Soccer Team, the 'Matildas', posed for a calendar to raise awareness of their team and to raise funds. In some sports, such as beach volleyball, uniform rules have been altered to attract sponsorship by marketing players' sexuality. Women beach volleyball players are required to play in two-piece bikini-style attire. Actions such as these have often been termed '**sexploitation**'. They can have a negative effect on both the sport and the athletes as the focus for some becomes the female athlete's physical appeal rather than her athletic prowess.



Figure 12.7 A sports industry marketing venture: gear for supporters of the Sydney Swans can be purchased on the Internet



Figure 12.8 2007 ASP Women's World Champion Stephanie Gilmore won the Rip Curl pro, sponsored by, among others, Ford



It's Steph against Steph

By David Riccio

They are the golden girls of the water, but this is a battle that can only be won on land.

World surfing champion Stephanie Gilmore is set to challenge dual Olympic swimming gold medallist Stephanie Rice as Australia's hottest female athlete.

[Over] the next 10 years, Gilmore can earn close to $6 million.

Not bad for a sandy-haired 20-year-old whose lure into surfing was a $100 wetsuit.

'As far as women in Australian sport go, she's as bankable as Stephanie Rice ... if not more,' Gilmore's Rip Curl team manager Gary Dunne said.

After signing her first million-dollar deal when still at school, Gilmore owns an exclusive apartment on the Gold Coast and has graced magazine covers across the globe. With career earnings just below $217,000, Gilmore's impact on the waves is dwarfed by her success on the land.

At every airport stop on the women's world tour, keys to a $60,000 Ford Territory await her.

Lucrative sponsorship and endorsement deals with Ford, Rip Curl, Sanitarium Up and Go and popular sunscreen Alba have paved a golden path.

Penning a $1 million five-year incentive-laden deal with major sponsor Rip Curl in 2005, Gilmore's second world title victory at Sunset Beach a fortnight ago triggered a five-figure bonus.

'We don't mind signing the cheques if Steph keeps winning,' head of Rip Curl marketing Neil Ridgeway said.

Gilmore, who sponsors two World Vision kids from Ethiopia, said her ever-increasing wealth has never been her motive.

'It's my job, it's my hobby, it's my escape—it's everything rolled into one,' Gilmore said of surfing.

'Whether someone is paying me, I'm still going to be out there enjoying the ocean and riding waves. Stephanie Rice is an incredible athlete, she's a beautiful girl and it's great to see her grabbing all the opportunities that have come her way.

'It's good for her image and I look to her for inspiration, too.

'But to my friends, even if I'm a world champ, I'm still just Steph and a good friend to hang out with. It's just a tag against my name really.'

Ridgeway believes Gilmore can use that tag to great effect. 'She has the potential to earn what she wants,' he said.

'She's 20 years old and you think of Kelly Slater, who's 36—Steph has effectively got 16 years left in the sport and she's already won 10 WCT events in her first two years, which is a third of Kelly's record in all his time in the sport.'

Gilmore's success has helped her close the gap on Rice as Australia's most marketable female star …

Daily Telegraph, 14 December 2008

Critical inquiry

1 Using the articles above and opposite, complete the following tasks:

a **Analyse** the impact that sponsorship has on athletes.

b **Contrast** the experiences of athletes in high-profile sports with those of athletes in low-profile sports.

Olympians up the creek

High-profile gold medallists go on to a life of endorsements and big dollars while other Olympic champions are not so lucky, writes Adrian Proszenko …

What do they have in common?

During 16 glorious days in August, they were the toast of a nation after winning gold medals at the Beijing Olympics. It has been more than two months since the Games and our heroes have slept off their hangovers and picked the last bit of ticker tape from their hair.

So what happens now?

Does a gold medal set you up for life? Are sponsors falling over themselves to line your pockets? Do you have to sign autographs when lining up at the supermarket?

Do you head back to your day job? How does standing on the podium change your life?

For rower David Crawshay, one half of our men's double sculls rowing crew, the answer to the last question is, well, not a lot.

'At the moment, I'm in debt, so this will be an interesting social experiment, to see what a gold medal will do for you,' Crawshay tells The *Sun-Herald*. 'I built up a bit of a war chest over the two years that I worked and then I decimated it leading up to the Olympics.'

The work he refers to is his political career …

Some of Crawshay's gold medal colleagues have less lofty ambitions, but are noble nonetheless.

Take Elise Rechichi. Alongside Tessa Parkinson, Rechichi won gold in the 470 women's sailing division.

She hopes to defend that title in London but in between times the 22-year-old is studying to become a pilot for the Royal Flying Doctor Service …

For some, such as Rechichi, a gold medal means that everyone wants a piece of her, even if sailing lacks the profile of sports such as swimming.

'The medal should come with a disclaimer—there needs to be some fine print that says it comes with two months of functions and no sleep,' Rechichi laughs.

For others, life has gone on as normal. For Duncan Free, who won rowing gold alongside Drew Ginn in the men's pairs, it's back to work at the Queensland Department of Local Government, Sport and Recreation …

What about sponsors? Surely gold medallists are hot property. It appears the transition from rowing gold to Goulburn Valley Gold only works for the Oarsome Foursome. As yet, no sponsors have come onboard.

'For athletes that think they're going to retire on a gold medal, it's not going to happen unless you're in a [high-profile] sport,' Free says.

Sometimes, sponsorship can be tough even for the highest-profile athletes. Steve Hooker and Matthew Mitcham were joint winners of the prestigious Don Award, for their feats in pole vault and diving respectively. Yet not one sponsor has come forward since their Beijing heroics.

'Hopefully that's something that comes up but in these uncertain times, it's hard work,' Hooker said.

Their manager, David Flaskas, has fielded corporate enquiries for both and is confident something will come up soon. But it's proof a gold medal isn't a licence to print money.

'They need to be involved in companies they're passionate about and believe in, otherwise the public is smart enough to know it's not a comfortable fit,' Flaskas says.

While some gold medallists have to go back to their day jobs, the advantage Hooker and Mitcham have is they can make enough money to concentrate solely on their sporting careers …

Sun-Herald, 9 November 2008



Champions: Drew Ginn, left, and Duncan Free

The economics of hosting major sporting events

Hosting major sporting events can be viewed as a positive economic windfall to the host nation but it also can have negative economic consequences if not managed properly. A key example of a major sporting event is the Olympic Games. Involvement in the Olympics has changed over time. Hosting the Olympics provides a nation with the opportunity to display its strengths. With this privilege, however, come certain financial responsibilities. A large national investment is required for:

- the construction of stadiums, playing fields, aquatic centres, medical facilities, media facilities and the Olympic village
- publicity
- the creation of national mascots
- the organisation of opening and closing ceremonies.

The nature of this investment can be seen as being quite different from the original intention of the Games: for athletes to participate as individuals (not as nations) and compete with amateur status. In ancient Greece, athletes' performances were recognised by their being crowned with a laurel wreath.

In 1984, the Los Angeles Olympics was boycotted by several nations. This was, in part, as retribution for the US boycott of the 1980 Moscow Games, but the 1984 boycott was also said to be a reaction against the use of the Olympics as a vehicle for commercial gain through the sale of television rights and Olympic paraphernalia. Before the Los Angeles Olympics, most host countries had been left with a substantial debt as a result of hosting the Games. The Los Angeles Olympics, through sales of television coverage and sponsorship, made a considerable profit.

In recent years, the **International Olympic Committee (IOC)** has allowed Olympic athletes to gain sponsorship to support their training and competing. These funds must be used for sports-related expenses, such as living costs, equipment purchases and travel expenses. This is in keeping with the original philosophy of the Olympics: that only amateur athletes may compete. In recent years, however, the IOC has allowed professional tennis players, baseball players, soccer players and professional basketball teams to compete in the Games.



Consequences for spectators and participants

With sport having become a commodity and a big business, numerous consequences can be identified for both the spectator and participants. Spectators have become consumers of the product that sport has become. Continual exposure to the marketing of key sponsors through product endorsements, merchandising sales and advertising at venues and in the media has changed the nature of sport. Sport has become an entertainment package. Some argue that sport has lost its true essence due to the influence of the money associated with businesses that financially support sport. The close link to business and its associated finance has led to some sporting clubs ceasing to exist. For example, 2008 saw the loss of the Sydney Kings and the Brisbane Bullets from the National Basketball League.

For participants in sport, players now endorse the products that they or their sport are associated with through sponsorship, commitments to media and an image to portray to the general public. Players' lives are often lived out in the view of the public and their sporting commitments must be juggled with corporate responsibilities.

Players are often scrutinised by the public. This can have a negative impact on participants with some not able to handle the pressure associated with such exposure.

Hosting major sporting events has numerous associated consequences. For spectators and participants alike, the building or redevelopment of sporting facilities is seen as a positive outcome of this commitment. Cities are often left with world-class facilities as a result of hosting a major sporting event. For example, because it hosted the 2000 Olympics, Sydney has outstanding multipurpose facilities in the Homebush Bay area that are used by the general public and for sporting and entertainment purposes. When hosting a major sporting event, the host city and country become the focus of international media, increasing their exposure to the world. This often boosts tourism to the host nation, which can benefit its economy.

Hosting a major sporting event does, however, involve a large financial outlay initially. This expenditure may not be supported by certain sectors of the public as it often means the allocation of taxpayer funding. Some sectors feel that this money should be spent elsewhere. The host city or nation needs to be mindful of meeting its budget as poor financial leadership could leave the nation in serious debt. For example, hosting the Montreal Olympics in 1976 left Quebec with a debt that it carried for decades.

Research and Review

Select a major sporting event, such as the Olympics. Research the economics associated with hosting this event and its impact on spectators and participants.

how have meanings about sport and physical activity changed over time?

chapter summary

- Australia's sporting origins have had a strong British influence since the nineteenth century.
- Sport in colonial Australia was male dominated, patriotic and symbolic of one's character and values. It was associated with discipline, mateship and physical strength.
- Social class groups in colonial Australia participated in different sports and activities, a division that mirrored those in British society. The upper class participated in sports such as cricket, tennis and golf. They enjoyed membership to sporting clubs that excluded the lower class and women.
- Social class segregation in colonial Australia also divided sport into amateur and professional status.
- Women were restricted to a minimal role in sport in colonial Australia. It was frowned upon by society, not supported by the medical profession and women's clothing of the day restricted movement.
- Women of the upper class were able to participate in some sports, but only for recreation. Acceptable sports included croquet, tennis and golf.
- The lower-class participated in athletics. Some activities, including pedestrianism (walking races), were participated in for financial gain.
- Since the twentieth century, sport has evolved into a commodity.
- Sport has become big business, involving sponsorship and contractual obligations. Large amounts of money are sourced through corporate sponsorship. In return, sponsors have high expectations of the sports they sponsor and their participants.
- The impact on the host city or nation must be considered carefully when hosting a major sporting event as such events have numerous consequences for both spectators and participants.

revision activities

1. **Outline** the values that were associated with sport in nineteenth-century England and colonial Australia.
2. **Compare** the role of men and women in sport in nineteenth-century England and colonial Australia.
3. **Clarify** how sport has become a commodity.
4. Sport could not survive without sponsorship and advertising. **Discuss**.

extension activities

1. Research the role women played in both the ancient and modern Olympic Games, then complete the following tasks:
   a. **Describe** what this role was.
   b. **Compare** the role of women in the Ancient Games with that of women in the Modern Games. Use a Venn diagram to illustrate your comparison.
2. **Outline** the obstacles that women have faced to becoming participants in the modern Olympic Games.
3. Select one athlete who interests you. Research your chosen athlete's sponsorship deals and commitments, then complete the following tasks:
   a. **Outline** the sponsorships that your chosen athlete has secured.
   b. **Analyse** the impact and consequences that these sponsorships may have on the athlete.

exam-style questions

1. **Discuss** the purpose played by sport in early nineteenth-century Australian society. (8 marks)
2. **Examine** the meanings of the concepts of 'amateurism' and 'professionalism' in nineteenth-century Australian society. (8 marks)
3. **Describe** the role played by women in Australian sport during the nineteenth and early twentieth centuries. (8 marks)
4. **Assess** the impact that sponsorship has had on sport and individual athletes. (12 marks)
5. Professional sport in the twenty-first century is viewed as big business. **Analyse** the consequences for various sports as they have adopted this focus. (12 marks)
6. **Evaluate** the economic consequences of hosting major sporting events for both spectators and participants. (12 marks)

chapter 13

what is the relationship between SPORT AND NATIONAL and cultural identity?

This chapter is associated with the relationship that sport has with both national and cultural **identity**. We examine the role of government funding in relation to the high value that Australian society places on sport. Politics and sport have become intertwined and we explore specific instances of this in terms of the consequences this relationship has had on sport, athletes and the Australian public. This chapter also investigates the role of physical activity and sport in the lives of Indigenous Australians and a variety of cultural groups in Australia.

Australian sporting identity

National and regional identity through sporting achievements

Since colonial times, sporting successes have assisted the emerging nation of Australia to establish its identity. Contests between the colonies and Britain were considered to be tests of the new settlers, and their British counterparts admired the physical ability of the colonists. The Australian colonies demonstrated their maturity through their successes in sport, particularly cricket. The first 'Test' match was played in 1877, before the nation of Australia was formed at Federation in 1901. Sir Donald Bradman's extraordinary batting ability lifted the spirits of Australia during the tough times of the





1930s Depression era. Cricket continues to be a source of fierce rivalry between Australia and Britain, particularly during test matches for the coveted Ashes trophy.

Australians have identified with national sporting successes, including wins in Davis Cup tennis, medals at Commonwealth and Olympic Games, qualification for World Cup soccer and wins in the cricket Ashes. Victory in the America's Cup in 1983 united the nation with a sense of pride in Australia's sporting achievement. It also increased Australia's international profile because it entailed the defeat of a 'super power': the United States of America. More recently, Australia has celebrated success in the sporting domain and continued to upgrade and reinforce its international standing by hosting the Olympics in Sydney in 2000 and the Commonwealth Games in Melbourne in 2006.

Uniting nations through sport

A nation's success in the Olympics is seen as a measure of that nation's standing in the international community.

The identity of a nation is showcased at the opening ceremony of the Olympics, and also with the playing of its national anthem at medal ceremonies, the raising of its flag, the wearing of the official national uniform, and the presentation of the national team to the host nation's head of state.

Nations who compete internationally in political and economic arenas place great importance on the success of their athletes at the Olympics. Athletes are increasingly targeted at young ages for specialist training in an effort to increase the medal tally. Government funding is directed to developing athletes for the purpose of enhancing the profile of the nation, rather than that of the individual.

The media, by providing live coverage and commentary, have played a very important role in creating Australian sporting heroes and in promoting Australian sporting success.

Uniting communities through sport

For many Australians, sport has the ability to unite a community. Rugby league's State of Origin series is an example of an event that promotes regional identity. Supporter loyalty for one's 'state of origin', be it New South Wales or Queensland, is fiercely exhibited. Players are proud to be selected to represent their state and view this as a great honour.

With the success of local individuals or teams, communities gain recognition. Local heroes become national heroes and this often has an economic and social impact on the local region. Associating a community with a sports team has been common, particularly in the football codes. Rugby league teams names such as Cronulla, South Sydney and St George, and AFL team names such as Collingwood, Richmond and Carlton are all directly associated with localities. Players were originally drawn from the local talent of these communities. Spectators flocked to matches to support their local side, which often provided working-class communities with a sense of opportunity and hope.



Figure 13.1 Sir Donald Bradman is one of Australia's sporting icons



Figure 13.2 Passionate support of a local team can unite a community

Research and Review

1 Read the article below, then complete the following tasks:
   - a **Outline** how sport can unite a community.
   - b **Describe** how sport assists in developing a regional identity.

2 **Identify** other examples of how local individuals and local communities have benefited from sporting success.

3 **Clarify** how the coverage given to the Olympic Games and State of Origin football promotes Australian national and regional identity.

Joey's town to Joel town

By John Taylor

Newcastle Jets owner Con Constantine says that his team has conquered the rugby league heartland and is now just as popular as the Knights.

Just days before the Jets aim to shoot down Queensland for a place in the Grand Final at the Sydney Football Stadium on Sunday week, Constantine declared that it would be 'an Origin battle' and insisted star striker Joel Griffiths was Newcastle's latest sporting hero.

'For 20 years rugby league dominated this city—not any more,' Constantine said yesterday as his team worked to cast off the memory of losing the major semi-final to the Central Coast on Sunday.

The Jets were eliminated 3-2 on aggregate after falling 3-0 in the return in Gosford.

'When we started out three years ago I would have given the Jets a rating of 6/10. The Knights were 10/10.

'We've got just as much credibility now and we're all square. The people in this place just worshipped Andrew Johns. He was God.

'I loved the man myself. A great guy.

'But don't think for one minute that Joel Griffiths is not as big a personality as Andrew was. You go into pubs and clubs and everyone talks about Joel.

'Aside from his looks, he's a coach's dream the way he plays the game.

'He gives it everything. He works his butt off and it was an absolute credit to him that he was the league's top scorer. He's a class above the others.'

With a place in the grand final at stake in Sunday's winner-take-all preliminary final, Constantine—who has poured millions into the club—said the buzz around the city now would be dwarfed if the Jets managed a victory over the Roar.

'This is not Sydney or the Central Coast we're playing—this is Queensland,' he said.

'This is like an Origin battle.

'And you know what NSW people think about Queenslanders. The fans will come out in their thousands to cheer our boys on and drive them home. This is just as big as when the Knights won their last grand final [against Parramatta in 2001].

'What some people may not be aware of is that we get over this hurdle and we're into Asian football.

'How good's that going to be for this city?

'It's also very special for the city in that soccer was played here over 100 years ago by Adamstown and to think we've come this far.

'We had a hiccup last Sunday [against the Mariners].

'It was one of those days. That's the round ball for you.

'I said when I took on the Jets that I believed it would take off. It was not easy at the beginning but this year we have gone to another level.

'As for the A-League, the sky's the limit.'

But Constantine's dream is to see the Jets and Knights unite.

'There's room for both to exist,' he said.

'One's played in winter and the other in summer. Let's have no more conflict,' he said. 'We have a very good relationship with the Knights now and I know we can do it [unite].'

A grand final spot is one thing and a re-match with Central Coast beckons.

But victory over the Roar will also mean an automatic place in next year's Asian Champions League.

Daily Telegraph, 13 February 2008

Government funding

Sport has become highly valued in Australian society. This is indicated by the amount of media coverage, sponsorship investment, and federal and state government funding sport receives as well as the high esteem with which Australians view their sporting heroes. Sport is considered to be an important pastime, and its ability to raise Australia's international profile results in **infrastructure** being established to support sport development. This infrastructure includes local and state facilities, and ventures associated with Australia's hosting of the Commonwealth and Olympic Games.

Government funding and development programs are initiatives that began in the 1970s in Australia. Prior to this, athletes were generally expected to fund their own participation in international contests, and to develop their own talent. This practice stemmed largely from the British ideal of amateur sport. Competitive sport was for those who participated for the glory, and clubs were responsible for financing their teammates, based on the principle of *esprit de corps* (group morale). In 1914 the Australian Olympic Committee (Federation) was founded, with its primary role being to raise funds for future Olympics. Hosting the 1956 Melbourne Olympics spurred the federal and state governments to assist in supporting the infrastructure required for an international competition.

The 1956 Melbourne Olympics marked the first time that the Olympic Games had been held in the Southern Hemisphere.

In 1972, with the election of the Whitlam Labor Government, various initiatives were undertaken to enhance Australian involvement in sport. These measures included the promotion of community fitness, provision of financial assistance to national sports associations and improvements in sporting facilities. Local governments supported the establishment of swimming centres, parks and playing fields for community participants.

Australia's failure to win a gold medal at the 1976 Montreal Olympics was attributed to the fact that many other nations had increased funding of training and had developed talent-identification programs. Because of this perceived failure of Australian athletes and the tarnishing of our international sporting image, the Australian Government felt compelled to act. It could not risk athletes and coaches moving overseas to access the superior facilities and knowledge base they could find there. As a result, the Australian Institute of Sport (AIS) was established in 1980 in Canberra. Its primary aim was to raise the standard of Australia's elite performers.

WEB

A website that allows you to examine the history of the AIS can be accessed via www.oup.com.au/pdhpe12

Since the 1970s, federal governments have continued to support sport by providing funding for training facilities and technology, and employing experienced coaches and support personnel, such as nutritionists and sport psychologists. The Australian Sports Commission has been established to assist in coordinating sports development in Australia. More recently, governments have funded facilities for high-profile events, such as world cups, Olympic and Commonwealth Games and grand prix events. These measures create employment and tourism opportunities.

Research and Review

1 a **Explain** why the Australian Institute of Sport was established.

b **Outline** the benefits that were gained by athletes and the nation from the establishment of the institute.

2 Select an international sporting event that has been held in Australia, such as the Olympic Games in Sydney or the motor racing Grand Prix in Melbourne. **Describe** how government funding assists the chosen sport or event, and how the sport or event benefits the state in which it is held.

3 **Discuss** why many sports have gained corporate funding as well as government funding.

Politics and sports

Sport and politics have a close interrelationship, with international sport often acting as a **diplomatic** tool. Governments have the ability to provide and withdraw funding, and individual politicians have often aligned themselves with a state or nation's sporting successes. Examples include:

- Former prime minister John Howard wore a Wallabies or Australian cricket team tracksuit on his morning walks and provided a strong presence and passion at sporting fixtures of those teams.
- The success of the 2006 Commonwealth Games was closely associated with former Victorian premier Steve Bracks and his government.
- The success of the bid for the Sydney 2000 Olympics was closely associated with John Fahey's NSW government.
- Former NSW premier Neville Wran battled with the prospect of World Series Cricket (a break-away league created by media magnate Kerry Packer) in the late 1970s.
- In 1933, the then Australian prime minister, Joseph Lyons, defused the 'bodyline' cricket issue. This was an issue arising from the bodyline cricketing tactic being employed by English bowlers, which caused diplomatic controversy between Australia and England.

Stop playing Games, it's always political

By Garry Linnell

Bloodied protestors. Armed police wielding batons. Security guards with chiselled jaws and thousand-yard stares. It's Olympics time and it can only mean one thing. The usual love is in the air.

That is, it should be if you are a paid-up subscriber to the International Olympic Committee, or a card-carrying member of the Chinese Communist Party.

For the past week, as the flame, making its way toward Beijing, came close to being snuffed out by a string of violent pro-Tibet protests across Europe, the mantra from the Olympic movement has been loud and strong.

Leave our torch alone. Politics and sport should never mix. The Olympic movement is a force for good in the world and it should never be sullied by grubby disputes over money, borders or whether the host nation chooses to imprison [or] shoot … dissidents opposing its rule …

It's an easy image to fall for. The Olympics are unique—still the greatest show on earth—and eight years ago those of us in Sydney, supposedly the home of the cynical, felt the love.

When it works, as Sydney did, it's like visiting Disneyland. You might be sceptical of the hype and the merchandising and the lousy takeaway food, but for 16 days something happens that allows you to suspend disbelief.

Sydney turned itself upside down. Drivers gave way to pedestrians. Beggars gave coins to passers-by. Train travellers relished the sensation of sardine-like journeys to Homebush and even taxi drivers reached deep into their pockets and invested in deodorant.

But Sydney was rare and even those in the Olympic movement will admit to it. Ever since the modern Games began in 1896 this once-in-four-years carnival has often been hijacked for political purposes.

The most blatant was in 1936 when Hitler used the Berlin Games to stage a propaganda-fest for his Third Reich.

The Melbourne Games of 1956 are largely remembered for the blood in the pool during the water polo match between the Soviet Union and Hungary. There were boycotts staged by many nations over issues ranging from the Suez Canal crisis to the USSR's invasion of Hungary.

Oh, almost forgot. Wasn't it China that decided not to go to the Melbourne Olympics just a fortnight before the opening ceremony? Something to do with Taiwan being recognised as an independent state.

So please, let's dispense with this pretence the Games are aloof and above political fray. If that's the case, why do we have such an all-important medal tally if not to measure bragging rights against other nations?

The 1960s and '70s saw some eastern bloc countries turn their athletes into steroid monsters in order to top that medal table.

In 1972 Munich was wracked by the tragedy of 11 Israeli athletes massacred by terrorists. The 1980s became a blur of boycott-plagued Olympics—all politically motivated.

Awarding the Games to a totalitarian regime is a blatant political act to begin with.

China has claimed that hosting the Olympics is its own way of staging its coming out party.

After almost 5000 years of keeping the door largely closed, it says its embrace of capitalism and its opening up since the death of Mao have laid the path for the biggest debutante celebration in history.

In other words, China wanted the Games in order to strut its stuff. But as Australia discovered when its indigenous welfare issues were aired around the world, you can't party without some of your dirty linen falling out of the cupboard.

China's answer to the demonstrations by Tibetan monks in recent months—protests that have sparked a world-wide movement now fuelled by the daily progress of the Olympic torch—have been nothing more than reaching into the past. Oppress. Silence. And shoot when necessary.

China claims it has brought Tibet into the modern age. Tibetans claim it has oppressed the native population and developed an apartheid system by encouraging Chinese migration into the region and giving them preferential treatment …

Tibet is just one of the human rights issues upon which China now finds itself being tested by the larger world community. Welcome to the real Games.

Last year Juan Antonio Samaranch, the diminutive Spaniard who regally presided over the modern Olympic movement for more than two decades, declared that he expected the Beijing Games to be the 'best in Olympic history.' It's a phrase old Juan has uttered before. He got it right last time he used it.

But for Beijing to pull it off, it may need more than just a touch of that Olympic magic because these Games are not just a sporting contest.

They never have been, never will. And nor should they be.

Daily Telegraph, 11 April 2008

Over the years, various state and federal governments have played important roles in securing national and international competitions, such as Commonwealth and Olympic Games. Prior to the 1950s, however, governments in Australia rarely intervened in sports policy, and international teams were free to tour to nations of their choice.

The 1970s and 1980s provided several political complications for sports administrators and the Australian Government. The 1971 South African Springbok rugby tour was clouded with public protests condemning the **apartheid** policies of the South African Government at that time. Subsequently, there were bans on participation in sport with South African teams, and tours to South Africa were not undertaken by sporting teams. The question of whether to boycott the 1980 Moscow Olympics was another controversial political issue. The federal government strongly supported the boycott, but the Australian Olympic Federation decided to participate in the Games. The government showed its opposition to the decision by offering teams and individuals considerable amounts of money if they agreed not to participate.



Figure 13.3 A 'free Tibet' protest along the 2008 Olympic torch relay course

The Olympics have well-established links with politics. The tally of medals won is a measure of a nation's success and symbolic strength at the Games. In 2008 much controversy was witnessed surrounding China's hosting of the Olympics due to its human rights record and treatment of the people of Tibet. The torch relay was severely interrupted, and in some countries abandoned, due to political protests.

Government legislation ensures certain sporting events (including the Olympic Games) are broadcast on free-to-air television.

Australians go to Moscow

The Australian Olympic Federation has voted to send an Australian team to the Moscow Olympic Games in defiance of Federal Government policy. The tight 6–5 ballot, announced by Federation president Syd Grange at Melbourne's Sheraton Hotel, ends speculation about Australia's role following America's boycott of the Games. The USA has withdrawn from the Games in protest against the Soviet invasion and continued occupation of Afghanistan.

The Prime Minister, Malcolm Fraser, was critical of the decision, expressing hopes that Australian participation would not be interpreted as an endorsement of Soviet policy. 'I can't give them any blessing to go but I can say that I hope that any athlete who does compete in Moscow makes damn sure that he or she beats everyone else in whatever the event may be,' he told television reporters. But Syd Grange, explaining the rebuff to the Fraser Government, said, 'There's always been conflicts in our loyalties to the government and our loyalties to amateur sport.'

The Federation vote was welcomed by Opposition Leader Bill Hayden, who said, 'It was a decision that took a fair bit of courage,' adding it would be unfair to ask Olympians to sacrifice their chance to compete in the Games when Australia continued to trade in wheat and wool with the Soviet Union.

23 May 1980

Rebels to tour South Africa

An agreement was reached today to allow a rebel cricket tour of South Africa by a team of Australian players, beginning in November. As a result, the players concerned will face bans from Australian cricket for up to three years.

Rumours of a possible rebel tour to South Africa originally surfaced in mid-April, after it was reported that 15 Australians with first-class cricket experience had agreed to two tours in 1985–86 and 1986–87. This was ironic, as the English players who had embarked on a similar tour three years earlier were just coming off their bans and would now be eligible to rejoin Test cricket in the upcoming Ashes tour. The Australian Cricket Board (ACB) responded to the rumours by asking that all players selected for the Ashes tour sign statutory declarations denying any involvement in the rebel tour and stating their availability for all future matches.

Within days, the details of the rebel tour became clearer. It would commence in November, the players having been approached on behalf of the South African Cricket Union (SACU) by former Australian Test player Bruce Francis.

12 July 1985

Critical inquiry

1 Read the article on page 260, which explores the influence of politics on sporting events, then complete the following tasks:

a **Identify** instances where Australia has used sport for political purposes.

b **Outline** instances where politics has been a factor prior to or during an Olympic Games.

2 a **Examine** the preceding articles concerning the boycotts associated with the Moscow Olympics and the rebel cricket tour to South Africa.

b **Discuss** how politics was involved in these instances and the impact it had on the associated sports and athletes.

Research and Review

1 **Evaluate** the impact of political involvement on the athletes and the Australian public.

2 Listen to the ABC 'Sport vs politics' podcasts, which debate the issue of politics and its relationship with sport, then complete the following tasks:

a **Summarise** the viewpoints presented.

b Should politics be involved in sport? **Justify** your response.

WEB

The podcasts referred to in question 2 can be accessed via www.oup.com.au/pdhpe12



The meaning of physical activity and sport to Indigenous Australians

Traditional activities and sports

Before European colonisation, Indigenous Australians participated in a variety of games, dances and physical activities that mirrored their daily survival activities of hunting and fishing, and their affiliation with the land. For Indigenous Australians, an organised notion of sport, such as held by the British, did not exist.

Physical activities often included elements of play. Games included throwing spears at targets and using boomerangs, and basic movement skills, such as the running, jumping and climbing activities that formed a part of everyday life. 'Sport' competitions were organised by elders and included activities such as tree-climbing races and throwing spears for distance. These physical skills were paramount to the people's survival and, as such, were highly valued and encouraged. As a means of solving intertribal disputes, wrestling competitions were organised. Young boys participated in practice fights to improve their wrestling skills.

Dance was both an amusement and a teaching tool used by Indigenous Australians. Dance played a major part in the initiation process of young boys, and corroborees were performed for ceremonial purposes. Tribal corroborees were performed to celebrate good fortune and involved all members of the tribe in dance, music and song-making. Movements of animals were replicated to portray stories, both of the past and of daily activities. Tracking was a necessary skill learnt by all children, and games centred on identifying the correct track or noise.

Games involving catching, throwing and kicking using various types of balls were played. Balls were constructed of materials such as possum hair, kangaroo intestine, beeswax and seeds. Games were informal, often lasting many hours or days, with few rules and no need for umpires or referees. Both males and females played these games and their purpose was to promote interaction between tribal members and encourage participation.

Those Indigenous Australians who had access to waterholes or coastal beaches engaged in water activities, such as fishing, canoeing and swimming. Young Indigenous Australian children were encouraged to learn to swim from an early age.

Indigenous Australian games and activities were closely linked to teaching survival skills and respect for tribal elders. The major focus of 'organised' games was enjoyment rather than a result, and Indigenous Australians developed pastimes that demonstrated clear links with their family, tribe and land.

Links between community and identity

In 1962 the Yuendumu Games were created as an alternative sporting event for Indigenous Australians. The Yuendumu Games are a mixture of cultural events and sports, providing remote Indigenous Australian communities with the opportunity to participate in contests such as boomerang-throwing and Australian football. These games reflect the cultural identity of their participants, and assist in unifying their communities.

Boxing has provided an avenue for a number of Aboriginal men to find fame. One notable Indigenous Australian boxer is Lionel Rose, who became World Bantamweight Champion in 1968. In the same year, Rose was awarded the honour of Australian of the Year, becoming the first Indigenous Australian to receive this award.

The importance of Australian football to Indigenous Australians and their communities is paramount. Local successes of region against region, and having local boys targeted by AFL teams, assist in bonding local communities and establishing an identity for both Indigenous Australians and their regions. The AFL has recognised the significant contribution of Indigenous athletes to its sport by each year commemorating their contributions in the Indigenous round. In this round the Sydney Swans play the Essendon Bombers for the MarnGrook Trophy. Players such as dual Brownlow medallist Adam Goodes and premiership player Michael O'Loughlin from the Sydney Swans are seen as positive role models for young Indigenous Australian children.

At the 1994 Commonwealth Games and the 2000 Olympics in Sydney, Cathy Freeman draped herself in the Aboriginal flag after winning the 400 metres. This demonstrated her identification with her community and culture. Her Aboriginality was an important aspect of her own identity, and her achievements in sport have assisted in establishing an identity for Indigenous Australian people.



Figure 13.4 Dual Brownlow medallist and Premiership player, Adam Goodes, proudly Aboriginal



Figure 13.5 Cathy Freeman draped in the Aboriginal and Australian flags at the 2000 Olympic Games

Indigenous Australian track and field athletes include Kyle van der Kuyp, Nova Peris-Kneebone, Cathy Freeman, Patrick Johnson and Joshua Ross. These athletes have been positive sporting role models for indigenous Australian communities.

The Australian Sports Commission, through its Indigenous Sport Program, is aiming to improve the participation rates of Aborigines and Torres Strait Islanders in sport and recreation. The focus of this program is on community development.

Research and Review

1. Select several indigenous Australian athletes who have been successful in their sporting endeavours. **Analyse** how their successes have contributed to a positive perception of their indigenous culture.
2. **Investigate** how physical activity and sport have influenced both the lives and identity of indigenous Australians.

Physical activity, sport and cultural identity

The role of competition

Modern sport is often defined as a competitive physical activity. In Western countries competition in sport is often valued as a form of training for the world of work because, through sport, young people learn to strive to win and to cope with losing. Competition is also regarded as an important motivational factor for excellence and participation. Yet such competition is not universally valued.

For some other societies, enjoyment, participation and playing for social and health benefits are the primary motivations for undertaking physical activity. In traditional indigenous Australian culture, partaking in physical activity is encouraged for its participation value. Members of family groups are encouraged to join in unstructured games for the pleasure of playing, rather than for the result. North American Indians traditionally based their games on cooperation and participation, rather than on competition. In Eastern cultures, the notions of bodily and spiritual awareness are highly valued. Activities that define the connections between body, mind and spirit are seen to be important, and less value is placed on the notion of competition.

Since the introduction of Western-style sports to such societies, competition has become more prominent in the physical activities that they pursue. Of course, not all people in Western countries enjoy competitive sport. Many people prefer recreational activities and informal games where there is little or no competition with others.

Links to cultural identity

Sport in Australia originally developed for a particular social and cultural group: Anglo-Saxon, middle-class males. Many Australians judged the value of newly arrived cultural groups on the basis of their ability to adapt to traditional Australian games.

Since colonial days, the diversity of the Australian population has increased, and many ethnic groups participate in particular sports traditionally associated with their **culture**, thus creating a link between cultural identity and sport. This link is witnessed with the Irish and Gaelic football, South Americans and Greeks with soccer, and Italians with bocce and soccer. Asian community leaders have also encouraged their youth to participate in martial arts clubs in an effort to create community links.

Australian football has long been associated with Indigenous Australian participation and identity. The style of the game reflects traditional Indigenous Australian activities, and success in local competitions is highly valued by Indigenous Australian communities. The Northern Territory has contributed many young Aboriginal players to AFL teams. Those Indigenous Australian players whose talents are



Black and white world of the Dreamtime

By Paul Kent

The truth of it is we don't know their pain.

Rod Jensen began talking about growing up an Aboriginal with a white father, and trying to find a place in their world for both of them.

It said everything about the racial differences that even today we pretend don't exist.

Jensen finally found a team happy to have a little Aboriginal kid playing among them.

But there was nowhere among those in the grandstand for his father to sit.

Here is the difficulty of a black man in a white man's world, and a white man in a black man's world, even today.

'As a kid you kind of find … I'm quite dark skinned but when I am with my old man it's hard to be in the right place,' Jensen said. 'The blacks are careful when the whites are around and the whites don't want a blackfella around.'

He said this Tuesday night, when the Indigenous team to play Sunday's World Cup warm-up against a New Zealand Maoris team had dinner at Redfern Community Centre.

After their first training session at La Perouse their bus pulled up outside the Berkeley Hotel in Abercrombie St. The players walked up Vine St and into Tony Mundine's gym and after 30 minutes there headed towards the Community Centre. They walked through The Block, where kids streamed out of homes.

After dinner a light-skinned Aboriginal man named Billy Williams started talking about cultural awareness and identity.

He showed a few slides and then asked every person in the room to introduce himself and the tribe he was from.

Even coach Neil Henry was invited to speak, despite an absence of a tribe.

'The boys reckon you might be Koori anyway,' Williams said. 'Skinny ankles and you're afraid of snakes.'

And as each man spoke and told his story a power began to run through the room.

'You don't know what it's like for us to see this happening in my lifetime,' Sol Bellear, the former ATSIC deputy chairman and team manager, told them.

He recalled how at the naming of the Indigenous Team of the Century earlier this year many of those named had been denied Australian selection because of race.

But their sacrifice, he said, led to today's team, preparing to play the Maoris.

'That's what I was trying to impress upon them,' Bellear said. 'The doors that they kicked in all those years ago are the ones they are walking through now.

'The doors they're kicking in today are the doors the 9, 10, 11-year-olds will be kicking in in 10 years time.' Daine Laurie introduced himself, named his tribe, 'the toughest mob in north Queensland'. His teammates howled.

Mostly it was honest and sincere.

It went around the room to Preston Campbell, the little captain whose tribe is from Tingha. 'It's not often I get emotional about playing footy but …' and his voice broke.

The little man with the 100-watt smile faltered, albeit briefly.

'This is definitely,' he continued, 'the proudest moment of my rugby league career.'

Williams knew what they were saying.

He also hoped they knew what they were doing. 'I know you've always felt different,' he told them.

'But on the edge of playing for your people, I just wonder … have you ever felt this wonderful.'

Daily Telegraph, 23 October 2008

Critical inquiry

Using the article above as your stimulus, **analyse** the relationship between physical activity, sport and cultural identity.

practical application

Links to cultural identity

Select a variety of sports that are associated with a cultural heritage, such as Gaelic football with the Irish. As a class, participate in the sports you selected.

recognised by the AFL are supported and encouraged by their Indigenous Australian communities. Examples of well-known Aboriginal AFL players who originated from the Northern Territory include Andrew McLeod, dual Norm Smith Medallist (best on ground in the Grand Final) for the Adelaide Crows and Cyril Rioli, 2008 Premiership player for Hawthorn.

Relationships to health

In Australian society, sport and physical activity are viewed as pathways to health. Participating in physical activity is associated with a reduction in the likelihood of developing **lifestyle diseases**. During the 1970s and 1980s, significant government funding was allocated to advertising campaigns promoting health and participation in physical activity.

One such campaign was 'Life. Be In It'. The purpose of this campaign was to encourage all Australians to participate regularly in some form of sport or physical activity. Campaigns in the late 1990s and today have concentrated on the importance of being physically active for life. For example, the 'Live Life Well' campaign reinforces a more **holistic** approach to health.

In Australian society, health is equated with fitness, muscularity and being slim. Toned, muscular male physiques and toned, slim female physiques are valued. These physiques are often associated with participation in serious competitive sport or physical training. In other societies, such as Asian societies, participation in physical activity is undertaken for other purposes, such as linking the mind and body.

Ways of thinking about the body

In Western societies, the body is seen to be a machine that can be trained and developed to achieve success in competition. In the past, the body was considered as separate from the mind, with training focused on physical development. More recently, however, successful participation in competitive sport has involved training the mind as well as the body. Sports psychologists and motivational trainers have been employed by elite athletes and teams to improve their concentration and focus.

Sport has also been important in the way we view ourselves physically. The aesthetic appearance of an athlete—toned and with muscular definition—is a sought-after body image.



Figure 13.6 Tai chi is a traditional Chinese physical activity that enjoys growing popularity in Western cultures

Traditionally, in Eastern cultures, humans are viewed more holistically, with an awareness of connections between mind, body and spirit. This view has been nurtured by physical activities such as tai chi and yoga, which encourages participants to centre their concentration and mental energy when performing movements. These types of activities are considered to foster a sense of self, personal control and well-being in participants. Participants develop body awareness through regulated breathing patterns, allowing the body and mind to relax during a series of physical poses. More recently these types of activities have enjoyed a surge in popularity in Western cultures as we realise their holistic benefits to overall health and well-being as well as sporting performance.

practical application

Ways of thinking about the body

1 a Participate in a variety of activities that stem from traditional Eastern cultures. Yoga and tai chi are suitable examples.

b **Describe** the impact these activities had on you personally.

c **Discuss** why athletes may incorporate such activities into their training.

Research and Review

1 **Investigate** sporting opportunities for females in a variety of different cultures, then complete the following tasks:

a **Outline** how opportunities for physical activity differ for girls from different cultural backgrounds.

b Girls from Muslim societies that have strict dress codes involving covering certain body parts may experience difficulties when participating in a school PDHPE program. **Identify** these difficulties.

c **Discuss** how the difficulties identified above could be overcome by adjusting the program or the school rules.

2 **Investigate** a variety of sports or physical activities that have a cultural significance, then complete the following tasks:

a **Identify** the key elements of each identified sport or physical activity.

b **Explain** the cultural significance of each identified sport or physical activity.

what is the relationship between sport and national and cultural identity?

chapter summary

- National and regional identity are closely associated with sporting achievement and this association is promoted.
- Government funding is linked to sporting achievement.
- Sport and politics are interrelated and this is evidenced by Australia using sport as a tool in various instances.
- Physical activity and sport have a strong influence on the lives and identity of Indigenous Australians with traditional activities and sports mimicking daily life.
- Sports such as Australian football and the Yuendumu Games reflect the cultural identity of Indigenous Australian participants and contribute to unifying their communities.
- Strong indigenous Australian role models have also assisted in creating a sense of identity.
- Physical activity and sport has a cultural significance for particular groups.

revision activities

1. Select a sporting event that promotes regional identity. **Outline** how this is achieved.
2. Sport and politics should not mix. **Clarify** your thoughts on this statement.
3. **Describe** the traditional activities and sports of indigenous Australians.
4. **Contrast** the meaning of sport and physical activity for a variety of cultural groups.

extension activities

1. **Investigate** the current government funding allocated to sport. Tabulate your findings.
2. Construct a timeline investigating the role that politics has played in Australian sporting history.
3. Research a variety of traditional Indigenous Australian games.
   a. **Outline** the basic purpose of each game.
   b. Participate in these games as a class group.
   c. **Describe** your feelings after participating.

exam-style questions

1. **Analyse** how sport has contributed to the establishment of an Australian national identity. (12 marks)
2. **Discuss** how government funding has assisted the growth of sport in Australia. (8 marks)
3. **Evaluate** the impact on athletes and the Australian public of sport being used for political purposes. (12 marks)
4. **Describe** the contribution that sport and physical activity has made to the identity of Indigenous Australians. (8 marks)
5. **Assess** the relationship between physical activity, sport and cultural identity. (12 marks)

chapter 14

how does the mass media contribute TO PEOPLE'S UNDERSTANDING, values and beliefs about sport?

In this chapter we will examine the relationship between sport and the mass media. This relationship will be explored in terms of how sport is represented and the economics associated with media coverage. Media messages, images and the amount of coverage given to sports will be analysed to give a depth of understanding.

The relationship between sport and the mass media

Sport and the **mass media** have long shared a two-way relationship: sport providing the subject matter and the media providing the coverage.

The representation of sport in the media

Print media

Sport enjoys wide coverage in both newspapers and magazines, which are known as the print media. Certain magazines that cover particular sports have emerged to promote their sports to their audiences. Examples includes triathlon in *Triathlon and Multi Sport Magazine*, rugby league in *Rugby*





League Week, snowboarding in *Snowboarder*, golf in *Australian Golf Magazine* and adventure sports in *Australian Mountain Bike*. These magazines represent athletes in a particular way that encourages readers to purchase the magazine. Camera angles and photograph size and content in relation to accompanying articles are carefully selected for use as persuasive marketing strategies aimed at increasing sales.

Owners of newspapers, such as the Fairfax and Murdoch companies, have the power to control the nature of newspaper content. There are limits on the percentage of shares in newspapers that any owner can control. This policy is aimed at providing the public with balanced newspaper content.



Figure 14.1 Australia's *Triathlon and Multi Sport Magazine* focuses on triathlon

Newspapers are written to target different social audiences. Broadsheets, such as the *Sydney Morning Herald*, are aimed at 'white-collar' workers, whereas tabloids, such as the *Daily Telegraph*, are traditionally read by the working class. These audiences have their views of sport shaped by the print media. Particular social values and meanings about sport in Australia are conveyed by the choice of sports to be covered, the amount of coverage given to particular sports, the choice of photographs printed and the language used in articles. These usually match the social group that the newspaper is targeting. For example, the *Sydney Morning Herald* is more likely to provide greater coverage of rugby union than does the *Daily Telegraph*, which has more coverage dedicated to rugby league.

Television

Sport and television have a close relationship, from which both gain benefits. Sport is a highly attractive product for television as ratings are often guaranteed, and because it provides an opportunity to entice sponsors for advertising. From the perspective of the sport, television offers it publicity, attracts corporate sponsorship deals and increases its popularity.

Television has made demands that have changed the nature of sporting competitions. The tempo and excitement of various games is heightened by such changes as six-ball overs being used in cricket, basketball being divided into quarters instead of halves, penalty shoot-outs featuring in soccer, and tie-breakers replacing the advantage system in tennis.

Tennis has also introduced rule changes, such as the challenge rule where players can challenge a line call via instant replay using the Hawkeye system. Three 'challenges' are allowed per set. The on-court consultation with a coach is another new rule adopted by the Women's Tennis Association. It is allowed once during a change of ends or when a medical break occurs per set.

The need to make televised play entertaining and appealing to spectators has produced such innovations as coloured cricket uniforms for one-day matches, the evolution of Twenty20 cricket and changes in the number of teams involved in competitions.



Figure 14.2 Coloured cricket uniforms worn during one-day matches appeal to spectators

Segments of play have become '**compartmentalised**' to meet the needs of television commercial breaks. The umpire in AFL waits till the 'flashing light signal' is viewed prior to bouncing the ball after a goal has been scored as this indicates that the television channel providing coverage of the game has completed its run of advertisements.

Games under lights allow greater exposure to a wider range of viewers at prime viewing time, which assists in securing corporate product endorsement. An example of this is the National Rugby League moving its grand final to the evening time slot.

With increased technology, especially in the form of satellites, television has '**internationalised**' sport. Certain sports, including the football codes, have become more popular due to media exposure and strategic marketing. Specific television programs on certain sports have been developed. Examples are 'The Footy Show' on both rugby league and AFL codes on free-to-air television. In 2009, Network Ten launched One, which is a digital-only free-to-air sports channel. It is Australia's first new channel in more than 50 years.

Pay-television stations devoted to sport have come into being. Foxtel, for example, has three dedicated sports channels. Other channels focus on certain sports. Sky Channel provides racing coverage while ESPN shows a variety of US sports, such as the NFL (gridiron) and the NBA (basketball).

Television is able to manipulate our understanding and interpretations of sport coverage. By selecting which sport viewers see, and deciding how the sport is represented, television has an impact on the viewers' perception of an event. Violent episodes in football are often highlighted and replayed, and commentators act as interpreters of the action on the field. Camera angles focus the viewers' attention and provide a selective view of the event.

Economic considerations of media coverage and sport

Sport has emerged as a **marketable product**, and sales of sporting events to the media increase with sporting finals, such as the AFL grand final; big racing meetings, such as the Melbourne Cup; and international competitions, such as the Australian Open Tennis and the Olympic Games. Sport results and commentary of play are both represented in the media. Sport is then 'sold' to consumers by media commentators and writers, and this has emerged as a form of business, as well as entertainment. Sponsors are attracted to sports that receive prime media exposure. An example of a long-term sponsorship partnership is QBE and the Sydney Swans. QBE has been a major sponsor of the Swans for more than 20 years.

Sport relies on the media to popularise it and attract sponsorship, and the media gain in terms of product exposure and advertising revenue. There are mutual benefits for both the sport and the media.



Figure 14.3 The popularity of the Melbourne Cup makes it attractive to sponsors

practical application

Media coverage and sport

1 View sporting matches or events on different free-to-air television channels or pay-television channels, if available, then complete the following tasks:

a **Describe** how the media determined what you saw.

b **Discuss** why you think the media determine what images and commentary are presented.

c **Outline** the social values that are promoted in media coverage of sport.

Critical inquiry

1 Form a small group. Imagine that you have created a new sport and wish to gain sponsorship and media coverage of your sport.

- a **Outline** the factors you would need to consider when determining the different aspects of the sport, such as rules, uniforms, segments of play (such as quarters) and court/field size.
- b **Discuss** how the above considerations would create media interest in your sport.
- c Present your ideas as if you were in a boardroom pitching it to a company that you wish to sponsor your sport.

Research and Review

1 Review a variety of media types focusing on how they represent sport, then complete the following tasks:

- a **Analyse** the relationship between sport and the media.
- b Select one sport and **outline** the changes that have occurred in the sport to suit the needs of the media.

2 **Outline** who benefits from sport representation in the media.

3 **Examine** how the media influences our understanding of an event and its outcome.

4 **Discuss** how the media determines what we see and read.

5 **Describe** the economic considerations that are associated with media coverage and sport.

Deconstructing media messages, images and amount of coverage

The media play an important role in determining what we see, hear and read about sport.

Differences in coverage for different sports across various print and electronic media

Decisions about which sports gain coverage, and the space allocated to those sports, are closely associated with the ability of the sport to gain corporate sponsorship and public recognition. If a sport is popular, financed by 'big business' and associated with a product or hero, the sport is more likely to be allocated space in the media.

However, the media can also determine which sports are popularised. By devoting space—in the form of headlines, photographs, articles and airtime—to a less-sponsored sport, the media have the ability to change the public's view of the sport and to increase its popularity. The way the sport is marketed greatly influences the amount of media coverage it receives.

The social values of a society are represented by sports coverage in the media. Sports represented in Australian media are commonly played by males, and are traditional Anglo-Saxon sports, such as horse-racing, football and cricket. Extreme sports and those associated with ethnic and Indigenous groups are allocated less space or airtime in both print and electronic media.

Language relating to aggression, courage, perseverance and physical size are emphasised. Terms such as 'hammered the opposition' and 'bone-crunching tackle', and team names such as 'the warriors', 'the storm' and 'the hawks' all relate to highly valued masculine attributes. **Metaphors** are often utilised within the story or the headline (see Figure 14.4). Commentary relates to the ability of the athlete or the results of the performance. Photographs depict athletes participating actively in their sport. These photographs are often large in comparison with the size of the article and situated on the front or back page of the newspaper. They are usually associated with a dynamic, action-packed headline that depicts the athlete's strength and physical size or ability.

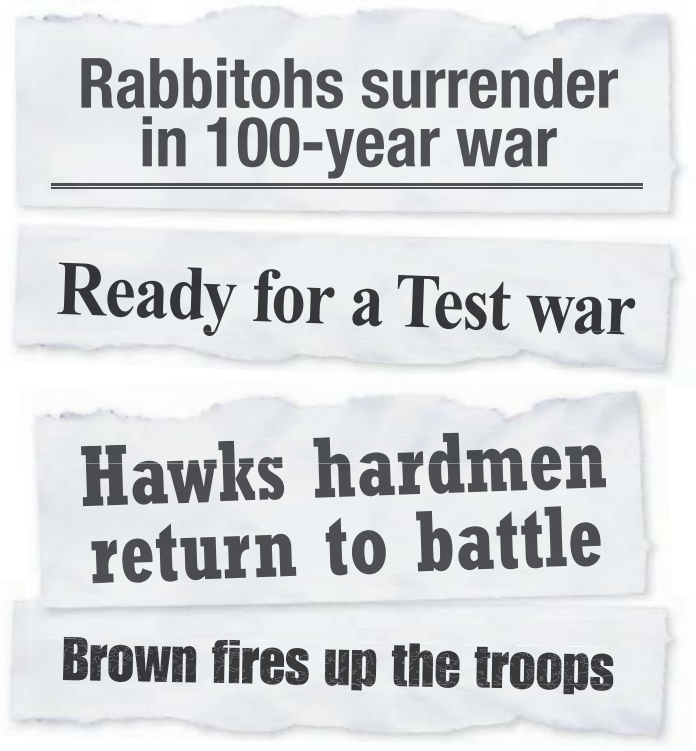


Figure 14.4 Metaphors used in sporting headlines

The emergence of extreme sports as entertainment

Extreme sports have begun to emerge as entertainment. Examples include big wave surfing, rock and ice climbing, skateboarding and BMX. Participants pitch themselves against other competitors as well as the natural and often unpredictable terrain and weather conditions. Extreme sports look for ways to make headlines in the media to increase public recognition. Some view this pursuit as placing participants at risk. Others see it as a way to provide entertainment that is more exciting, making the sport more attractive to sponsors.



Figure 14.5 Big wave surfing has emerged as entertainment

practical application

Sports coverage in the media

1 **Examine** the sports coverage in a weekend newspaper, then complete the following tasks:

- a Count the numbers of pages allocated to sport.
- b **Identify** the sports represented.
- c **Calculate** what percentage of coverage is aimed at traditional sports, such as horse-racing, cricket and football. To do this, count the number of pages devoted to traditional sports. Divide this by the number of pages devoted to all sports, and multiply this by 100.
- d **Describe** the graphics that accompany these articles.
- e **Describe** the language used that associates sport with particular images. Look for metaphors that may be associated with war or the Australian identity; for example, 'underdog' and 'digger'.
- f **Discuss** what the articles and graphics reveal about the audience for which it is written and what values are considered important.
- g **Examine** whether non-traditional sports are represented.
- h **Outline** any evidence there is to suggest that non-traditional sports are not valued by the corporate owners of the newspaper.
- i In your opinion, **justify** who determines what we read in newspapers.
- j **Analyse** how the coverage given to particular sports reflects which sports are valued and which are not.

Critical inquiry

1 Collect several sports articles from newspapers, magazines or the Internet, then complete the following tasks:

- a **Describe** the language and images that are used in the articles that would suggest particular social values to the reader.
- b **Identify** the metaphors that are common in the presentation of sport.

2 Conduct a class debate on the following topic: 'The media has pushed extreme sports to take excessive risks'.

Research and Review

1 Research a variety of extreme sports, then complete the following tasks:

- a **Outline** what they entail.
- b **Justify** the title of 'extreme sport'.

how does the mass media contribute to people's understanding, values and beliefs about sport?

chapter summary

- Sport enjoys wide media coverage in a variety of forms, such as newspapers and television.
- Social values and meanings about sport are demonstrated by the selection of sports represented in the media, the amount of coverage given and the visual images selected.
- Sport and the media share a relationship that benefits both parties.
- For television, popular sports bring increased ratings, attracting further sponsorship and advertising opportunities.
- For sport, media exposure brings popularity, recognition and the attraction of the corporate sector with sponsorship opportunities, thus ensuring the sport's survival.
- Media needs and influences have meant that some changes have been made to sports in terms of format, rule modifications and/or uniforms.
- Coverage received by a sport is related to how society values and perceives it.
- Media coverage of sport often uses metaphors, such as football as 'war'. Such metaphors are symbolic representations of the characteristics attributed to sport.

revision activities

1. **Clarify** the relationship between sport and the media.
2. **Discuss** how the media influence our understanding of sporting events.
3. **Account** for the differences in coverage for different sports across various print and electronic media.
4. **Outline** how extreme sports have emerged as a form of entertainment.

extension activities

1. Examine a free-to-air television guide.
   a. **Calculate** the amount of television time that is dedicated to sport. Illustrate this graphically.
   b. **Identify** which sports are given the most broadcast time.
   c. **Discuss** how the above results contribute to people's understanding, values and beliefs about sport.
2. Select a high-profile sporting event, such as the AFL Grand Final or the Melbourne Cup.
   a. **Investigate** the amount of coverage given to this event. Utilise newspaper archives.
   b. Research the sponsors associated with this event.
   c. **Analyse** the relationship between this sporting event, the media and sponsors.
3. Create a collage of metaphors used to describe sport in the print media.

exam-style questions

1. **Assess** the impact that media coverage has on society's perception of sport. (12 marks)
2. **Analyse** the interrelationship between sponsorship and the media and its collective impact on sport itself. (12 marks)
3. **Clarify** the relationship between economics, media coverage and sport. (8 marks)
4. **Describe** the changes that have been made to sport to suit the needs of the media. (8 marks)
5. **Evaluate** how the coverage given to a sport reflects how it is valued by society. (12 marks)

chapter 15

what are the relationships between SPORT AND PHYSICAL ACTIVITY and gender?

This chapter is concerned with the relationship between sport and physical activity and gender. The notion of sport being a traditionally male domain and the construction of meanings linked to masculinity and femininity are discussed. The role of the media in the formation of these meanings is explored and the implications for sponsorship, policy and resourcing are analysed. Challenges to traditional notions are also examined, as are participation rates in a variety of sports and physical activities.

Sport as a traditionally male domain

Sport has contributed to defining the position of women in society.

Sport has played a major role in determining what it means to be male and female in Australian society. Traditionally, sport has been viewed as primarily a male preserve with women as supporters. Historically, there has been a clear differentiation between those sports that are appropriate for men and those that are appropriate for women.

Sport has contributed to defining the position of women in society. The subordinate role of women in society throughout history has been reinforced in the sporting arena by such practices as:

- women only being permitted to become associate members of certain golf clubs
- women receiving less prize money than do men in a number of sports and events
- women receiving less media coverage than do men
- women receiving less government funding than do men
- women at times continuing to have less access to sporting facilities than do men.





Although women now play traditional male sports, such as rugby league and Australian football, sport continues to make a major contribution to defining narrow notions of **femininity** and **masculinity**. However, sport also has the potential to challenge these traditional meanings of what it means to be male and female.

Sport and the construction of masculinity and femininity

Sport has contributed greatly to the construction of masculinity. Sport requires participants to be competitive, courageous, determined, muscular, powerful and strong. These qualities, which are promoted by participation in sport, are largely associated with being male.

Family expectations play a significant role in determining whether sport will be played and which sports sons will play. Sports such as rugby league are considered 'manly' whereas dance and figure-skating are stereotyped as feminine. Parents often 'validate' their sons' masculinity by encouraging them to play socially acceptable 'male' games. Playing these games creates expectations that there will be certain on-field language and rough play associated with male behaviour. For those boys whose interests lie in areas other than sport, taunts of being a 'girl', a 'sissy' or a 'woos' are commonplace.

Masculine qualities of aggression, determination and strength are often linked to sport.

Traditionally, sport has been associated primarily with males. Women were encouraged to participate in sport and physical activity only when it required minimal exertion, did not prevent them from maintaining their feminine body shape and did not interfere with their 'motherly' duties.

The medical profession played a significant role in socialising young women. Doctors promoted the myth of females having 'finite physical and mental energy'. This was a phrase used to describe the notion that women had only enough energy for daily activities and childbirth, and not for extraneous activities, such as sport. Women were commonly described as 'permanently weak'. Doctors discouraged women from participating in strenuous physical activity because it was believed that this would damage their reproductive organs.



Figure 15.1 Men and women now play sports traditionally associated with the opposite gender

Women who actively pursued team sports were regarded as masculine and unattractive, as their bodies developed muscularity. It was believed that women were meant to be dainty, graceful and elegant, not active and muscular.

Women today participate in a variety of sports. For women, however, play needs to be restricted to the rules, because aggression and determination are considered to be male qualities. Female athletes who pursue their sport with passion, hard play and the development of body muscle may find themselves labelled 'masculine'.

The experience of girls in physical education classes at school can contribute to traditional notions of masculinity and femininity. The range of sports offered to girls at school may be limited to traditional female sports or physical activities, such as netball and dance. Uniform regulations may require girls to participate in physical activity in sports skirts. Physical education teachers might themselves present stereotyped roles, such as a female teaching dance whereas a male teaches Australian football. These experiences can contribute to the understanding of girls regarding what it means to be female.

practical application

Sport and gender

1 Design a promotional campaign to raise the profile of women in sport, highlighting that girls can play any sport. Consider including the following in your campaign:

- a posters
- b a PowerPoint presentation for students in lower grades or for parents at an information evening
- c articles in the school newsletter
- d jingles or a song at assembly
- e a lunchtime competition that focuses on non-traditional sports for girls.

Implications for participation

There are significant differences in sport and physical activity participation levels for men and women. Girls and boys have different perceptions of their ability in sport. Boys perceive themselves as good at sport whereas girls often perceive sport as a male activity.

These perceptions have implications for the participation of girls in sport, and for their motivation to succeed. Girls are less likely to participate in sport and physical activity without the support of positive female role models. Young boys are more likely to be encouraged to participate in sport, and this results in their developing high-level skills and a positive sense of their physical abilities. Boys often dominate equipment, space and teaching time in co-educational physical education lessons. Girls who excel in sports are often harassed by their peers and called 'show offs' or 'butch'.

Having a physically active sister or mother contributes to girls being encouraged to undertake sporting activities. Many female role models who are prominent in the media provide positive images of women participating and being successful in sport. These role models include netballer Liz Ellis, hurdler Jana Rawlinson and swimmers Stephanie Rice and Libby Trickett.

If the femininity of young girls is questioned as a result of participation in sport, they are more likely to drop out of sport at an earlier age. Girls often view themselves as less capable of succeeding in sports because **sex-role socialisation** contributes to girls viewing sport as a 'man's game'. If girls are inactive during childhood, their skill level will be minimal, which restricts their opportunity for later success in sport. Limiting the experiences of girls in physical activity and sports results in a lack of fitness and skill ability. By association, these girls may experience limited confidence in their physical ability to perform and may develop a negative body image.



Figure 15.2 Libby Trickett, a positive role model

Table 15.1 Adult participation in selected sports and physical activities, 2005–06

	Number ('000)	Participation rate (%)
Males		
Walking for exercise	1298.6	16.5
Aerobics/fitness	744.5	9.4
Golf	695.6	8.8
Cycling	691.0	8.8
Swimming	633.3	8.0
Running	425.9	5.4
Tennis	389.5	4.9
Soccer (outdoor)	311.5	3.9
Cricket (outdoor)	309.7	3.9
Bushwalking	248.1	3.1
Females		
Walking for exercise	2659.7	32.8
Aerobics/fitness	1271.5	15.7
Swimming	814.0	10.0
Netball	387.5	4.8
Tennis	379.4	4.7
Cycling	320.7	3.9
Bushwalking	271.4	3.3
Running	255.4	3.1
Yoga	248.7	3.1
Golf	179.9	2.2

Australian Bureau of Statistics, Participation in Sport and Physical Activities, Australia, 2005–06

Sponsorship, policy and resourcing

Securing sponsorship from large corporations is a relatively new phenomenon in women's sport. Traditional male sports, such as cricket and Australian football, have consumed much of the corporate dollar, because these sports are perceived to be entertaining and high profile. As a result, women's sports have suffered from lack of sponsorship and inadequate resourcing. Without the financial support of corporations, women's teams have been limited in their ability to attend international competitions or gain sufficient media recognition. Media coverage directly affects a team's ability to gain sponsorship dollars.

Teams that are successful in international arenas are more likely to gain media coverage, sponsorship and resources. The successes of the Australian women's cricket, basketball, soccer and netball teams have resulted in their gaining high-profile sponsors. Sponsors that have supported women's sporting teams in recent years include the ANZ Bank (netball), Westfield (soccer), the Australian Defence Force (basketball) and the Commonwealth Bank (cricket). Outstanding international performances by Australian female athletes have been rewarded with increased support from governments and the media. The article on page 278 discusses the newly formed ANZ Netball Championship and the changes it hopes to bring to the sport and its players.



Figure 15.3 The Australian women's cricket team, sponsored by the Commonwealth Bank

Critical inquiry

1 Examine Table 15.1, then complete the following tasks:

- a **Identify** the trends regarding female and male participation in sport and physical activity.
- b **Discuss** why males and females participate in different sports from each other.
- c **Outline** the implications that males and females participating in different sports may have for young players who wish to participate in sports that are not stereotypically associated with their gender, such as females playing rugby.
- d **Describe** the factors that influence young players to participate in particular sports.
- e **Explain** why some forms of activity have become traditionally associated with each gender.
- f **Analyse** the role that media outlets and public role models have in influencing the popularity of particular sports.

C'mon boys, give us a go

By Amanda Lulham

Sex sells, sport sells and Australian shooter Cath Cox believes sports fans of the opposite sex will soon be sold on netball as it enters a new era with the kickoff of the ANZ championship this weekend.

The NSW Swifts have the support, backing and admiration of the Sydney Swans but the high-flying netballers want more men to stand up and be counted during the inaugural league between Australian and New Zealand teams.

One of the most successful female sporting teams in Australian history, the Swifts, formerly the Sydney Swifts, have targeted a new kind of fan to swell their supporter base—of the male persuasion.

With the seven- to 17-year-old girls' market just about cornered, Cox is urging Australian sporting fans to become more like their New Zealand rivals and embrace 'sport in general'.

In New Zealand, top netballers are almost as recognisable as rugby league and rugby union players.

Recently, Northern Mystics' feisty mid-courter Temepara George was signed on as a contestant on New Zealand's *Dancing With The Stars* and a number of her colleagues are considered celebrities on and off the court.

Cox wants the Swifts and their Australian counterparts to be as recognised and respected on this side of the Tasman and fans to be as well-versed in the game as they are in New Zealand.

'In New Zealand fans are just generally fanatical about sport, male or female,' Cox said.

'We'd love to see that here as well, general sporting fans coming to the games.

'And we want the boys too.

'I think once they come and see the speed of the game, the bodies on the line, the bodies on the floor and just how hotly contested it is, they will be converts.



Swifts poised: (from left) Kimberlee Green, Catherine Cox, Selina Gilsenan and Susan Pratley

'We just want to get them to give it a try.'

Cox and her teammates make their first appearance in the semi-professional league on Monday night after being awarded the honour of hosting the first trans-Tasman match on Australian soil.

The match against Southern Steel is a clash of the reigning Australian and New Zealand domestic champions and the first opportunity for NSW fans to see the new colours and line-up of the Swifts side.

'I think we can get them,' Cox said of the side the Swifts beat by three in a pre-season tournament.

'We haven't had as much match-practice as we would have liked but we're ready to go.'

The Swifts will tune up for the game with a match-up against the NSW men's team this week.

The ANZ Bank's involvement with the new competition is believed to be the biggest sponsorship of women's sport in Australasia.

Top players sprinkled around the five Australian and five New Zealand teams are believed to be earning about $50,000 from the competition alone, with each team operating under a $268,000 salary cap.

Cox, part of the Australian team which defeated New Zealand for the world netball crown last year, believes Australian teams will be dominant forces in the championship.

Daily Telegraph, 4 April 2008

Critical inquiry

Examine the article on page 278. **Discuss** the impact of securing a major sponsor for the sport of netball and its participants.

The role of the media in constructing meanings around femininity and masculinity in sport

Sport is highly valued in Australian society, and large amounts of time and space are dedicated to sport in both the print and electronic media. How sport is represented in the media has the ability to affect our emotions, shape our values and determine our understandings of an event. Messages associated with masculinity and femininity are often portrayed by a media commentary, the positioning of an article, the wording of a headline or the focus of a photograph.

Women athletes in the media are primarily constructed as passive and supportive. Often, their athletic ability is reported as secondary to their looks, fashion sense and emotional response to their achievements. An example of this can be seen in the article on the right.

Language is a powerful tool used by the media, and it has the ability to influence the audience's perception of a situation. Women athletes have been represented in the media with descriptions that emphasise their physical attractiveness. Consider these examples relating to tennis and water polo from the *Daily Telegraph*:

- 'Glamour Ana' (19 December 2008)
- 'Sexy Ivanovic charms Sydney' (9 January 2008)
- 'Water babes' (22 August 2008)
- 'Courting battle of the babes' (19 June 2008)
- 'Champions put emphasis on clothing … sartorial stunners' (26 June 2008).

In contrast, males are represented in the media as active, determined and successful. Images of rugby scrums, male athletes engaged in mêlées (fights) on the field and male athletes with gritted teeth and bloodstained brows are common in the media. The language in the headlines below is typical of that used when reporting on male athletes:

- 'Warriors maul blues attack' (*Daily Telegraph*, 14 October 2008)
- 'FC shot down in a blaze of glory' (*Sydney Morning Herald*, 20 October 2008)
- 'Angry Storm vents full fury' (*Weekend Australian*, 27–28 September 2008)
- 'Dragons find their fighting spirit' (*Weekend Australian*, 26–27 April 2008)
- 'Clarkson's army enforcing defensive revolution … Hawks shaping for war' (*Weekend Australian*, 3–4 May 2008).

Open season on glamour as girls serve it up to Serena

By Will Swanton

A sporting catfight is set to start at the Australian Open between a group of millionairesses looking glamorous enough for a catwalk—and the leader of the pack is Serena Williams.

Williams has always transcended tennis as a global celebrity but, as she prepares for the four-way battle for the world No. 1 ranking at Melbourne Park from tomorrow, her rivals have begun chasing her in the fashion stakes.

Current rankings leader Jelena Jankovic has unveiled an airbrushed portrait fit for *Vogue*. Previously only Williams attempted to look so good in promotions.

The image makeovers are part of the WTA Tour's global *Looking For A Hero?* advertising campaign.

The campaign is being rolled out in 75 countries and features 30 players, led by Williams, Jankovic, Dinara Safina, Elena Dementieva and Serbia's immensely popular Ana Ivanovic.

'Tennis is a premier sport for all women athletes and I think it's a great opportunity to have the best athletes get together,' Williams said.

Williams's sister, Venus, is another glamazon with a stunning portrait. World No. 2 Serena and those directly behind her on the rankings, Russian pair Safina and Dementieva, can also overtake Jankovic at No. 1 at the Australian Open. Safina and Dementieva lived in the shadow of Russian stunner Maria Sharapova for years but they are forging their own identities …

Sun-Herald, 18 January 2009



Volley dollies: Serena Williams (left) will dress to impress in Melbourne from tomorrow. Right: Jelena Jankovic.

These descriptions reinforce the concept of sport being associated with warlike behaviour. In our culture, this is more likely to be associated with the behaviour of males than of females. Visual images of female athletes often target their sexual appeal. Camera angles focus on their body lines, and female athletes are sometimes required to pose in alluring positions. In print media, action shots of female athletes participating in their sport are rare, allocated space towards the back of the sport section, and are small in size.

Magazines utilise the female athletic body for marketing purposes. Photographs of athletes posing in swimwear are common in a variety of sports magazines. For example, *Inside Sport* and *Sports Illustrated* feature a new female model in swimwear on the cover of each issue. The photographs are large in size with the focal point being the female body.



Figure 15.4 'Looking good: Ana Ivanovic' is the caption that accompanied a photo of the tennis star that appeared with the article 'Ana Ivanovic a model player'



Figure 15.5 This photo of a match between the All Blacks and the Wallabies featured the caption 'Beasts of Eden: Auckland curse strikes as All Blacks savage Wallabies'

From the Glam Slam to the Lovely Links

Just days after Maria Sharapova and Ana Ivanovic contested their 'Glam Slam' tennis final, Australia's next generation of female golf talent turned on the glamour to promote the Women's Australian Open.

Rising stars Nikki Garrett and Kristie Newton frocked up on Melbourne's waterfront ahead of the Open … at the famous Kingston Heath layout from Thursday.

Like their tennis counterparts, the new wave of Australian women professionals have brought a vitality and style to their sport.

Garrett and Newton are representative of the new breed but they are aware that good looks and style mean nothing without golfing ability.

Garrett is the perfect example of beauty and talent. She won twice on the European Tour in 2007, finished 12th on the money list and was named rookie of the year.

Two weeks ago, she represented Australia, with Lindsey Wright, in the World Cup in South Africa.

Sydney's Sarah Kemp is another to fit the mould. The vivacious 22-year-old blonde has won her playing card for the 2008 US LPGA Tour, where she will take on world No. 1 Lorena Ochoa and hall of famers Karrie Webb and Annika Sorenstam.

This week, the new breed will test their skills against many of the world's best in a major tournament on a renowned and testing layout …

Daily Telegraph, 29 January 2008

Gold in glamour: Michelle Wie the latest to prove it pays to be beautiful

By Nick Walshaw

Michelle Wie has whacked golf balls into swamps, stormwater drains, even parked cars this past year … and bagged a tidy $14 million for her efforts.

In a spectacular case of sex really selling, *Golf Digest* this week announced American sensation Wie as the highest money-earner in women's golf.

Yep, the same teenager who broke par only twice in 2007. Who never scored in the 60s and made a cut just three times. In one memorable match, struggling with wrist injuries, she hit a parked car and stormwater drain with the *same* shot.

This is the millionaire who, despite grossing more than Australians Aaron Baddeley and Geoff Ogilvy combined, made just $11,029 swinging her own clubs …

Of course, these revelations will have sporting purists bemoaning the fact golf now has its very own Anna Kournikova. All body, beauty and bogeys.

Golfing experts will tinker with her swing. Shrinks doing the same with her brain.

Trying all those gimmicks once used on Kournikova, Mark Philippoussis and countless other beautiful folk from whom we demanded more.

Yet just like the Poo with his Ferraris and models, or Kournikova with her swimsuit shoots and film gigs, Wie will continue making millions.

Why? Because if the girl straddling her motorbike in those Chiko Roll ads taught us anything, it's sex sells.

It was Kournikova, remember, who signed a lucrative contract with Berlei sports bras seemingly hours after turning 18. Pictured half naked next to a catchline *Only the balls should bounce.*

In 1999 her dipping career earned only $800,000 on court but the most Googled woman on the planet still made $20 million in endorsements.

In comparison, world No. 1 Martina Hingis made $5 million on court and still couldn't catch her earnings.

Wie, who only cut her 18th birthday cake last October, made $10 million the instant she turned professional a week before her 16th birthday.

But more than just a good sort, this Stanford student also speaks fluent Korean, Chinese and Japanese. In 2006, *Time* magazine listed her among the '100 people who shape our world'.

Of course, those magazine titles can be as short-lived as the on sale dates …

Daily Telegraph, 17 January 2008

practical application

Femininity and masculinity in sport

In small groups, create a cartoon strip for a sports newspaper. The cartoon strip should consist of at least six scene boxes and needs to present male and female athletes in a non-stereotypical way. Publish the cartoon strips in the school newsletter or create an ongoing series and produce a cartoon book for viewing in the school library.

Critical inquiry

1. Note the photographs and captions on pages 279 and 280. **Discuss** how the media portray male and female athletes differently.
2. **Describe** how the values of Australian society are reflected in the way males and females are presented in the media.
3. **Justify** whether the media have the power and ability to change stereotypical images of males and females.
4. **Examine** the articles on pages 279–281. **Analyse** the media's role in the perception of women athletes.

Research and Review

1. Collect several sports articles from newspapers, magazines and/or the Internet, then complete the following tasks:
   - a. **Analyse** why men and women are represented differently in the media.
   - b. **Justify** the benefits to the media of representing men and women in this way.
   - c. **Discuss** how the words and images used to describe female and male athletes relate to traditional notions of being male and female.

Challenges to the male domain

Women's participation in sport and physical activity has been limited to certain sports, and for specific purposes. Women have traditionally participated in golf and tennis, and their participation has been for health and social reasons. Before 1948, women participated in only two Olympic sports: swimming and athletics. The women's marathon was not introduced into Olympic competition until the Los Angeles Games in 1984. Numerous practices have contributed to minimising the participation of women in physical activity and sport. These include the creation of by-laws regarding club membership, the celebration of feminine physiques and the encouragement of myths regarding biological inadequacy.

In recent times, the traditional boundaries of sport for men and women have been crossed. Today, women are become increasingly involved in sports requiring strength, body contact and risk-taking, such as rugby union, rugby league and boxing. These sports were once considered suitable only for males.

Much debate surrounds the entry of women into these traditional male domains, and the trespass of women onto male sporting territory has been met with hostility, and ridicule of their performances. Women's successes have at times been trivialised, and their athleticism viewed as compromising their femininity.

It was traditionally believed that the contact nature of some sports, such as rugby and boxing, was a sufficient deterrent for most women. However, increasing numbers of young women are joining the ranks of players in these sports. Women who participate in sports that are viewed as traditionally male are at risk of being the target of **homophobic** comments, and having their femininity questioned. Women who develop muscular bodies are considered to be abnormal, whereas muscle-bound males are objects of appeal.

Males are also participating in traditional female sports, such as netball. The pace of the play has enticed a large number of males to the game. However, few males encounter harassment as a result of their participation. The article below examines some of the perceptions of girls playing a traditional male sport.

Critical inquiry

1 Read the article below, then complete the following tasks:

- **a** **Discuss** why females have recently undertaken traditional male sports.
- **b** **Identify** the barriers that discourage girls from participating in traditional male sports.
- **c** **Propose** a variety of methods that may be utilised to overcome these barriers.

practical application

Challenging the male domain

Design a promotional campaign for a sport that females have traditionally not played. The purpose of the campaign is to encourage female students in your school to participate in this sport. Use posters and visual images in the form of a PowerPoint presentation and/or Photo Story of successful female players to increase student interest. Encourage female teachers to participate in the competition as either players or officials. Invite a successful female athlete of such a game to speak to the students or referee a game.

Alicia Eva is a match for boys

By Amelia Harris

… [Alicia Eva, a] Year 11 student at Sacre Coeur, plays on the ball and up forward for the East Malvern Junior Football Club in the youth girls (13 to 18 years old) competition.

She played in a premiership hat-trick from 2004–06 with her school team before it folded and its players drifted to the East Malvern Knights …

Eva, of East Malvern, said it was becoming more accepted for girls to play football.

'It depends who you come across,' she said.

'Some people find it really cool. They're like, "Oh, wow I wish I got into that".

'Then there are the people who are like, "Oh, that's a bit weird". They kind of believe it's a male's game.

'People are just accepting it's a game for both genders.

'I wouldn't go up to someone and say I play AFL football because there's always been that stereotype behind it (women footballers).' …

Eva began playing as a seven-year-old before joining the under-9s at East Malvern.

'Because my primary school was small it was a majority of boys,' she said.

'In Year 6 I only had eight people in my class and there were only three girls. We used to just join in and play footy with the boys.'

A joint winner of last year's league best-and-fairest, Eva is part of the 30-member Youth Girls Academy which meets monthly at Windy Hill.

'I feel kind of proud of everything because there are a lot of girls playing in the league now,' she said …

Herald Sun, 10 May 2008

what are the relationships between sport and physical activity and gender?

chapter summary

- Traditionally sport has been viewed as the domain of the male gender, with females playing a lesser, supportive role.
- Sport has played a large role in determining what it means to be male and female and, thus, characteristics associated with femininity and masculinity have developed into narrow and often stereotyped perceptions of gender.
- Traditionally women were discouraged from participating actively in sport as it interfered with society's gender expectation of women as homemakers and mothers. Medical professionals perpetuated the myth that physical exertion would harm women's reproductive function.
- Women who participated in team sports or sports requiring physical exertion have had their sexuality questioned.
- Young girls need positive role models, encouragement and adequate access to resources to ensure that sports participation rates for women continue to expand, particularly beyond sports traditionally associated with the female gender.
- Women's sports have traditionally lacked corporate support in terms of sponsorship as they have lacked the media coverage that has been afforded to male sports, but this is starting to change.
- The media have played a major role in the construction of meaning around femininity and masculinity in sport through their use of language and the images they select for portrayal.
- Women are challenging the male domain, with increasing numbers participating in male-dominated sports, such as the football codes.

revision activities

1. **Define** the terms 'masculinity' and 'femininity'.
2. **Distinguish** between the ability of sport to reinforce traditional notions of gender and its ability to challenge them.
3. **Outline** what needs to occur, in your opinion, to ensure women's participation in sport continues to expand.
4. **Describe** the impact that the media have had on the participation rates of women in sport and the perception of women's sport in society.

extension activities

1. Compile a media file consisting of a variety of articles that either demonstrate traditional meaning associated with femininity and masculinity in sport or challenge this notion.
2. Complete a Venn diagram to **compare** the entry of women into traditional male sports and the entry of men into traditional female sports. Consider the reaction of the public and media and its appeal to spectators and sponsors.
3. Research the participation rates of both women and men in a variety of sports. The participation can be in active playing roles as well as other roles, such as coaching. **Discuss** what these statistics demonstrate in terms of which sports are considered traditionally male and those considered traditionally female.
4. Conduct a class debate on the following topic. 'Men should stick to "male" sports and women to "female" sports'.

exam-style questions

1. **Assess** the ways that sport contributes to traditional notions of masculinity and femininity. (12 marks)
2. **Propose** a variety of ways that sport has the ability to challenge traditional, narrow understandings of gender. (8 marks)
3. **Evaluate** the role of the media in constructing meanings around femininity and masculinity in sport. (12 marks)
4. **Describe** how the social construction of gender can affect participation rates in sport. (8 marks)
5. **Discuss** how women have challenged traditional male sporting boundaries. (8 marks)



outcomes

A student:

- H8 explains how a variety of training approaches and other interventions enhance performance and safety in physical activity
- H13 selects and applies strategies for the management of injuries and the promotion of safety in sport and physical activity
- H16 devises methods of gathering, interpreting and communicating information about health and physical activity concepts
- H17 selects appropriate options and formulates strategies based on a critical analysis of the factors that affect performance and safe participation.

option

3 Sports medicine

coming up This Option explores the issues of prevention, assessment, management and recovery from sports injury. Students will learn about the classification and management of common sports injuries, and how these conditions are managed by sports medicine. Students will also examine the strategies and equipment designed to prevent the occurrence of injury. The Option emphasises the importance of correct treatment—both immediate and ongoing through the rehabilitation process.

FOCUS QUESTIONS

- How are sports injuries classified and managed? [page 286]
- How does sports medicine address the demands of specific athletes? [page 300]
- What role do preventative actions play in enhancing the well-being of the athlete? [page 312]
- How is injury rehabilitation managed? [page 334]



chapter 16

how are SPORTS INJURIES classified and managed?

This chapter examines the process of classification of sporting injuries. It then focuses on the assessment and management strategies that are appropriate for different types of sporting injuries based on their initial **classification**.

Ways to classify sports injuries

Sports or performance injuries can be classified according to either the cause of the injury or the type of body tissue damaged.

If injuries are classified according to *cause*, the three categories are **direct injury**, **indirect injury** and **overuse injury**.

If injuries are classified according to the *type of body tissue* damaged, the two categories are **soft-tissue** injury and **hard-tissue** injury.

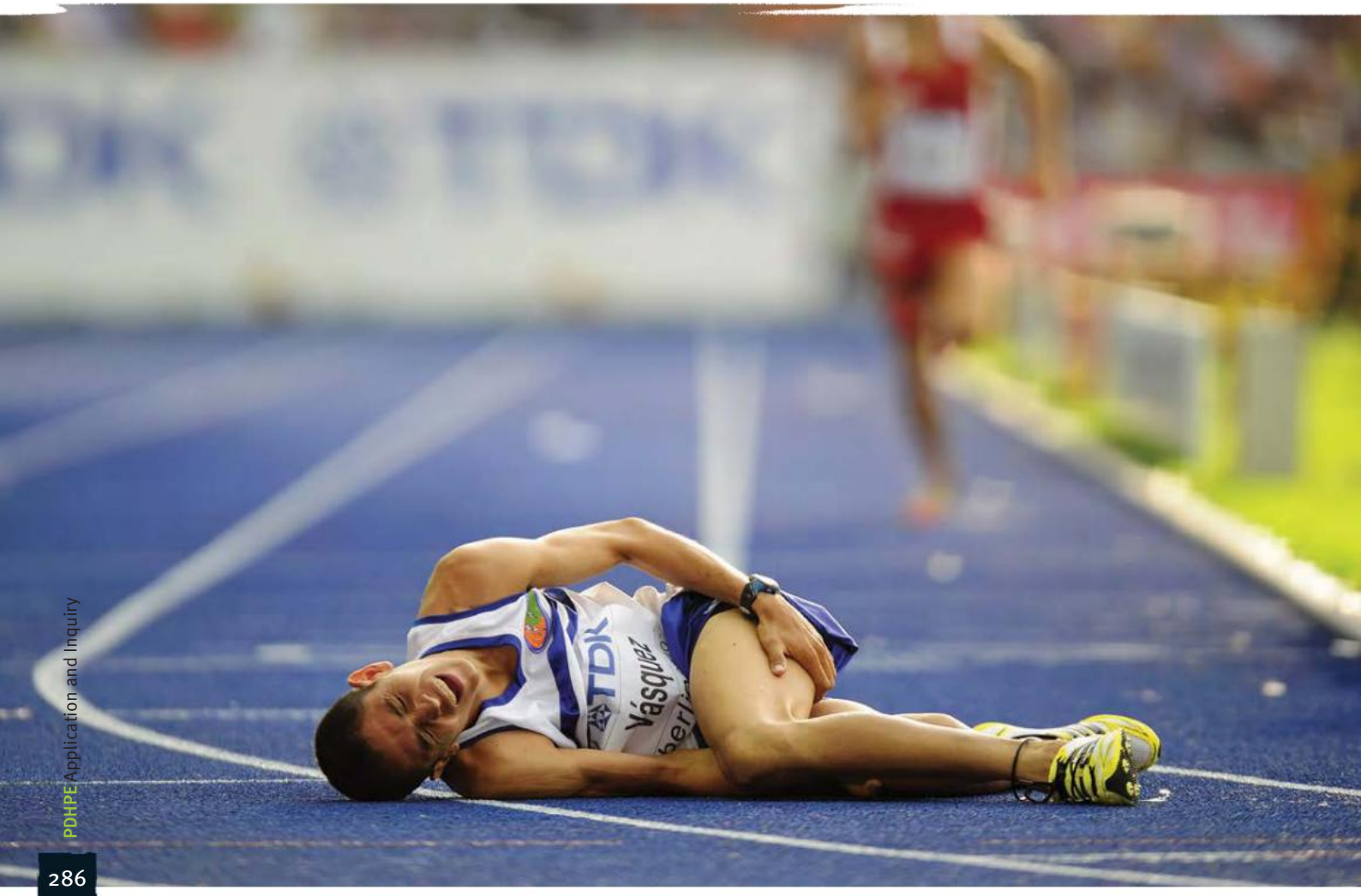




Table 16.1 Overuse injuries

Injury	Symptoms and signs	Possible causes	Management
Shin soreness	Tenderness Pain in shins Pain increases by running and jumping Swelling	Increased activity Poor footwear Postural imbalance Muscle imbalance	Decrease painful activity RICER Physiotherapy Correct footwear Orthotic control
Knee pain	Pain around knee Pain increased by sport, stairs, sitting, hills Swelling Discolouration	Increased activity Postural imbalance Poor footwear Muscle imbalance Growth spurt	Decrease activity RICER Physiotherapy Tape Correct footwear Orthotic control
Heel pain	Tenderness over heel Pain increased by running, jumping	Tight calf muscles Growth spurt Poor footwear	Decrease activity RICER Physiotherapy Stretching program Correct footwear Orthotic control
Shoulder pain	Pain on certain movements Reduced movement Local tenderness	Increased activity, e.g. swimming Poor technique, e.g. swimming, pitching, serving	Decrease activity RICER Physiotherapy Stretching program Exercises Modify activity
Elbow pain	Pain in and around elbow Pain increased by certain activities, e.g. shaking, lifting, gripping	Jarring Increased activity e.g. golf, tennis Muscle imbalance Poor technique Change of grip Lack of control	Decrease activity RICER Physiotherapy Stretching program Elbow brace Modify technique

Australian Coaching Council Inc.

RICER stands for rest, ice, compression, elevation and referral.

An orthotic control is a device placed in footwear to correct foot alignment.

Classification according to cause

Direct injury

A direct injury is caused by an external blow or force. Direct injuries can be caused by:

- a collision with another person (for example, during a tackle in rugby union)
- being struck with an object (for example, a cricket ball or hockey stick).

Examples of injuries that result from external forces include haematomas ('corks') and bruises, joint and ligament damage, dislocations and bone fractures.



Figure 16.1 Direct injury: hockey stick impacting athlete's body



Figure 16.2 Indirect injury: ligament sprain/strain

Indirect injury

An indirect injury can occur in two ways:

- The actual injury can occur some distance from the impact site. For example, falling on an outstretched hand can result in a dislocated shoulder.
- The injury does not result from physical contact with an object or person, but from internal forces built up by the actions of the performer, such as may be caused by over-stretching, poor technique, fatigue and lack of fitness. Ligament sprains and muscle strains and tears are examples of these injuries.

Overuse injury

Overuse injuries occur when excessive and repetitive force is placed on the bones and other connective tissues of the body. Little or no pain might be experienced in the early stages of these injuries and the athlete might continue to place pressure on the injured site. This prevents the site being given the necessary time to heal. Eventually the damage accumulates, and the injured site becomes inflamed, and therefore painful.

The symptoms of overuse injury often occur when there is a change in training practices (such as increasing training frequency or intensity), and the body is unable to deal with the new stresses that are placed upon it. A large number of overuse injuries results from poorly planned training programs in which the athlete is not given appropriate time to recover between intense sessions.

Other causes of overuse injury are use of poor technique and poor equipment. Athletes who practise and compete using poor technique or equipment place extra stress on their body. Examples of this include elbow injury from poor backhand technique or the use of a heavy racquet in tennis, and ankle or knee pain from an inappropriate running style or from wearing inappropriate footwear.

Examples of injuries that result from repetitive forces are stress fractures (small cracks in the bone) and tendonitis (inflammation of a tendon).

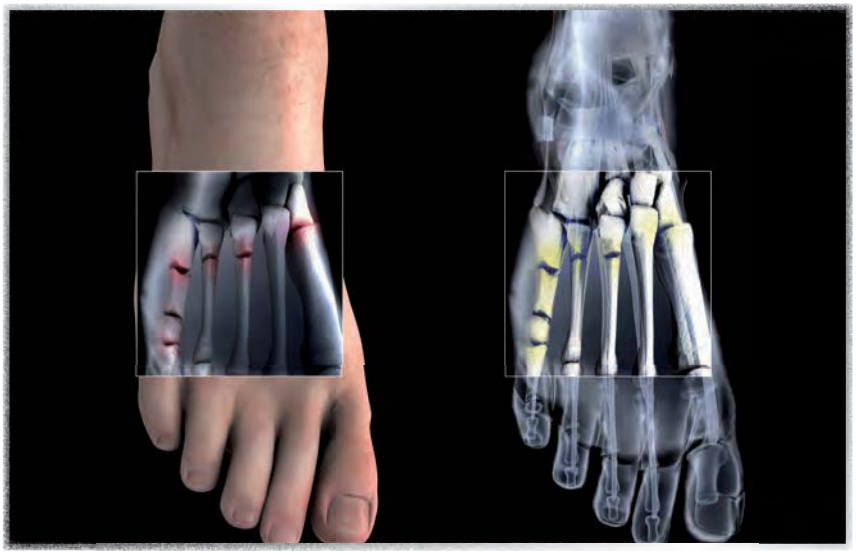


Figure 16.3 Stress fractures can result from a repetitive force

Classification according to tissue type

Soft-tissue injury

Soft-tissue injuries are the most common injuries resulting from participation in sport. They include the following:

- skin injuries—abrasions, lacerations and blisters
- muscle injuries—tears or strains of muscle fibres and contusions
- tendon injuries—tears or strains of tendon fibres and inflammation (tendonitis)
- ligament injuries—sprains and tears of ligament fibres.

Soft-tissue injuries can result in internal bleeding and swelling. Prompt and effective management of this bleeding aids recovery. Soft-tissue injuries are covered in further detail on page 290.

Tendons join muscle to bone while ligaments join bone to bone.

Table 16.2 Injury prevalence in AFL (missed games per club)

Body area	Injury type	
Head/neck	Concussion	0.3
	Facial fractures	0.7
	Neck sprains	1.1
	Other head/neck injuries	1.6
Shoulder/arm/elbow	Shoulder sprains and dislocations	6.4
	Acromio-clavicular joint injuries	1.4
	Fractured clavicles	1.8
	Other shoulder/arm/elbow injuries	1.5
Forearm/wrist/hand	Forearm/wrist/hand fractures	2.3
	Other forearm/wrist/hand injuries	3.1
Trunk/back	Rib and chest wall injuries	1.9
	Lumbar and thoracic spine injuries	2.8
	Other buttock/back/trunk injuries	1.7
Hip/groin/thigh	Groin strains/osteitis pubis	18.0
	Hamstring strains	24.3
	Quadriceps strains	5.6
	Other hip/groin/thigh injuries	5.5
Knee	Knee anterior cruciate ligament (CL)	15.9
	Knee medial CL or posterior CL	6.3
	Knee cartilage	9.1
	Other knee injuries	6.0
Shin/ankle/foot	Ankle sprains or joint injuries	7.1
	Calf strains	3.1
	Achilles tendon injuries	2.2
	Fractures/stress fractures of leg or foot	9.5
	Other leg/foot/ankle injuries	4.2
Other	Medical illnesses/non-football injuries	4.1
Missed games/club/season		**147.5**

Adapted from *16th Annual AFL Injury Report: Season 2007*

Osteitis pubis is an overuse injury to the groin region (inflammation of the pubis symphisis).

Hard-tissue injury

Hard-tissue injuries are those involving damage to the bones of the skeleton. They range from severe fractures and joint dislocations to bruising of the bone. A direct force can bruise a bone and cause bleeding between the outer layer of the bone and the underlying compact bone. This is common in a bone such as the tibia (shin) where there is little muscle tissue over the bone to absorb the force.

Bones have a blood supply and internal bleeding can result from a fracture. In major injuries, this internal bleeding in the bone, together with bleeding from surrounding damaged tissue, can lead to shock and serious circulatory complications. Hard-tissue injuries are covered in further detail on page 294.

Secondary injury

Athletes returning to activity are also at risk of a secondary injury, which is an injury that occurs as a result of a previous injury being poorly treated or not being fully healed. Athletes risk recurrence of injuries if they commence playing before regaining full strength and range of movement.

practical application

Classify sports injuries

1 Examine Table 16.2 (page 289), then complete the following tasks.

- a **Classify** the injuries in the table into direct and indirect injuries on the basis of their most likely cause.
- b **Discuss** how some of these injuries could be both direct and indirect.
- c **Classify** the injuries listed in the table into soft-tissue injuries and hard-tissue injuries.
- d **Identify** the injury that resulted in the most missed matches in 2007.
- e **Discuss** the possible reasons for the identified injury resulting in the most missed matches.

2 a **Identify** examples of direct and indirect injuries that might occur in the following sports:

- field hockey
- snow skiing
- cricket.

b **Classify** the injuries identified in task 2a into soft-tissue and hard-tissue injuries.

Critical inquiry

1 **Explain** why it is necessary to classify injuries.

2 **Investigate** whether injuries can be classified in other ways than those described above.

Research and Review

1 **Describe** the differences between direct and indirect injuries.

2 **Explain** how poor technique can cause an overuse injury.

3 **Define** soft-tissue injury and hard-tissue injury.

4 a **Clarify** what a secondary injury is.

b **Outline** how they can be prevented.

Soft-tissue injuries

Three common soft-tissue injuries are tears, sprains and contusions.

Tears, sprains and contusions

A *tear* is a disruption of the fibres of a muscle or tendon. This can be tiny and microscopic (often called a strain). A tear can also be more severe, and involve larger fibres of muscles and tendons. Tears (and strains) occur when a muscle or tendon is over-stretched or when a muscle contracts too quickly. The severity of the tear can range from the microscopic level (a strain), to a small number of fibres through to a complete rupture of all muscle fibres.

A *sprain* is a tear of ligament fibres, muscles or tendons supporting a joint. This can occur when a joint is extended beyond its normal range of movement. A sprain can involve a small number of fibres through to a complete rupture. In extreme circumstances, the fibres of the ligament, muscle or tendon can remain intact and rip from the bone.

A *contusion* or bruise is bleeding into the soft tissue. It is caused by a direct blow from another person, an implement or an object. A bruise can occur to any soft tissue of the body.

Skin abrasions, lacerations and blisters

Injuries to the skin are very common in sport. They include minor wounds, such as abrasions (grazes), blisters and small lacerations. They also include bone fractures and more serious lacerations that require suturing (stitches). Small skin abrasions, lacerations not requiring sutures and blisters are manageable conditions, and in most cases do not require referral to a doctor.

Skin abrasions occur when the outer layer of skin is removed, usually as a result of a scraping action. The open wound can contain dirt or gravel, which should be removed. More extensive, deeper abrasions require medical attention.

When the skin is lacerated (cut), the depth and location of the *laceration* will determine whether suturing is required. Medical attention is required if the laceration is deep enough to expose tissues, such as fat, tendons or bone. Sometimes a superficial laceration will require suturing. This can be required if the laceration is located:

- over a joint (such as the knee) because **flexion** will continually open the wound
- in a cosmetically sensitive position (for example, on the face).

Deep lacerations are usually accompanied by significant bleeding.

Blisters result from friction (rubbing). One layer of skin separates from another and a small pocket of fluid forms. Blisters can be caused by equipment, shoes, pressure from callus build-up, increased training loads or simply by the recommencement of training after an extended rest period.

A *callus* is a build-up of dead skin formed at a site where there has been frequent rubbing and pressure; for example, on the heel.



Figure 16.4 Skin abrasions occur when the outer layer of skin is removed

Inflammatory response

The initial stage of repair of body tissue is the **acute inflammatory phase**. It exists during the first 24 to 72 hours after injury. The immediate response of the body to injury is to increase the flow of blood and other fluids to the injured site. If blood vessels at the site are damaged there will also be direct bleeding into the surrounding tissue. The accumulation of fluid in the area causes an increase in tissue pressure, which produces pain.

All these changes produce what we call inflammation. Inflammation consists of redness, heat, swelling, pain and loss of function. If inflammation is left unchecked and persists for a long time, formation of **scar tissue** will be more severe.

The extent to which the formation of inflexible scar tissue can be prevented will, in part, determine the time required for rehabilitation of the injury and the degree to which normal functioning can be returned to pre-injury levels. Figure 16.5 (page 292) shows how stretching and the application of ice will limit the formation of scar tissue.

Managing soft-tissue injuries

In order to effectively manage soft-tissue injuries the RICER procedure needs to be followed.

RICER

The immediate management of soft-tissue injuries during the acute inflammatory phase is very important for successful rehabilitation after the injury. The aims of immediate treatment are to:

- prevent further tissue damage
- minimise swelling
- ease pain
- reduce the formation of scar tissue
- reduce the time needed for rehabilitation.

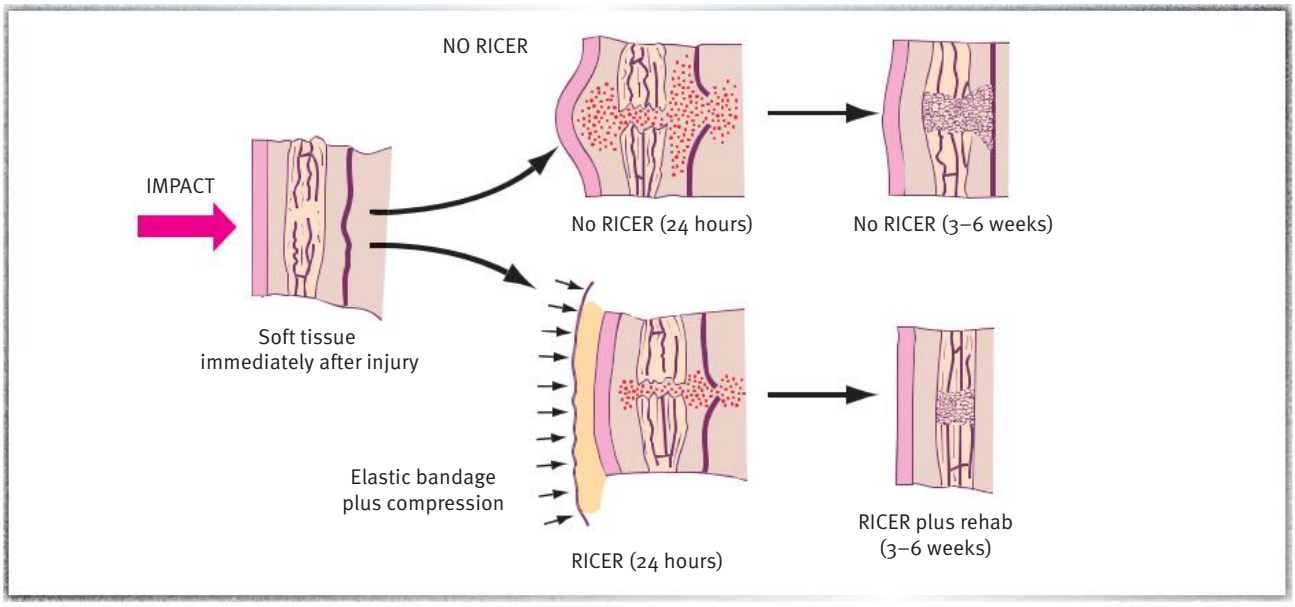


Figure 16.5 How RICER helps in the management of a soft-tissue injury

These aims are achieved through the application of the RICER procedure.

- **R** for Rest
- **I** for Ice
- **C** for Compression
- **E** for Elevation
- **R** for Referral.

Rest

The injured area must remain relatively inactive for the first 48–72 hours. The duration of the rest will depend on the severity of the injury.

Ice

The application of ice causes the blood vessels to constrict, thus decreasing circulation and resulting in less inflammation at the site. Where possible, ice should be applied to the surrounding area, in addition to the direct site. Ice should be applied in a wet towel for periods of 20–30 minutes every two hours for the first 48–72 hours. Do not apply ice, or a plastic bag containing ice, directly onto the skin. Care should also be taken when applying ice in the region of the eye.

Do not apply ice, or a plastic bag containing ice, directly onto the skin.

Compression

In addition to the application of ice, compression should be applied using a wide elastic bandage over the injured site and surrounding area. This will help to reduce the swelling by limiting fluid build-up (see Figure 16.5). It also provides support for the injured site. Care should be taken to ensure that circulation is not constricted by bandaging too tightly.

Elevation

Elevation of the injured part above the level of the heart reduces the volume and pressure of blood flow to the injured area, thus limiting inflammation. Elevation can be achieved for most injuries by supporting the injured area while the casualty is seated or lying down.



Figure 16.6 Rest, ice, compression and elevation of an injured ankle

Referral

Medical assessment should be sought as soon as possible to ascertain the full extent of the injury, and to commence appropriate rehabilitation.

Actions to be avoided

During the first 48–72 hours after an injury there are certain actions that must be avoided. These include the application of heat (for example, use of hot liniments, spas, saunas and hot baths), drinking alcohol, physical activity and massage. These actions all increase blood flow, and therefore swelling.

Immediate treatment of skin injuries

The aims of the immediate management of skin injuries include prevention of infection for both the victim and the first aider, minimisation of blood loss and tissue damage, and promotion of healing in order to reduce recovery time.

For most skin injuries the common management steps that should be followed are:

1. Reduce the dangers of infection (for example, by wearing gloves).
2. Control bleeding with rest, pressure and elevation.
3. Assess the severity of the wound.
4. Clean the wound using clean water, saline solution or a diluted antiseptic.
5. Apply an antiseptic to the wound (for example, Savlon or Betadine) after ensuring that the person is not allergic to the antiseptic to be used.
6. Dress the wound with a sterile pad and bandage.
7. If necessary, refer the person to medical attention.

Skin injuries that should be referred to medical attention include wounds that require suturing, wounds that show signs of infection or cannot be properly cleaned of foreign material and wounds to the head. The reason why all head wounds should be referred to medical attention is because even minor injuries to the head might be accompanied by concussion.

Concussion is a brain injury that is not usually considered life threatening.

Critical inquiry

1 a **Discuss** whether elevation is possible for all soft-tissue injuries.

b If elevation is not possible, **outline** other ways that blood flow to the area can be reduced.

2 If ice is not available, **identify** items that can be substituted.

practical application

Managing soft-tissue injuries

1 **Apply** the RICER procedure to the following soft-tissue injuries:

a sprained ankle ligaments

b corked thigh

c sprained thumb ligaments.

Research and Review

1 **Describe** the differences between a sprain and a strain.

2 **Explain** the acute inflammatory response.

3 **Outline** the aims of the immediate management of soft-tissue injuries.

4 **Identify** the problems that can sometimes occur at the 'ice' and 'compression' stages of the RICER procedure.

5 **Explain** what actions should be avoided after sustaining a soft-tissue injury.

6 **Identify** the common management steps that should be followed with skin injuries.

7 **Clarify** when a skin injury requires professional medical attention.

Hard-tissue injuries

Types of hard-tissue injuries

Hard-tissue injuries include fractures and dislocations.

Fractures

A **fracture** is a break in a bone. This can result from a direct force, an indirect force or repetitive smaller impacts (as occurs in a stress fracture).

If the skin over a fractured bone is intact, the fracture is described as 'simple' or 'closed'. If the skin over a fracture is broken, the fracture is described as 'open' or 'compound'. The skin might be broken either by the force of the injury that caused the fracture or by a piece of broken bone protruding through the skin. A fracture is described as 'complicated' if nearby tissues and/or organs are damaged.

In some cases, a simple fracture can be difficult to detect. The signs and symptoms of a fracture include:

- pain at the site of the injury
- inability to move the injured part
- unnatural movement of the injured part
- deformity of the injured part
- swelling and discolouration
- grating of bones.

Dislocations

Dislocations are injuries to joints where one bone is displaced from another. A dislocation is often accompanied by considerable damage to the surrounding connective tissue. Dislocations occur as a result of the joint being pushed past its normal range of movement. Common sites of the body where dislocations occur are the finger, shoulder and patella.

Signs and symptoms of dislocation include:

- loss of movement at the joint
- obvious deformity
- swelling and tenderness
- pain at the injured site.

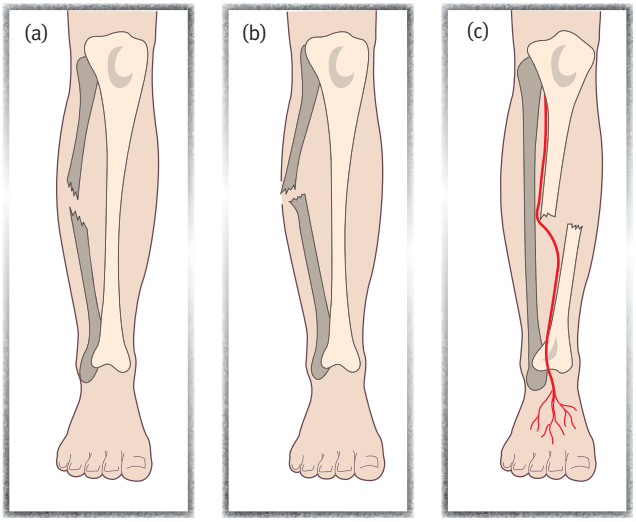


Figure 16.7 Types of fractures: closed (a), open (b) and complicated (c)



Figure 16.8 Splinting a leg fracture

Table 16.3 Types of fractures

Type of fracture	Definition	Associated factors
Closed	The bone is fractured but there is no cut or wound at the fracture site.	Bleeding remains concealed beneath the skin.
Open	A jagged end of the fractured bone protrudes through the skin or there is a cut near the fracture site.	Visible external bleeding occurs. Infection may enter the body and the bone through the cut. Infection will significantly delay healing and should be prevented.
Complicated	The fractured bone damages the local tissues; i.e. the organ(s) that it protects (e.g. a lung punctured by a fractured rib).	Seek medical assistance quickly as the damage to other structures may cause internal bleeding.

Managing hard-tissue injuries

Medical treatment

Because hard-tissue injuries can be accompanied by significant damage to muscle, blood vessels, surrounding organs and nerves, immediate medical treatment is required. For serious hard-tissue injuries, the person should not be moved, and an ambulance should be called. Immediate management in this situation is as follows:

- Immobilise and support the injured site with a splint or sling.
- Check for impaired circulation and other possible complications.
- Arrange for transport to hospital and professional medical assessment.
- Implement the RICER procedure—if it does not cause pain.

Immobilisation

Management of hard-tissue injuries aims to minimise movement of the injured area. This is achieved by immobilising the joints above and below the injury site. If the injury site is the shaft of a long bone (for example, the femur or humerus), the injury can be supported with a sling or splint.

A supporting splint should be long enough to extend beyond the nearest joints of the injured site. A splint can be another limb or another part of the body or a firm, straight object.

The correct application of the splint is essential. When correctly applied, a splint is secured at all these six points:

- above the joint above the fracture
- below the joint below the fracture
- at the joint above the fracture
- at the joint below the fracture
- just above the fracture
- just below the fracture.

In some cases of fracture, a rigid splint is unnecessary. In these cases, a sling or bandaging of the injured limb to the other limb is adequate.

With dislocation, immobilisation is also the immediate aim. Under no circumstances should the first aider attempt to relocate the dislocation. As a result of the dislocation there can be associated damage to the bones and to the ligaments of the joint. In most cases, an X-ray is needed before relocation. Any rushed attempt by the first-aider to relocate the dislocation might result in further damage to the joint.



Figure 16.9 A sling used where the fracture does not require splinting



Figure 16.10 An X-ray of a dislocated shoulder

practical application

Managing hard-tissue injuries

1 Using a variety of appropriate materials, **apply** a splint to fractures of the:

a tibia
b femur
c radius
d finger.

2 It is important to be able to discriminate between injuries that require immediate medical attention and those that do not. Using the knowledge gained so far through the study of sports medicine, **construct** a policy entitled 'Guidelines for Medical Referral'. This policy should list those situations where immediate medical attention for injuries should be sought.

Research and Review

1 **Describe** the various types of fractures.
2 **Identify** the signs and symptoms of a fracture and of a dislocation.
3 **Outline** what the immediate aim of management of a fracture and a dislocation is and how this can best be achieved.
4 **Explain** why a dislocation should not be relocated.

Assessment of injuries

It is important to follow correct assessment procedures when assisting an injured athlete.

TOTAPS

When attending to an injured athlete who is unconscious, the DRABCD action plan must be followed. If the athlete is conscious, the TOTAPS method of injury assessment can be used. This ordered procedure will provide information about the extent of the injury, and will indicate whether the person should be permitted to continue the game/performance or should be given professional medical help. TOTAPS stands for:

- **T** for Talk
- **O** for Observe
- **T** for Touch
- **A** for Active movement
- **P** for Passive movement
- **S** for Skills Test.

It is important to note that the control of bleeding takes priority over TOTAPS.

DRABCD stands for danger, response, airway, breathing, compressions and defibrillation.

Talk

Ask the athlete questions to gather information about the cause, nature and site of the injury. For example:

- How did the injury happen?
- Where does it hurt?
- Did you hear any snaps or cracks?
- Do you have any 'pins and needles'?
- Is the pain sharp or dull?
- Did you continue to play for any time?

For suspected concussion, the questions should be directed at discovering the athlete's alertness and level of consciousness.

If the athlete shows signs of serious injury (that is, spinal injury, a fracture or a dislocation) the person should be immobilised and professional help should be sought immediately. The first aider might also seek information on the injury history of the athlete (for example, previous injuries to the body part) and might talk to witnesses who saw the injury occur.

Observe

After questioning the athlete, visually examine the site of the injury. Look for deformity, swelling and redness. If the injury is to a limb, compare it with the corresponding area on the opposite limb. If there is obvious deformity, there is likely to be a fracture or serious ligament/tendon damage, and medical assistance is needed. If there is no deformity move on to the next stage of the assessment ('touch').

Touch

If there is no obvious deformity and the athlete is not especially distressed, feel the site of the injury. Using your hands and fingers, gently touch the site without moving it. If possible, feel the corresponding site on the other side of the body and compare the two sides. Note any differences in bone shape and skin temperature.

Observe the athlete's level of distress as you touch the injury. If touching the injury causes the athlete intense pain, the injury might be serious and medical diagnosis is necessary. If touching the injury causes only slight pain, move on to the next stage of the assessment ('active movement').

If there is evidence of a fracture or dislocation, the procedure is stopped at this point. Specific management for a fracture should begin.

Active movement

Ask the athlete to attempt to move the injured part. Observe the degree of pain. Also observe the extent or range of movement that is achieved by the athlete. If possible, compare it with the other limb. As the athlete moves, feel the injured site for any clicking or grating. If the athlete cannot move the injured site, or has only minimal range of movement, the RICER procedure is used, and medical assistance is sought. If the athlete can move without intense discomfort, proceed to the next stage ('passive movement').

Passive movement

If you have reached the passive movement stage, it is likely that the injury is not serious. A decision needs to be made as to whether or not the athlete should continue to play. The 'passive movement' stage requires the first aider to move the athlete's injured body part and determine how much pain-free movement is possible. If the athlete cannot have the injured part manipulated through the normal range of movement without pain, the first aider should not continue. RICER treatment should be administered. If the range of movement is normal, the athlete should be asked to stand.

Skills test

If the athlete can stand, have the person place pressure on the injured site by performing movements similar to those required in the activity to be resumed. For example, the athlete could run, hop, jump and push. If these actions can be completed, the athlete may resume the activity. For example, in the case of a touch football player being assessed for an ankle injury, you would ask the player to run forward and backward and change direction quickly as these movements are fundamental to the game.

Figure 16.11 Touch the injured site to help determine the seriousness of the injury



Table 16.4 A summary of the approach to an injured athlete

Step	Action
1 Danger	• Control dangers then assess injured athlete
2 Life threat	• Use DRABCD
3 Initial injury assessment	• Use STOP
4 Detailed injury assessment	• Use TOTAPS
5 Initial management	• Manage appropriately • Refer to health professional

Safer Sport

STOP stands for stop, talk, observe and prevent and is a fast on-field assessment.

practical application

Using TOTAPS

For each scenario outlined below, apply the TOTAPS procedure to determine the nature and extent of injury. Remember that medical help is to be sought when a serious injury is suspected. Prepare a table such as the one below, and complete it.

- Scenario 1: A hockey player goes in for a tackle and is involved in a heavy collision with another player. The player remains on the ground in intense pain, grasping the lower leg.
- Scenario 2: At a cross-country event, a participant cannot continue and is in obvious discomfort with a leg injury.
- Scenario 3: At a game of rugby union, a player remains lying on the ground after a ruck. The player is conscious and complains of pain in the spinal region.
- Scenario 4: You arrive at the scene of a cycling accident. The cyclist is attempting to remount the bike and continue the race, but has severely limited movement in one arm.
- Scenario 5: A 100-metre hurdler pulls up in the middle of the race and grasps his or her knee.

Step	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5
Talk: What questions would you ask the injured person?					
Observe: What are some of the injuries you would be looking for?					
Touch: Would you touch the injury? If so, how?					
Active movement: What things would you look for as the casualty moves the injury?					
Passive movement: Would you move the injured part? If so, how?					
Skills test: What skills would you require the athlete to perform?					

Research and Review

1 **Discuss** the value of following the TOTAPS procedure.

2 In the touch stage, **identify** what the first-aider should be feeling for.

3 a **Compare** the differences between active movement and passive movement in the TOTAPS procedure.

b **Discuss** why passive movement follows active movement.

4 At each stage of the TOTAPS procedure, **describe** some signs that require you to seek immediate medical treatment.

how are sports injuries classified and managed?

chapter summary

- Sports injuries can be classified by cause: indirect, direct or overuse. They can also be classified by tissue type: soft or hard tissue.
- Soft-tissue injury is the most prevalent type of injury in sport and it occurs to muscles, ligaments, tendons and the skin. Examples include tears, sprains, strains, contusions, abrasions, lacerations and blisters.
- The inflammatory response is the body's initial mechanism of tissue repair and occurs in the first 72 hours post injury. Blood and fluids flood the site, causing pain and inflammation.
- Soft-tissue injuries are managed using the RICER (rest, ice, compression, elevation and referral) procedure.
- The immediate treatment of skin injuries includes the control of bleeding, cleaning of the wound, application of antiseptic and dressing of the wound.
- Hard-tissue injury involves injury to bone. Examples include fractures and dislocations.
- The key to the management of hard-tissue injury is the immobilisation of the limb.
- Sports injuries are assessed using the TOTAPS (talk, observe, touch, active movement, passive movement and skills test) procedure.

revision activities

1. **Identify** a variety of sporting injuries that can be classified as:
   a. soft tissue
   b. hard tissue
   c. overuse.
2. **Describe** practices that should be avoided after receiving a soft-tissue injury.
3. **Outline** the procedure for the immediate management of skin injuries.
4. **Clarify** the difference between the assessment and management of sporting injury.

extension activities

1. Select a sport of your choice and research the most common injuries that occur within that sport. Use Publisher or a similar program to create a brochure or pamphlet in which you **summarise** the following:
   a. latest injury statistics
   b. classification of injuries sustained
   c. primary causes of injury
   d. preventative methods.

   Incorporate a variety of diagrams and graphs to visually represent the statistics you have found.
2. Compile a media file that contains a variety of articles about the injuries sustained by elite athletes. For each injury identified:
   a. **Classify** it according to cause and tissue type.
   b. **Outline** relevant management procedures.
3. Create a visual representation (such as a Vodcast) of the management procedure for:
   a. soft-tissue injury
   b. hard-issue injury.
4. Create a series of questions using content from this chapter that could be used as part of a game show such as *Jeopardy* or *Who Wants to be a Millionaire*. Use your questions to test your classmates' knowledge. Use a game show format.

exam-style questions

1. **Explain** how sporting injuries can be classified. (8 marks)
2. **Contrast** the management of soft-tissue injury and hard-tissue injury. (8 marks)
3. **Describe** the inflammatory response and the role it plays in injury rehabilitation. (8 marks)
4. **Assess** each step of the TOTAPS procedure and the role it plays in the assessment of a sporting injury. (12 marks)

chapter 17

how does SPORTS MEDICINE ADDRESS the demands of specific athletes?

This chapter focuses on the specific groups of children and young athletes, adult and aged athletes and female athletes. It explores each of these athlete groups in terms of the medical conditions and appropriate management strategies that are commonly associated with the group. It also explores the physical needs and appropriate exercise types for each group.

Children and young athletes

Exercise and play are important parts of a child's physical, mental and social development. Children and young people obtain the following benefits from participating in physical activity:

- enjoyment
- social interaction
- improved motor and communication skills
- greater aerobic fitness
- improved coordination
- increased strength
- development of self-esteem
- promotion of physical activity into adulthood.

WEB

Websites that give you further information in regards to sports-specific coaching and completing a Beginning Coaching General Principles course online can be accessed via www.oup.com.au/pdhpe12





Children are not little adults. They have specific physical capabilities, and special care should be taken when they are involved in sport. Young athletes cannot cope with the same level of training as adults. Intensive training can often be boring, restrictive and socially isolating for maturing young performers. Attention should be paid to their physical, mental and social health, and the pressures of performance should be minimised.



Figure 17.1 Considerations for young athletes

In 2008, Sports Medicine Australia (SMA) released a policy that outlined the safety guidelines for children and young people in sport and recreation. It identified 10 points that will help to ensure young people have a positive and safe experience when engaging in exercise and physical activity (see right).

10 points to remember

1. Clubs, schools and providers should ensure that they identify, manage and monitor the risks involved in sport and recreation activities.
2. An estimated 50% of all sports injuries are preventable.
3. Coaches should have at least an entry level qualification from a coaching course conducted by the National or State organisation of their sport.
4. A First Aider should be present at all sporting events with participants under 16 years of age. A Sports Trainer should be present at all sporting events with participants over 16 years of age. Any complaint of pain, tenderness, limitation of movement or disability should be promptly referred to a qualified Sports First Aider, Sports Trainer or medical professional for management.
5. Appropriate and properly fitted protective equipment, clothing and footwear should be used at all times.
6. The environment and facilities should be inspected and made safe before participation.
7. All coaches and teachers must be aware of the medical history and other commitments of participants. A pre-season medical and activity questionnaire should be completed by all participants and the current medical state of individuals should be taken into consideration prior and during participation. A medical clearance must be obtained from the treating doctor before any child or young person taking prescription medication participates in sport or physical activity.
8. Warm up, cool down and stretching should be included before and after all participation.
9. Activities for children and young people should be well planned and progress from easy to more difficult. Strength training can be safely introduced to young people provided it is carefully supervised. It should involve low resistance and high repetitions to avoid maximal lifts.
10. To reduce the likelihood of injury match the physical and mental maturity of the child to the level of participation, complexity of the task and the game rules.

Safety Guidelines for Children and Young People in Sport and Recreation, Sports Medicine Australia

Medical conditions

Children with certain medical conditions should avoid contact sports. These include children who:

- have an enlarged liver or spleen
- have only one kidney or one eye
- are haemophiliacs (people who have a hereditary disorder whereby blood does not clot properly)
- have suffered recent head trauma or concussion
- have undescended testes
- have *congenital spinal abnormalities* (for example, spina bifida).

Certain medical conditions will prevent participation in sport altogether. Some forms of congenital heart defects (a structural problem with the heart) might come into this category.

Medical conditions (including asthma, diabetes and epilepsy) may affect the athletic performance of any person. Children are not necessarily more likely to have these problems, but any athlete who suffers from these conditions should take certain precautions.

It is important for people—especially young people—who suffer from asthma, diabetes or epilepsy to inform their coaches or carers of their condition. This ensures that, if complications do develop, correct responses are more likely. Intensive activity appears to be one of the most important factors in causing problems in all three conditions.

A congenital abnormality is one that a person is born with.

Asthma

Asthma is a narrowing of the airways that makes breathing difficult. Strenuous physical activity can trigger an asthma attack in some sufferers. This is called 'exercise-induced asthma' and is very common among asthmatics. It can occur at the start of activity or during activity, but is most common at the end of exercise. Factors that make the condition worse include cold, dry air and exercise of significant intensity and duration. All asthmatic children should have a current asthma management plan that has been developed with a doctor.

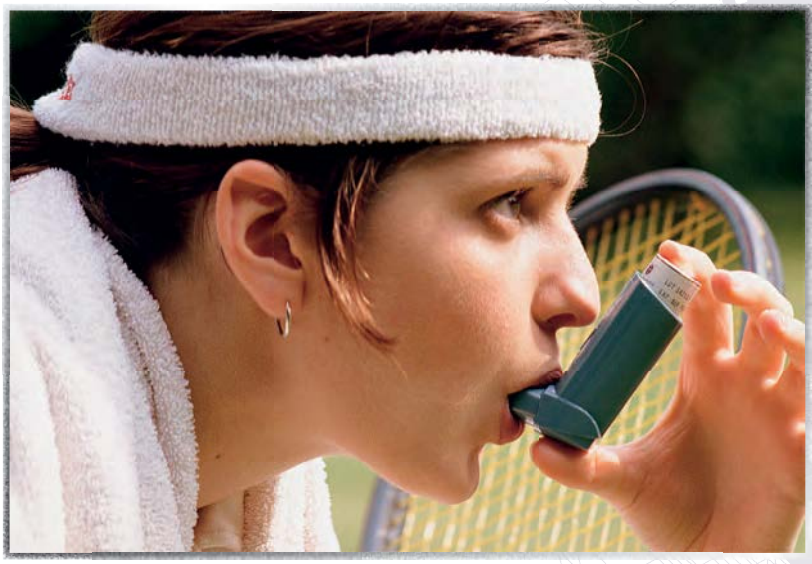


Figure 17.2 Strenuous physical activity can trigger an asthma attack in some sufferers

Many asthmatic children are encouraged to swim because the fitness gained through swimming greatly benefits asthmatics. Swimming encourages deep breathing. It also facilitates air to be breathed in just above the water's surface, which is already warmed and humidified. This minimises the risk of an asthma attack occurring.

Asthma does not appear to be a serious barrier to participation if care is taken. The following points should be noted when training asthmatics:

- Ensure the person has an adequate warm-up.
- Don't ask the person to perform if he or she has had an asthma attack recently.
- Provide opportunity for rest.
- Have the person use preventative medication, if necessary, and ensure it is with the person at all times.
- Take extra care in cold or dry weather, or if the person is suffering from a respiratory infection.
- Know the athlete's limits.
- Be aware of asthma management techniques and familiar with the individual person's asthma management plan.

Diabetes

Diabetes can occur in children and later in life. It can be controlled with a proper regimen of:

- diet
- medication
- exercise.

Participants with diabetes need to be aware of how to deal with their condition and the appropriate adjustments and responses that should be made if the above three variables change. Diabetic athletes should prepare themselves for the demands of training or participation by adhering to specific dietary requirements and by monitoring their blood glucose levels.

If diabetics engage in over-strenuous activity they can develop hypoglycaemia. This can cause collapse, and even unconsciousness. If the person develops hypoglycaemia and is still conscious, a glucose substance should be given. Suitable substances include glucose tablets, lollies and drinks. If a diabetic collapses during exercise, glucose should be given immediately, medical attention should be sought, and the patient should be kept calm and warm.

Hypoglycaemia is low blood sugar.

Epilepsy

Epilepsy is a condition characterised by seizures that make individuals unable to control their movements. A less severe form of the illness can cause people to have a temporary loss of awareness without a full seizure. Some cases of epilepsy are due to small areas of damage ('scars') in the brain but, in most cases, the exact cause is unknown.

Epilepsy can be treated with medication to reduce the incidence of seizures. When participating in physical activity it is important to know that fatigue and extremes of body temperature can trigger an epileptic seizure. Those supervising physical activity should keep a close eye on epileptics in swimming and boating activities.

If an epileptic episode occurs:

- Allow the seizure to occur unrestrained.
- Ensure there is a safe space around the affected person.
- Allow the person to rest after the seizure has ceased.

If the seizure goes for longer than 10 minutes, seek medical attention.

Overuse injuries

Until the age of about 11 or 12 years, boys and girls have similar strength and body proportions. This changes during the growth spurt, which takes place at around 11–13 years in girls and 13–15 years in boys. During the growth spurt, bones grow significantly, muscle mass increases and secondary sex characteristics begin to appear. Injuries in both pre-adolescents and adolescents are usually related to growth imbalances among bones, muscles and tendons. The growth plates of bones are especially affected. Bones can grow faster than muscles and tendons, and this can produce painful inflammatory conditions, especially during exercise.

Fractures are also common because children and younger people are more prone to falls and accidents. This is a result of their lack of experience and care in avoiding dangerous situations.

Injuries in children can be caused by:

- anatomical factors (**growth deformities**, congenital abnormalities and **malalignment** in diseases such as **scoliosis**)
- environmental factors (equipment, weather and playing surfaces)
- the nature of the training program.

Lower back injuries are common in young dancers, gymnasts and bowlers in the sport of cricket. Stress fractures can result from overuse. Children should not over-train, particularly on hard surfaces. To avoid overuse of particular muscles and joints, children should be allowed to play a number of sports, and to exercise in a variety of positions. Coaches and parents should help to avoid overuse injuries by ensuring appropriate conditioning and stretching programs are undertaken as well as ensuring correct footwear is worn for the sport being played.

Thermoregulation

Children are less **metabolically** efficient than adults. This is because of three important differences between children and adults: compared with adults, children have smaller limbs in relation to torso size, have less-developed sweat glands and have less muscular development.

Since children have smaller limbs in relation to the size of the torso, they have a relatively large skin surface area to body size. They have less fluid in their bodies and more opportunity to lose that small amount of fluid through their relatively large skin surface area. Children are thus much more likely to lose fluid and dehydrate than are adults.

Even though they have a relatively large skin surface area, through which they can lose fluid, children have less-developed sweat glands than do adults. They thus produce less sweat than adults. Because sweating is an important means of cooling the body, children are more likely to become overheated and suffer heat stress.



Figure 17.3 Children are more prone to dehydration and extremes of temperature than are adults

Because children have less muscular development than adults, they are less able to generate heat through muscular activity.

Because of the above three factors, children are more prone to dehydration and extremes of temperature (both hot and cold) than are adults. Therefore, children should not exercise for long periods of time (more than 30 minutes) in any extremes of weather conditions. They should be encouraged to drink small amounts of water frequently to replace any lost fluids, and to wear appropriate clothing.

practical application

Children and young athletes

Construct an original game for children to participate in that is active, fun and safe and takes into consideration their physical needs.

Appropriateness of resistance training

The best exercises for developing strength in children are those where they lift their own body weight. It is acceptable to use resistance training (using light weights and large numbers of repetitions), as long as it is closely supervised and correct technique is taught. Maximum lifting should be avoided because it can injure growth plates. Ensure there is an adequate warm-up. Resistance training sessions should be appropriately prepared and should focus on the development of skills and fitness, but without over-exertion.

Critical inquiry

Assess whether the health and social needs of young performers are met by sporting organisations.

Research and Review

1. Research a number of common injuries among children.
   - a **Examine** risk factors for these injuries.
   - b Suggest suitable methods to reduce the occurrence of such injuries.
   - c **Outline** current treatment strategies for each injury.
2. **Discuss** the role of a coach in determining who should do what exercises, play in certain positions or play particular sports.
3. **Describe** the benefits children derive from participation in physical activity.

Adult and aged athletes

The benefits of regular physical activity are evident throughout life, whether one is a junior netball player, a teenage swimming sensation, a 30-year-old sprinter or a 65-year-old 'golden oldie' rugby player. This section deals with adults of 30 years of age or more.

Masters (sometimes known as veterans) is a participation category for older athletes.

Important consideration must be given to the reasons for adults and older people continuing to play sports and maintain physical activity. Medical conditions associated with ageing also need to be considered, including coronary heart disease, high blood pressure, cancers, mental disorders, osteoarthritis (deterioration of joints), osteoporosis (brittle bones) and vision and hearing problems. These can reduce physical activity, and a reduction in physical activity complicates the normal process of ageing.

As a result of the ageing process, the ability to function efficiently decreases. This decrease might be due to disuse, medical conditions or simply 'wear and tear' on the body. Exercise programs aimed at developing strength, aerobic capacity, flexibility and coordination can improve the ability to function efficiently. This might not make people live longer, but it improves their quality of life and independence. Table 17.1 shows the physical changes that occur as a result of ageing, and suggests the benefits of exercise to the aged.



Figure 17.4 Olympic swimming champion Dawn Fraser continues her career at masters' titles

Table 17.1 Physical changes of ageing that are affected by exercise

System	Ageing change	Effects of exercise
Muscle	Loss of mass and strength Decreased power Decreased endurance	Losses can be minimised with exercise
Bone	Decreased total body calcium Loss of mineral content Increased brittleness Decreased mass Faster calcium loss in post-menopausal women	Regular exercise and good diet will decrease bone loss
Cartilage	Loss of elasticity (greatest loss in hip, knee, ankle and spinal areas) Increased osteoarthritis	Impact can worsen osteoarthritis Weight-bearing exercises can slow changes
Ligaments and tendons	Loss of elasticity Increased incidence of sprains and strains Decreased flexibility and range of motion	Stretching before and after activity will maintain flexibility Regular use will maintain suppleness and strength
Nervous	Decreased nerve conduction (function) velocity Decreased number of neurons and axons (cells in the nervous system) Decreased reaction time and speed Loss of vision and hearing	Reaction time and speed can be maintained by use
Cardiovascular	Lower max VO2 Less aerobic endurance Less anaerobic endurance Decreased maximum heart rate and **cardiac output** Decreased heart strength Increased **vascular resistance** Increased risk of coronary heart disease	Exercise can: • maintain max VO_2 • stop endurance loss • slow decrease in maximum heart rate • decrease risk of cardiovascular disease
Respiratory	Decreased maximal lung capacity Decreased air flow Decreased elasticity of lungs and chest wall Increased effort to breathe	Regular exercise will reduce changes

Adapted from Australian Coaching Council, *Beginning Coach: Level 1 Coach's Manual*, Australian Coaching Council Inc., Canberra; M Cross, N Gibbs & J Gray, *Sporting Body*, McGraw Hill, Australia; E Sherry & D Bokor, *Sports Medicine: Problems and Management*, Oxford University Press, UK

The goals of an exercise program for an older athlete should be to improve quality of life by increasing the person's aerobic endurance, strength, energy levels, balance and coordination and flexibility and assist in weight maintenance. The side-benefits are equally as important as the physical improvements. These side-benefits include improved self-esteem, independence and sleep patterns and greater social interaction and enjoyment.

The Australian Government, in conjunction with Sports Medicine Australia, in 2005 produced a document entitled 'Choose Health: Be Active' that is a physical activity guide for older Australians. Recommended activities can be viewed in Table 17.2 (page 306).



Cardiac output is the volume of blood that is pumped out of the heart per minute.

Vascular resistance is the resistance to flow that needs to be overcome to push blood around the body.



To view the document 'Choose Health: Be Active' in full, access it via www.oup.com.au/pdhpe12

Table 17.2 Examples of suitable activities and exercise for adult and aged people

What sort of activity should I be doing?	Some ideas to keep you moving	
Four types of activity are needed to keep you healthy.	**Try to include at least one activity from each group.**	
Moderate fitness activities These activities help to keep your heart, lungs and blood vessels healthy. You should aim to do 30 minutes of activity from this group on most days. This can be in three lots of 10 minutes or two lots of 15 minutes. If you are just starting out, as little as 10 minutes helps!	• Brisk walking • Continuous swimming • Golf (no cart!) • Aerobics • Cycling • Washing the car	• Walking the dog • Yard and garden work • Tennis • Water aerobics • Dancing • Mopping and vacuuming
Strength activities These activities help your muscles and bones stay strong and make it easier for you to do daily tasks as you get older. Make a time to do specific strength exercises two or three times a week, and build some of them into your everyday activities.	• Weight, strength or resistance training exercises • Lifting and carrying (e.g. groceries or small children) • Climbing stairs (instead of taking the lift or escalator) • Moderate yard work (e.g. digging and shifting soil) • Calisthenics (e.g. push-ups and sit-ups)	
Flexibility activities These activities help you to move more easily. They include gentle reaching, bending and stretching. If you stay flexible you will always be able to put on your own shoes and socks. Try to do some form of stretching every day—even if it is only while you are watching TV.	• Tai chi • Bowls (indoor and outdoor) • Mopping, vacuuming • Stretching exercises	• Yoga • Dancing • Gardening
Balancing activities These activities will improve your balance and help to prevent falls. Make a specific time each day to do these exercises, or fit them in whenever you can (e.g. while waiting for the kettle to boil)	• Heel raises • Standing on one foot	
If you can, also try to reduce the time you spend sitting for long periods.		

Adapted from 'Choose Health: Be Active—A Physical Activity Guide for Older Australians', Dept of Veterans' Affairs, Dept of Health and Ageing, Sports Medicine Australia

Heart conditions

As we age, our cardiovascular system becomes less efficient and this leads to a decreased ability to carry oxygen. Problems associated with this process can include a weaker heart, narrowed and less elastic blood vessels, and high blood pressure. The lungs are also less elastic, which makes breathing harder.

Participants in **aerobic** events are therefore those most affected by heart problems. Older athletes should avoid strenuous exercise and should exercise at approximately 60–75 per cent of their maximum heart rate. Older athletes become fatigued more easily, and take longer to recover, to travel over set distances and to perform tasks. Adequate time and consideration must be given when coaching. A wide variety of physical activities are suitable as they do not place excessive stress on the cardiovascular system. They include walking, cycling, golf and bowls.

Aerobic event participants are those most affected by heart problems.

Fractures and bone density

Bones that are more brittle and less dense will fracture more easily as a result of falls, impact from other people or objects or even sudden muscle contractions. Stress fractures are also common among athletes with reduced calcium, especially those women who are **amenorrhoeic** or have low oestrogen levels. Particular care should be taken with older females in avoiding contact sports and situations that involve sudden changes in direction. Bone development relies on physical activity, thus strength training (resistance training) should be an important consideration.

Flexibility and joint mobility

Flexibility decreases with age because of a loss in elasticity of tendons, ligaments and muscles. Effort should be made to keep joints supple and flexible so that the full range of motion is possible and so that tasks can be performed efficiently and effectively. Regular, gentle and slow stretching can achieve this. Participation in activities such as yoga and tai chi can also assist in maintaining flexibility. Swimming or exercise in an aquatic environment, such as aqua aerobics, is ideal for maintaining joint mobility. It also allows light stretching to be done in a non-weight-bearing environment. It is important for older athletes to maintain flexibility to assist with being mobile.



Figure 17.5 Aqua aerobics is ideal for maintaining joint mobility

Critical inquiry

1 Explore the physical activity options that are available for older people in your local community.

- a Create a table summarising these options.
- b **Assess** the suitability of these options.
- c **Outline** the activity opportunities that exist for older people with medical conditions.

practical application

Adult and aged athletes

1 **Construct** an email that could be sent to your local council suggesting some suitable physical activity options for older people.

2 **Apply** the FITT principle (frequency, intensity, time and type) for an older athlete who wants to begin an exercise program.

3 **Describe** the special exercise guidelines you would suggest for an older athlete.

Research and Review

1 **Describe** the benefits of physical activity for older people.

2 **Outline** the types of exercise considered suitable for older people.

3 **Identify** which sporting organisations in New South Wales offer opportunities for 'masters' participation.

Female athletes

It has taken thousands of years for the strength, power and competitiveness of female athletes to be acknowledged. Female athletes have come a long way: from total exclusion in the times of the ancient Olympics, to passive spectators in the early modern Olympics, and then to athletes (such as Jana Rawlinson, Lauren Jackson and Emma Snowsill) competing in the Olympics of today.

Participation in sport can achieve for women the same physiological, psychological and social benefits as for men. Much research over the years has focused on determining the health risks associated with females competing in intensive and strenuous activities and training. It appears that some specifically female problems do exist for some elite female athletes but, in general, women can play sport at any level until they wish to give it up. The challenge for science and sports medicine is to keep women on the field, achieving to their peak physical abilities, while maintaining good health.



Figure 17.6 Australia's Emma Snowsill in action

Eating disorders

Eating disorders and sport are often linked. This is because they share certain characteristics relating to weight control, food intake and physical activity. Because eating disorders are commonly associated with females, and because many female athletes are very concerned about their food intake and weight control, it is not surprising that questions have arisen about the possible relationship between eating disorders and physical activity.

In industrialised societies, the incidence of eating disorders (such as **anorexia nervosa** and **bulimia**) has increased remarkably. Approximately 5 per cent of women in these societies can be expected to develop an eating disorder at some stage in their lives. Many factors are thought to be involved in causing eating disorders. It appears that high-level physical activity can be a risk factor for eating disorders only if other predisposing factors exist; for example, poor self-esteem. It seems that the eating disorder is more likely to cause extreme exercise, rather than the other way around. Extreme exercise actually becomes a symptom of disordered eating, with exercise being undertaken only for the purpose of burning off fat, and for no other purpose. For some women, extreme exercise is a way of dealing with conscious or unconscious emotional conflicts, just as others may engage in extreme gambling or excessive alcohol consumption for the same reason.

Disordered eating leads to starvation and dehydration, both of which impair performance. Recognition and attention by loved ones and treatment by professionals, such as psychologists and nutritionists, is the best way to help female athletes who have eating disorders. Awareness of signs and symptoms is essential, and a multidisciplinary approach is necessary to treat the condition.

Anorexia nervosa is common among elite female athletes, particularly in those involved with 'appearance' sports (such as gymnastics, diving, ice skating and body building) and endurance sports (such as long-distance swimming, running and triathlon).

Iron deficiency

Iron is an important nutrient for the body and for good health. The amount of iron needed depends on the person's age, gender and activity level. For example, iron needs increase during periods of rapid growth (such as during pregnancy, childhood and adolescence), which is when new tissue is being built. Females need twice as much iron as males. This difference is mainly due to blood loss during menstruation; iron is a major constituent of blood. Female athletes also need more iron during training. Iron is also lost from the mother to her foetus during pregnancy.

A lack of iron (iron deficiency) is common in females, including athletes. (Iron deficiency also exists in males, but is much rarer than in females.) Iron is needed in the blood to carry oxygen and carbon dioxide, and in important muscular and energy-producing chemical reactions. Symptoms of low iron include lethargy, weakness and fatigue. A person with iron deficiency might describe a feeling of being 'washed-out'. (Anorexia nervosa is also a problem for men in weight-classification sports, such as wrestling, boxing and horse-racing.)



Figure 17.7 Iron absorption is best achieved from foods that contain haem iron.

Iron deficiency can result in anaemia (low blood count). Iron deficiency, even without anaemia, leads to a reduced rate of lactate clearance, which is the removal of the waste product lactic acid from muscle. The slower lactate clearance rate causes early fatigue. So it is clear that iron deficiency can affect athletic performance and training levels, which means it is important for the female athlete to be aware of this important mineral and maintain correct intake.

The recommended daily intake (RDI) of iron for adult females (aged 19–50 years) is 18 milligrams. (The RDI of iron for adult males is 8 milligrams.) All athletes should be encouraged to consume iron-rich foods. Good sources of iron are:

- meat, seafood and poultry
- legumes and nuts
- whole grains and cereals
- dark green, leafy vegetables
- eggs.

Iron absorption is best achieved from foods that contain haem iron. Red meat and meat alternatives (such as poultry and fish) are the best sources of haem iron. Iron absorption from foods that contain non-haem iron is much lower. Non-haem iron is mainly found in plant foods, such as cereals, vegetables, legumes and nuts. Iron absorption is improved when a source of vitamin C is consumed with the meal containing an iron source.

Bone density

Bone density refers to the thickness and strength of bones. Calcium deficiency is associated with osteoporosis and bone fractures in older females. Calcium is necessary for bone strength, and is also required in the blood to allow muscles and nerves to function correctly. Causes of calcium deficiency in bones include the hormonal changes associated with menopause (cessation of menstrual period), decreased exercise and inadequate amounts of calcium in the diet. Athletes with amenorrhea (cessation of menstruation when of reproductive age) are also prone to calcium deficiency because of decreased calcium intake or lower **oestrogen** levels—or both.

Nutritionists recommend that people of all ages should have an adequate calcium intake. The RDI of calcium for females and males (19–50 years) is 1000 milligrams, which would require consumption of at least two serves of calcium-rich food each day. After menopause, the RDI for women (aged 51 years and over) is 1300 milligrams.

Good sources of calcium are:

- milk
- cheese
- yoghurt
- fruit and vegetables (especially green leafy varieties)
- fish with bones (such as sardines).

Adequate calcium intake is essential for maintaining bone density. Athletes need to be mindful of maintaining adequate calcium levels so as not to affect bone density, which may lead to increased risk of injury. Children who do not have a sufficient intake of calcium during growth develop smaller bones with reduced amounts of calcium, and are more likely to develop osteoporosis as adults. Regular exercise—of a light to moderate intensity—is recommended for young females (children through to teenagers) as a means of decreasing the risk of osteoporosis in later life. Oestrogen is also very effective in maintaining bone density. In fact, oestrogen is more effective than increased dietary calcium in this regard. Low bone density is associated with amenorrhoea.

Pregnancy

Mild to moderate exercise is safe and beneficial for pregnant women. Many elite athletes have trained and performed at various stages throughout and after pregnancy with no apparent problems. Some have even performed better postpartum (after giving birth). Jana Rawlinson, for example, won the gold medal in the 400-metre hurdles at the 2007 World Athletics Championships just eight months after giving birth. Rawlinson trained throughout her pregnancy.

WEB

A comprehensive fact sheet produced by Sports Medicine Australia in relation to exercise and pregnancy can be accessed via www.oup.com.au/pdhpe12



Figure 17.8 Mild to moderate exercise is safe and beneficial for pregnant women

Exercise is contraindicated (that is, considered dangerous) in high-risk pregnancies; for example, for women who have experienced a miscarriage, a multiple pregnancy, premature labour or high blood pressure.

The following basic training guidelines should be followed by pregnant athletes:

- Do not start a new exercise program during pregnancy.
- Avoid vigorous exercise.
- Decrease exercise intensity as pregnancy progresses. It is widely recommended to maintain heart rate levels at no more than 140 beats per minute (bpm), but some athletes may be able to sustain 150–160 bpm as long as no ill-effects are felt.
- Avoid contact and collision sports and scuba diving, parachuting, water skiing and gymnastics.
- Avoid overheating and heat stress (such as may be experienced in saunas and poorly ventilated areas and during hot or humid weather).
- Thoroughly warm up and cool down—exercise gradually.
- Maintain adequate hydration.
- Advise the doctor of the intention to exercise.
- Be aware of the signs to stop exercising (for example, pain, bleeding, nausea or headaches).

Research and Review

1 a **Identify** at what stages during pregnancy women can exercise or play sport.

b **Outline** what types of exercise or sport would be suitable for pregnant women.

2 **Discuss** why it is important to assess the physical, psychological and social needs of all athletes.

3 Suggest some of the myths associated with women competing in sports.

4 Research the conditions that result from inadequate dietary consumption of iron (iron deficiency and anaemia) and calcium (osteoporosis) to determine the following for each condition:

a a concise description

b signs and symptoms

c preventative strategies.

how does sports medicine address the demands of specific athletes?

chapter summary

- Children with medical conditions such as asthma, diabetes and epilepsy should engage in physical activity and sport due to its many benefits, but should inform their coach of their condition.
- Children should stretch, wear correct footwear, undertake conditioning programs and avoid overtraining to avoid the risk of overuse injuries.
- Children are more prone to extreme temperatures than are adults and should not exercise for excessive time periods and in extreme conditions. Adequate fluids should be drunk and appropriate clothing for the conditions worn.
- Resistance training in children and young athletes is acceptable if they are supervised for correct technique and use light weights and low repetitions.
- Exercise for adult and aged athletes provides many positive benefits. Medical conditions associated with ageing need to be considered when participating. Exercise duration, intensity and type need to be examined for suitability.
- Exercise options for adult and aged athletes with medical conditions include swimming, aqua aerobics, walking, yoga, stretch classes and golf.
- Eating disorders, iron deficiency and poor bone density are conditions that can affect female athletes and impede performance. Athletes need to be mindful of nutritional requirements, particularly in meeting the RDI of iron and calcium.
- Exercise during pregnancy is safe and beneficial as long as there is monitoring of basic guidelines concerning exercise intensity, type of exercise chosen and environment in which the exercise occurs.

revision activities

1. **Outline** how exercise can be made both fun and safe and thus beneficial to the well-being of children.
2. **Assess** the appropriateness of resistance training for children and young athletes.
3. **Justify** the need for good nutritional practices for female athletes.
4. **Discuss** the impact that medical conditions such as heart conditions, poor bone density and joint immobility may have on exercise options for the adult and aged athlete.

extension activities

1. a Conduct a literature review examining the appropriateness of resistance training for children and young athletes.
   b **Justify** your thoughts on the issue.
2. **Construct** a fact file that could be given to a sports coach outlining the medical conditions of asthma, epilepsy and diabetes. Include a brief overview of the condition, the implications for participation in sport, preventative techniques and management procedures.
3. **Construct** a brochure, pamphlet or booklet that outlines the benefits of exercise for pregnant women and the guidelines for exercise that they should undertake. The publication should be created using Publisher or a similar program and be suitable for distribution in medical facilities or insertion in parenting magazines.
4. **Construct** a feature article that highlights the importance of good nutritional practice to the sporting performance of women. The article should be suitable for publication in a women's sporting magazine and be created using Publisher or a similar program.

exam-style questions

1. **Discuss** how medical conditions such as asthma, diabetes and epilepsy need to be managed so that young people can engage in sport and physical activity safely. (8 marks)
2. **Analyse** the impact of thermoregulation for children and young athletes participating in sport. (12 marks)
3. **Describe** the sport participation options that are available for aged people with medical conditions. (8 marks)
4. **Assess** the impact of iron deficiency and bone density on the participation of females in sport. (12 marks)

chapter 18

what role do PREVENTATIVE ACTIONS PLAY IN ENHANCING THE WELL-BEING of the athlete?

This chapter examines the role of preventative actions in enhancing the athlete's well-being. Being physically prepared, having sporting policies and a sport environment that ensures safety, and taking into consideration the effect of the environment can all assist in the prevention of injury.

Physical preparation

Physical preparation is essential to enhance the well-being of the athlete. It involves ensuring the body is ready for the activity it is about to undertake. Appropriate physical preparation is a major factor in the prevention of sports injuries. It involves:

- conducting pre-screening (or pre-exercise screening) to determine a starting point for exercise
- promoting the particular skills and techniques required
- developing physical fitness, with an emphasis on those fitness components that are specific to the individual athlete's performance
- following adequate warm-up, stretching and cool-down procedures.





Pre-screening

An important preventative measure to perform prior to commencing exercise is to determine the athlete's current fitness level and goals and also become familiar with the athlete's medical history. This is known as pre-screening and is usually completed as a questionnaire. Pre-screening provides a starting point for exercise. It also allows exercise programs to be tailored to the individual based on that person's needs. Pre-screening also assists in providing the athlete with individualised advice and information. This will minimise the risk of injury occurring.

An effective pre-screening questionnaire will consider age, gender, health status and previous experience in physical activity. Sports Medicine Australia (SMA) has developed a pre-screening system designed to identify people with a high risk for exercise-related complications. The questions posed in the SMA questionnaire can be viewed in Table 18.1.

Table 18.1 Pre-exercise screening system 2005: Sports Medicine Australia Stage 1 questionnaire

1	Have you ever had a heart attack, **coronary revascularisation surgery** or a stroke?
2	Has your doctor ever told you that you have heart trouble or **vascular disease**?
3	Has your doctor ever told you that you have a **heart murmur**?
4	Do you ever suffer from pains in your chest, especially with exercise?
5	Do you ever get pains in your calves or buttocks or at the back of your legs during exercise which are not due to soreness or stiffness?
6	Do you ever feel faint or have spells of severe dizziness, particularly with exercise?
7	Do you experience swelling or accumulation of fluid about the ankles?
8	Do you ever get the feeling that your heart is suddenly beating faster, racing or skipping beats, either at rest or during exercise?
9	Do you have chronic obstructive pulmonary disease, **interstitial lung disease** or cystic fibrosis?
10	Have you ever had an attack of shortness of breath that developed when you were not doing anything strenuous, at any time in the last 12 months?
11	Have you ever had an attack of shortness of breath that developed after you stopped exercising, at any time in the last 12 months?
12	Have you ever been woken at night by an attack of shortness of breath, at any time in the last 12 months?
13	Do you have diabetes [IDDM or NIDDM]? If so, do you have trouble controlling your diabetes?
14	Do you have any ulcerated wounds or cuts on your feet that do not seem to heal?
15	Do you have any liver, kidney or thyroid disorders?
16	Do you experience unusual fatigue or shortness of breath with usual activities?
17	Is there any other physical reason or medical condition, or are you taking any medication(s), which could prevent you from undertaking an exercise program or that you are concerned about?

Sports Medicine Australia

High-risk factors for exercise-related complications include:

- being aged over 35 years if male and aged over 45 years if female
- being overweight
- having high blood pressure or cholesterol levels
- having diabetes
- smoking
- not engaging in exercise in the previous 12 months
- being pregnant.

It is recommended that if anyone presents with any of the above criteria that a doctor be consulted prior to commencement of exercise. A medical clearance may also be requested by coaches and trainers.

practical application

Pre-screening

1 Use the questionnaire developed by Sports Medicine Australia (Table 18.1 on page 313) to screen a variety of people. Select people of both genders and from a range of age groups, ensuring at least one person is aged over 45 years.

a **Identify** any respondent who you consider to be high risk.

b **Outline** why you selected that person.

c Select one respondent (not necessarily a high-risk person) and **identify** the factors that you would need to consider when developing an exercise program for that person.

d Design a program for this person that could be used as a starting point for exercise. Consider the principles of FITT (frequency, intensity, time and type).

2 Visit a number of gyms and collect their pre-screening questionnaires. **Contrast** these to the one produced by Sports Medicine Australia.

Skill and technique

Many sports injuries occur as a result of poor skill or technique. The injury might be the result of a single direct blow (for example, poor head position when making a tackle in rugby league) or repetitive minor impacts (for example, stress fractures in the foot from poor running technique). The fact that poor technique can result in injury places extra responsibility on coaches to ensure that the players under their control are competent in the basic skills of the game, especially those relevant to self-protection.

A contact sport is one that involves direct blows to the body.

Correct skill and technique can prevent injury in all sports, but this is especially so in:

- Rugby, Australian football and boxing—Those with the correct skill and technique are less likely to be injured in these contact sports.
- Cricket—The batter with correct technique is less likely to be struck by the ball
- Volleyball—The well-skilled are at less risk of hand and finger injuries.
- Hockey—The well-skilled are less likely to be hit by an opponent's stick.



Figure 18.1 Correct (top) and incorrect (bottom) head position in a tackle

In some cases, the performer might have the correct technique. However, due to certain conditions and situations, movements might have to be modified for safety reasons. For example:

- Wet or slippery conditions require the athlete to move more slowly and with more control to prevent injury.
- In gymnastics, 'spotting' is used.
- In rugby union, the referee promotes scrum safety by controlling the engagement of the front row through the use of the crouch–pause–engage command.

The coach has a very important role to play in ensuring the safe movement of the athlete through the different stages of learning a skill. The coach breaks down the skill into smaller, more manageable components. This not only makes the skill easier to learn, but also safer to execute. A safe movement is a controlled movement, and athletes should never attempt movements if they are unsure or lack confidence.

In gymnastics, a spotter is an assistant who ensures the safety of the gymnast.

A safe movement is a controlled movement.

Physical fitness

Athletes can prevent injuries by placing special emphasis on developing the physical components specific to their activities. For example, netball players need to work on their speed, agility and hand–eye coordination as well as cardiovascular and muscular endurance. These priorities differ from the needs of marathon runners, who would place a much larger emphasis on developing endurance in their training.

All athletes need a certain degree of total body fitness. However, more specific needs of athletes vary from sport to sport, and also vary within a sport from position to position. Emphasis on these specific requirements reduces the risk of injury. For example, in the sport of rugby union, forwards would need to undertake a specific neck-strengthening program as they are prone to injury from scrums.

Individuals need specific physical preparation for various reasons including:

- a previous injury
- a medical condition
- a disability
- an identified personal playing weakness.

Coaches and trainers need to be aware of these individual needs, and must cater for these differences in their physical preparation programs.



Warm-up, stretching and cool-down

In any form of physical activity it is desirable to begin with a warm-up and to conclude with a cool-down (sometimes referred to as a 'warm-down').

Warm-up

A warm-up prepares and fine-tunes the body for physical training or competition. It is important that the warm-up focuses on the muscles and movements specific to the activity, although other areas of the body should not be ignored. A thorough warm-up lasts between 20 and 35 minutes, but it can be shortened or lengthened depending on climatic conditions.

The purpose of the warm-up is to:

- increase blood flow and oxygen to the active muscles
- increase body and muscle temperature
- stretch ligaments and muscles to permit greater flexibility and reduce the chances of injury
- assist mental preparation
- allow the athletes to commence the activity at their physical and mental peaks.

A warm-up is best structured into three main sections: easy exercise, stretching and vigorous exercise.

Easy exercise

The warm-up begins with some short, light exercise. This could include jogging, easy aerobics, light weights or cycling. The exercise should continue for about 5 minutes and should be intense enough to raise body temperature and a sweat.

Stretching

A thorough stretching routine should last for 10–15 minutes. A correct stretching exercise will:

- increase the length of the muscle
- reduce tension in the muscle
- increase blood circulation
- improve the range of motion at the joint.

These processes greatly reduce the chances of a new injury occurring or an old injury recurring. There are two types of recommended stretching exercises: static stretching and PNF (proprioceptive neuromuscular facilitation) stretching.

Static stretching involves gradually stretching the muscle to a position of mild tension. This position is held, without bouncing, for 10–30 seconds. During this time the tension in the muscle lessens.



A static stretch is held, without bouncing, for 10–30 seconds.

PNF stretching involves static stretching of the muscle followed by an isometric contraction. There are no movements, but the muscle is stretched by applying a force to an immovable object. The force should be applied for 6–10 seconds.

The following guidelines should be followed when stretching:

- Relax and stretch slowly.
- Breathe normally.
- Do not push a stretch to an uncomfortable position.
- Do not engage in ballistic stretching, which involves bouncing or stretching with jerky movements.
- Place special emphasis on the major muscle groups used in the activity and any muscles previously injured.

Vigorous exercise

The final 10–15 minutes of the warm-up involves more intense exercises that are specific to the activity and involve the full range of movement likely to be experienced. At this stage athletes add the final touches to their physical and mental preparation. The types of activity typical of this stage are:

- short and sharp sprints
- agility movements
- more intense upper body exercises
- modified games
- skill/technique drills.

It is necessary to allow a short recovery time of about 5 minutes between warm-up and performance.

Cool-down

At the completion of the physical exercise it is important that a cool-down routine is followed. The main purpose of this is to assist the body to adjust from the intense activity back to a normal pre-exercise state. During exercise, fluid builds up in the working muscles and the cool-down period allows this excess fluid to be drained from the muscles and redistributed around the body. A proper cool-down will reduce muscle soreness and tightness, and will therefore allow the athlete to recover more quickly.



The cool-down process is the reverse of the warm-up: it begins with intense activity that is gradually reduced.

The cool-down process is the reverse of the warm-up: it begins with intense activity that is gradually reduced. For example, the cool-down could consist of 2 minutes of jogging followed by 3–5 minutes of walking. This is followed by stretching exercises that are similar to those performed in the warm-up. As with the warm-up, extra emphasis is needed on the major muscle groups used, and on those previously injured.



Shoulder stretch



Seated hamstring stretch



Calf stretch



Rear shoulder stretch



Quadriceps stretch



Groin stretch



Hip stretch

Figure 18.2 Basic stretching exercises

Table 18.2 Principal diagnosis groups for sport-related injury cases: males, females and persons, Australia 2004–05

Principal diagnosis	Males		Females		Persons	
Injuries to the head	5 333	(18.4%)	1 147	(13.9%)	6 480	(17.4%)
Injuries to the neck	767	(2.6%)	225	(2.7%)	992	(2.7%)
Injuries to the thorax	812	(2.8%)	166	(2.0%)	978	(2.6%)
Injuries to the abdomen, lower back, lumbar spine and pelvis	1 290	(4.5%)	427	(5.2%)	1 717	(4.6%)
Injuries to the shoulder and upper arm	2 691	(9.3%)	603	(7.3%)	3 294	(8.8%)
Injuries to the elbow and forearm	5 072	(17.5%)	1 985	(24.0%)	7 058	(18.9%)
Injuries to the wrist and hand	3 583	(12.4%)	598	(7.2%)	4 181	(11.2%)
Injuries to the hip and thigh	859	(3.0%)	289	(3.5%)	1 148	(3.1%)
Injuries to the knee and lower leg	6 980	(24.1%)	2 331	(28.2%)	9 311	(25.0%)
Injuries to the ankle and foot	832	(2.9%)	246	(3.0%)	1 078	(2.9%)
Injuries involving multiple body regions	–	(0.1%)	–	(0.0%)	18	(0.0%)
Injuries to unspecified parts of the trunk, limb or body region	101	(0.3%)	26	(0.3%)	127	(0.3%)
Effects of a foreign body entering through a natural orifice	–	(0.1%)	–	(0.0%)	19	(0.1%)
Burns	–	(0.1%)	–	(0.0%)	37	(0.1%)
Frostbite	20	(0.1%)	11	(0.1%)	31	(0.1%)
Poisoning by drugs, medicaments and biological substances	9	(0.0%)	5	(0.1%)	14	(0.0%)
Toxic effects of non-medical substances	86	(0.3%)	49	(0.6%)	135	(0.4%)
Other and unspecified effects of external causes	401	(1.4%)	150	(1.8%)	551	(1.5%)
Certain early complications of trauma	76	(0.3%)	8	(0.1%)	84	(0.2%)
Total	**28 977**		**8 275**		**37 253**	

Source: C Bradley and J Harrison, 'Hospital Separations Due to Injury and Poisoning, Australia 2004–05', Injury Research and Statistics Series no. 47, Australian Institute of Health and Welfare, Canberra

practical application

Physical preparation

1 a Using the information in Table 18.2, **identify** the three body regions that most sporting injuries occurred to.

b For the three body regions identified, **discuss** the specific physical preparation strategies that could prevent injuries occurring in these body regions.

c For the three body regions identified, **describe** any strategies used in various sports that are designed to prevent injury occurring in these body regions.

2 Select a sport/activity and, in small groups, design and perform a warm-up and cool-down appropriate to the needs of that sport/activity. It must follow the format discussed earlier in this chapter and include stretching exercises and specific drills.

Research and Review

1. **Justify** the need for the use of pre-screening.
2. **Describe** how incorrect technique increases the risk of sports injury.
3. **Explain** the benefits of warming up prior to performance and cooling down post-performance.
4. Select one individual sport and one team sport with which you are familiar.
   - a **Contrast** the fitness components that need to be focused on as part of physical preparation to minimise injury in these sports.
   - b **Analyse** how preventative strategies and adequate preparation can be used to prevent injury in these sports.

Sports policy and the sports environment

The presence of sporting policy and a safe playing environment are two key areas in injury prevention in sport.

Rules of sports and activities

When participating in a sport, players must respect the rules that govern that sport. Players who disregard the rules place themselves and others at unnecessary risk of injury.

If the very nature of a game or activity is dangerous, there are likely to be stringent rules to help minimise the chances of serious injury. In rugby league, for example, rules governing tackling outlaw dangerous tackles, such as head high or spear tackles. Players will be penalised for committing these offences with either a yellow card and the sin bin or the red card and a send off. Responsibility is placed on the officials and coaches to ensure that the players under their control and care participate in the right spirit and do not intentionally infringe the rules.

In some sports where the environment can be dangerous to athlete welfare, rules exist to protect the athletes' well-being. The heat rule policy in tennis is examined in the articles below and on page 320.

Heat rule has players in dark

By Margie McDonald

It was more than just the heat causing confusion as Melbourne Park baked in mid-40°C heat—it was the Australian Open's controversial heat policy.

For the first time in this year's tournament Tennis Australia [TA] closed the roof on Rod Laver Arena while play was suspended on outside courts until 6.30pm.

The men's and women's doubles matches scheduled for Margaret Court Arena were moved over to Hisense Arena with its retractable roof.

The junior boys and girls singles, and legends doubles, on 14 outside courts were suspended as players and spectators alike fled to the shade, or the air-conditioning of on-site cafes and merchandise stalls.

On Rod Laver Arena, the early women's quarter-final match between Carla Suarez Navarro (Spain) and Elena Dementieva (Russia) was played with the roof open. The players were given a 10-minute break after the first set, when the mercury reached 39.6°C, so they could change their dripping clothes and get further hydration in the air-conditioned locker rooms.

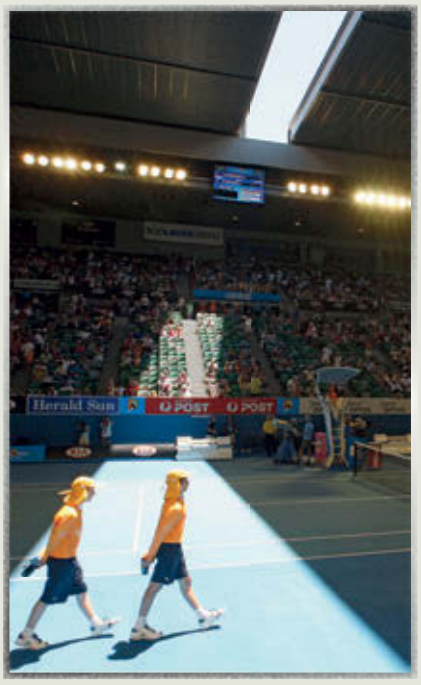
But the roof remained open when the players returned and Dementieva wrapped up the match 6-2 6-2.

It was later closed during the following quarter-final featuring Serena Williams and Svetlana Kuznetsova.

Dementieva, the world No 4, was a little confused as to why the roof was not closed before the match began if tournament organisers knew—as the rest of Victoria did—that Melbourne was set for heatwave conditions …

The reason it wasn't closed earlier was that TA's heat policy is driven by the wet-bulb globe temperature which the on-site meteorologist monitors until it reaches a dangerous level. That level is not contingent on the temperature alone but also considers on-court radiation and humidity …

The Australian, 29 January 2009



Cool change: The roof closes on Rod Laver Arena

Serena Williams shades fiery Russian Svetlana Kuznetsova

By Margie McDonald
While the rest of Victoria cursed the heat, Serena Williams was thanking her lucky stars yesterday after she moved into the women's semi-finals under the safety of the Rod Laver Arena roof.

Williams was losing the first set against Russian Svetlana Kuznetsova and struggling in the 40°C-plus temperatures when tournament referee Wayne McKewen decided to close the roof. The resultant break in play stole all the momentum the Russian had earned and Williams came back to win the quarter-final 5-7 7-5 6-1 …

Kuznetsova's frustration with Tennis Australia's heat policy spilled over to Fed Cup teammate Elena Dementieva, who had to play her quarter-final in 39°C heat.

The thermometer in the Williams-Kuznetsova match reached 44°C and the Rod Laver Arena roof was open during the first set, which Williams lost. But the American No 2 seed won the next two sets under a closed roof to progress to today's semis …

TA chief and Australian Open tournament director Craig Tiley joined McKewen in explaining that the roof can only be closed—and play suspended on outside courts—when a combination of air temperature, humidity and on-court radiation, or the wet-bulb globe measure reaches an 'index' of between 31 to 33.

Tiley said TA's heat policy came into operation in 2003 and was refined in 2007, with the input of the ATP and WTA which govern the men's and women's Tours. The magic figure was reached in the Williams match but not in Dementieva's.

'I think it's important to note also we're an outdoor championship. We take this very seriously,' Tiley said.

'We have a bureau on site that we get a minute-by-minute update of what the weather condition is. We don't make the decisions based on a forecast; we make the decisions based on what is actually happening.' …

The Australian, 29 January 2009

Critical inquiry

1. **Outline** how the rules governing tackling differ between the different football codes of soccer, Australian football, rugby league and rugby union.
2. **Describe** how the scrum rules in rugby union promote player safety.
3. Read the articles above and on page 319, then complete the following tasks.
   a. **Outline** the Tennis Australia heat policy and what occurs when it is invoked.
   b. **Analyse** how the above policy promotes safety for players, officials and spectators.

Modified rules for children

The modification of game rules for children has resulted in a lowering of the risk of injury to players. In some cases, this modification has involved the design of completely new games that develop the basic skills of the original games. Examples of these games are kanga cricket, mini basketball, mini/mod league, walla rugby and minky hockey.

Examples of rule changes include:

- kanga cricket—no fielder is allowed within 10 metres of the batting wicket
- walla rugby—no pushing in scrums and no lifting in line-outs.

In addition to the development of modified games, there are less extensive changes to the rules of adult games that are implemented at different age levels. For example, to prevent overuse injury in fast bowlers in cricket, players under 19 years of age are restricted in the number of successive overs they are allowed to bowl, and must be given adequate rest between spells.

practical application

Modified rules for children

1. Research a sport that has developed a modified game for children.
   a. Obtain the rules and equipment requirements for the modified game. Critically **analyse** these rules and requirements to determine the degree to which they promote safety.
   b. Present the findings to the class and/or participate in this modified game.

Matching of opponents

A child's readiness for sporting competitions can be measured according to the child's physical abilities (influenced by the person's age and size) or according to emotional readiness (such as maturity, social skills and ability to follow instructions). Opponents are generally matched according to age. From the point of view of sports medicine, factors other than age should also be considered. Variations in size and strength (growth and development), as well as motor skills should also be taken into account. Children should be matched against each other so that children develop their skills and have fun, rather than receive an injury and be disappointed, which can cause them to 'drop out' of sport. Proper consideration of needs will help to ensure the ongoing involvement of children, and an even competition.

Is Fotu, 9 and 85kg, too big for his teammates' boots?

By Louise Hall and Katie Benson
Parents are calling for the introduction of weight-restricted divisions in junior rugby league because of huge size differences between young players.

The increasing number of children of Pacific Islander background playing in local competitions has seen some players weighing up to 50 kilograms more than other kids in their own age group.

At an under-10s match in Sydney's west yesterday, nine-year-old Fotu Luani barrelled through opposition players, scoring three tries for Blacktown City. He was one of seven strongly built boys of Islander background in the team.

But parents from the opposing Colyton-Mount Druitt team called for boys such as Fotu, who weighs 85 kilograms and is 168 centimetres tall, to be put up into an older age group.

Donna Meyers, whose son Josh played against Fotu, said she was worried smaller kids could get injured when trying to tackle boys his weight.

'It's not his fault but he should be put up against players his own size,' she said.

But Fotu's parents, Monitana and Inoke Luani, who are from Tonga, said their son had always been bigger than normal but his skills were on par with other boys his age.

'I can understand the other parents, they don't want their son to be injured, but this is a game where you are working on skill not on weight and I think that's what it comes down to,' Mrs Luani said.

'My son is nine, 10 next month, and to put him in with the under-11s or 12s when they are more skilled than him isn't right.'



Blacktown City's Fotu Luani, 9, foreground

Fotu's coach, Jim Vanzwan, said Fotu could not be expected to compete against older boys with better fine motor skills.

He said Fotu used to be scared of tackling other players for fear of hurting them, but he had taught all his players the correct technique to avoid injury.

'It's not just his size that's got him where he is, he's really put in the effort to get himself fit and learn to tackle properly and he tackled his heart out today.'

Blacktown City parents said weight-based divisions could force players as young as nine to play against 18-year-old men.

'Mentally he's still a nine-year-old and if you watch the older teams play, they've got much more skill, whereas the under 10s just want to score a try,' said Carol Padden, mother of Joshua, 9.

Mrs Padden added that rugby league boosted the self-esteem of boys of Tongan, Samoan and Maori heritage.

Primary schools in the Penrith area successfully trialled a weight-restricted division last month.

As well as the usual age divisions, the Panther Trophy held a special competition for children under 48 kilograms.

Melanie Crinion, National Rugby League development officer with the Penrith Panthers, said feedback from parents, teachers and children had been overwhelmingly positive.

The Sun-Herald, 16 July 2006

Coaches and sports officials need to be aware that uneven competition can place competitors at unnecessary risk of injury. This can result from the matching-up of teams or players of different skill levels, or of different physical strength—the latter being especially dangerous. Coaches and sports officials must take into account that children grow and develop at different rates. Although their ages might be similar, children can have quite different physical strengths and capabilities.

In contact sports, the establishment of equal competition is of even greater concern. Some sports have taken this variation of children's maturation into account by allowing players of smaller physique to play under age.

In many competitions, a grading system that promotes even competition is in place. Unfortunately, this relies upon the competition having a sufficient number of teams or individuals, and in some areas, there are insufficient numbers of participants to implement such a scheme. A grading system that encourages even competition not only reduces risk of injury, but also promotes enjoyment and enthusiasm.

Critical inquiry

Read the article on page 321.

1 **Justify** whether some sports should return to a grading system based on physical characteristics (for example, weight) rather than on age.

2 **Discuss** the problems that might be associated with this approach.

Research and Review

1 **Discuss** how modified games improve safety.

2 a **Describe** how varying levels of physical growth and development influence safety.

b **Propose** a variety of ways that this problem may be addressed.

Use of protective equipment

Prevention is better than cure, and many injuries can be prevented by the use of appropriate preventative equipment. With professional sport becoming more financially attractive to the elite performer, the loss of potential earnings associated with injury provides motivation for the athlete to take every preventative measure available.

In most cases, the wearing of protective equipment is voluntary and the athlete takes personal responsibility for injury prevention. In supervising children, however, responsible adults have a duty of care.

The basic purposes of protective equipment are:

- to absorb and disperse energy from a direct blow (for example, mouthguards and helmets)
- to deflect a blow and protect against sharp instruments (for example, a chest guard in fencing)
- to limit excess movement (for example, studs in football boots and joint harnesses/braces).



Figure 18.3 Protective equipment must be fitted properly to the body

Apparel and protective guards

The most common pieces of protective equipment used in sport today are those designed to protect the head and neck, eyes, body, teeth and feet.

Helmets

Helmets should be worn (if the rules permit) where there is any risk of injury to the head from an external force. Sports that use helmets include cycling, motor racing, cricket, surfing, American football and ice hockey. For some of

these sports, the wearing of a helmet is compulsory, and for others this is voluntary. A helmet must be designed to protect the head, but must allow full vision and head movement. In rugby league and rugby union, a form of helmet can be worn that will offer protection to the head of the wearer, but not place other players at risk of injury should they come into contact with it.

Mouthguards

The majority of dental and jaw injuries can be prevented by the wearing of a correctly fitted mouthguard. A mouthguard will absorb and disperse the energy from a direct blow, thereby protecting the teeth and jaw. It will also absorb the shock of blows to the chin and decrease the chance of concussion. A mouthguard must be fitted by a dentist, and must fit comfortably without restricting breathing or the ability to talk.

Shoulder pads and shin pads

Shoulder pads and shin pads protect against bruising and soft-tissue injuries by absorbing the impact of a direct blow from an opposing player or a piece of playing equipment; for example, a hockey stick. To be effective they must be fitted properly to the body, and not restrict movement. Padding can also be worn on the knees and elbows (as in volleyball) and the chest (as worn by baseball catchers).

Joint harnesses and braces

To prevent joints extending past their normal range, the athlete can wear a protective harness or brace that will restrict joint movement. These are commonly worn for the prevention of shoulder dislocation. It is important that these braces are worn correctly and that movement is not restricted too much.

Footwear

In some sports, footwear, in addition to preventing injury, can make the difference between winning and losing. There are shoes on the market designed specifically for use in different sports.

Shoes should offer adequate support and traction to minimise injury. In many sports, the soles of the shoes are fitted with studs or sprigs made of metal or plastic. These shoes are worn in sports such as rugby league, rugby union, baseball, soccer and golf. They prevent the foot from losing traction and prevent injury by assisting the athlete to accelerate and change direction while maintaining balance and control. However, these boots can contribute to injury by anchoring the foot to the ground while the leg and upper body are forced in another direction. This can result in severe knee injury because the knee joint bears the major force of the twisting.

Proper footwear can prevent chronic (long-term) leg and foot injuries caused by repetitive impacts on hard surfaces (for example, stress fractures) in athletes who are involved in intense physical training, and in those who run long distances. To increase protection against repetitive impact injuries, the athlete can wear shock-absorbent inner soles. These shoe inserts disperse the forces from the running surface.

Poor footwear can cause shin soreness and other lower leg pain. They can also result in minor injuries, such as blisters.

Critical inquiry

1. **Explain** how the use of protective equipment in some circumstances can increase the risk of injury.
2. **Justify** whether the decision to use protective equipment should be left to each individual athlete.
3. If the use of protective equipment was made mandatory, **discuss** the barriers that might exist in implementing such a policy.
4. If the use of such equipment was not mandatory, **clarify** your thoughts on whether the use of protective equipment would decline.



Safe grounds, equipment and facilities

Grounds and facilities should be designed and maintained to provide a safe playing environment. Safe grounds are characterised by a level and firm playing surface that is free of obstruction. Any likely dangers must be appropriately covered or removed. Likely dangers include sprinkler heads and broken glass. Any fixture that is integral to the game, such as a goal or net posts, should be well padded for both training and playing. The ground should also be well secured from spectators, and positioned a safe distance from fencing or other obstructions. It should be well lit if required for play or practice at night.

In gymnastics, sufficient mat support is necessary to prevent injuries from falls. Equipment should be suited to the size and ability of the user.

When the nature of the surface is changed by weather conditions, additional dangers need to be assessed for injury risk.

Appropriate facilities should also be provided. Hygienic change rooms that are clean, tidy and of adequate size are required. A well-stocked first aid room is required for the immediate management of injury.

The safe design and positioning of fields and courts reduces risk of injury to participants. Courts and fields should be:

- positioned far enough apart to prevent games or players clashing
- positioned away from other dangers, such as roads, rivers, dams, cliffs, trees, fences, walls and buildings
- designed in a north–south direction to prevent the vision of players being impeded by the sun
- fitted with padding where necessary (for example, on goal posts)
- constructed on even ground and not have hard or rough surfaces (especially if contact with the ground is likely).

All equipment should undergo regular maintenance and safety checks. Large equipment (such as goal posts) should be securely anchored, stable and well padded. Temporary structures should be of sound construction and properly erected, especially if they are to support body weight.

Equipment should also be suited to the size of the user. Smaller equipment must also be properly maintained. Such equipment includes rubber grips on bats and racquets, and buckles and belts on safety equipment. Any protective equipment, should be properly fitted and in sound working order.

Ensure any posts are sufficiently padded and fields are level and free of obstructions.

practical application

Use of protective equipment

1 a **Identify** the protective equipment used in the following sports: baseball or softball; gymnastics; and snow-boarding or snow-skiing.

b **Describe** how the equipment identified on page 322–3 is correctly used.

2 a Participate in one of the listed sports in task 1 above ensuring all protective equipment is utilised.

b **Discuss** how use of this equipment enhanced your safety and well-being.

Research and Review

1 **Identify** the purposes of protective equipment.

2 a **Identify** three items of protective clothing that you believe are effective, and three items that you believe might not be effective.

b **Justify** your selections.

3 **Explain** how a mouthguard can decrease the chances of concussion.

4 **Describe** the factors that need to be considered in:

a the design of a playing field or court

b the provision of safe playing equipment.

Environmental considerations

The environment has the potential to have a negative impact on athlete well-being. A variety of preventative strategies can be used to minimise this impact.

Temperature regulation

The ability of the body to control its temperature is called thermoregulation. Major changes in the core temperature of the body can be extremely dangerous. Thermoregulation is achieved in the following ways: convection, radiation, conduction and evaporation.

Convection

Convection refers to moving currents of air. Body temperature is influenced by the flow of air across the skin, as in the cooling experienced from a fan. Cyclists gain a cooling effect through convection. In cold climates, strong air currents are a serious threat. This is commonly known as 'wind chill'. If the air currents are warmer than body temperature, the body will gain heat.

Radiation

Radiation describes the gain of heat from and loss of heat to the surrounding atmosphere. The body will lose heat when the atmosphere is cooler than the body; for example, in an air-conditioned room. The body will increase in temperature when the atmosphere is warmer than the body; for example, in a sauna or on a hot tennis court (as mentioned in the articles earlier in this chapter).

Conduction

Thermoregulation by conduction involves skin contact with an object of a different temperature. The body will lose temperature when in contact with a colder surface; for example, ice packs, snow, wet clothing or cold water. Conversely, the body will increase in temperature when in contact with a warmer surface; for example, a hot road, warm water or an electric blanket.



Figure 18.4 The body increases in temperature when in contact with a warmer surface, such as a hot road

Evaporation

As sweat evaporates from the skin, a cooling effect is achieved, thus releasing heat from the body. Evaporation is the most important avenue for heat loss from the body.

Critical inquiry

Examine how the four temperature-regulation mechanisms described above are supported in different sports and physical activity.

Climatic conditions

The climate can also have an impact on sporting performance. With the use of a range of preventative strategies and actions most negative impacts can be minimised.

Temperature, humidity, rain and wind

Air temperature and humidity are vital factors in thermo-regulation. If the air is dry and a breeze is blowing, sweat can easily evaporate off the skin. In these circumstances, the body's cooling system works efficiently. If humid and sunny conditions prevail, however, sweat does not evaporate as readily. Sweat drips off the body, and the cooling effect is reduced. When air temperatures reach above 25°C, caution is needed when exercising. If air temperature is high, especially if accompanied by high humidity, more serious health problems can result, particularly when endurance performance is required.

When air temperatures reach above 25°C, caution is needed when exercising.

Because the body's temperature-regulation mechanisms, particularly evaporation, might not function effectively in hot and humid conditions, hyperthermia can result. Hyperthermia is a serious condition in which the core body temperature has risen dangerously high. It is characterised by confusion, hot skin, headache, nausea and, in severe cases, collapse and coma. Urgent medical treatment is required.

Table 18.3 displays the risks associated with certain temperature levels and guidelines for sport activity management to ensure the well-being of participants. Establishing the wet-bulb globe temperature (WBGT) is useful when determining humidity levels. Risks and guidelines based on the WBGT are shown in Table 18.4. This measure is used at events such as the Australian Open Tennis in Melbourne. The use of this measure is also examined in the articles found earlier in the chapter.

Problems can also occur when engaging in physical activity in cold and windy climates. If air temperature is cold, strong wind currents can contribute to the 'wind-chill factor'. If appropriate insulating clothing is not available, this can produce a life-threatening situation. Extremely low core body temperature is called hypothermia.

Being exposed to cold water for a prolonged time also poses a serious health risk. Compared with air, water is a more efficient conductor. The body thus loses heat more quickly when immersed in water. Immersion hypothermia can occur when the body is immersed in cold water for an extended time.

Both hypothermia and hyperthermia are more likely to occur when there is a combination of extreme climatic conditions—heat and humidity (hyperthermia), or cold and wind (hypothermia).

Hypothermia and hyperthermia are more likely to occur when there is a combination of extreme climatic conditions—heat and humidity (hyperthermia), or cold and wind (hypothermia).

Tables 18.3 and 18.4 provide estimates of risk related to the weather and guidelines to managing activity in order to minimise heat stress. Table 18.3 is based on ambient temperature. It is easily understood and is most useful on hot, dry days. Table 18.4 is based on the WBGT. This index is useful when humidity is high.

Table 18.3 Ambient temperature

Ambient temperature (°C)	Relative humidity	Risk of heat illness	Recommended management for sports activities
15–20	–	Low	Heat illness can occur in running Caution over-motivation
21–25	Exceeds 70%	Low–moderate	Increase vigilance Caution over-motivation
26–30	Exceeds 60%	Moderate–high	Moderate early pre-season training Reduce intensity and duration of play/training Take more breaks
31–35	Exceeds 50%	High–very high	Uncomfortable for most people Limit intensity, take more breaks Limit duration to less than 60 minutes
36 and above	Exceeds 30%	Extreme	Very stressful for most people Postpone to cooler conditions (or cooler part of the day) or cancel

Heat stress increases with increases in air temperature but be aware that there are not clear demarcations in risk between temperature ranges. At relative humidity levels above those indicated in the table, stress increases markedly.

'Beat the Heat' fact sheet, Sports Medicine Australia

Table 18.4 Wet-bulb globe temperature (WBGT)

WBGT	Risk of heat illness	Recommended management for sports activities
Less than 20	Low	Heat illness can occur in distance running Caution over-motivation
21–25	Moderate–high	Increase vigilance Caution over-motivation Moderate early pre-season training Take more breaks
26–29	High–very high	Limit intensity, take more breaks Limit duration to less than 60 minutes per session
30 and above	Extreme	Consider postponement to a cooler part of the day or cancellation (allow swimming)

'Beat the Heat' fact sheet, Sports Medicine Australia

Critical inquiry

1 Access the Bureau of Meteorology website:

a Research how WBGT readings are determined.

b **Discuss** how the method of arriving at the WBGT differs from the regular temperature-reading method.

WEB

Access the Bureau of Meteorology website via www.oup.com.au/pdhpe12 to locate WBGT readings

Research and Review

1 **Define** thermoregulation.

2 **Describe** the four body-temperature regulation mechanisms.

3 **Contrast** hypothermia and hyperthermia.

4 **Identify** the climatic conditions that contribute to hypothermia, and those that contribute to hyperthermia.

5 **Explain** why the combination of heat and humidity and of cold and wind increase the likelihood of hyperthermia and hypothermia, respectively.

Altitude

Exercising at **altitude** can also affect the well-being of an athlete. Millions of people live with no apparent difficulty at altitudes greater than 3000 metres above sea level. They are able to work and exercise comfortably because they are accustomed, or **acclimatised**, to the conditions. At altitudes of around 1500 metres above sea level the ability to perform physical work is affected; and the higher the altitude the more severe the effect.

The highest mountain in Australia is about 2220 metres, and most people in Australia live well below 1500 metres.

Short-term **anaerobic** work is not affected by altitude, but longer-term aerobic performances are diminished in high altitude. This is due to hypoxia, which is a condition where an inadequate supply of oxygen is available to the body. At higher altitudes, atmospheric pressure decreases. The air is less dense; that is, each litre of air contains fewer molecules of oxygen. In technical terms, this is described as a lower partial pressure of oxygen. In this situation, a person would require more air in order to obtain the same amount of oxygen as would be obtained at sea level.

Max VO_2 decreases with increasing altitude. Up to moderate altitudes (less than 4000 metres) this is believed to be due to a decrease in the arterial oxygen content, because of a decrease in oxygen partial pressure. At higher altitudes, the decrease is explained by a decrease in cardiac output.

Lower humidity and air temperatures at altitude also create temperature-regulation problems in the body. It is recommended that athletes who need to perform at higher altitudes undergo acclimatisation to altitude to promote their well-being.

Pollution

The effects of air pollution on the well-being and performance of athletes can be viewed as detrimental. Few studies have been undertaken to determine these effects, however, and so many scientists remain unsure of the exact effects of air pollution. Lung function is particularly affected by air pollution. The pollutant carbon monoxide (found in car exhaust fumes) potentially reduces the delivery of oxygen to working muscles, which depend on oxygen to function efficiently. Polluted air inflames and irritates the respiratory system, which triggers asthma attacks, and high levels of pollutants can lead to respiratory illnesses.

Guidelines for fluid intake

Exercise leads to fluid loss. Maintaining hydration levels is important to the well-being of participants in physical activity. Thirst is a poor indicator of when fluid should be consumed. When we are thirsty we are well on the way to dehydration. If not hydrated adequately participants run the risk of becoming dehydrated. Dehydration impedes performance, contributes to fatigue and can lead to other heat-related illnesses, such as heat stress and heat stroke. Water is an excellent source of fluid replacement. Consumption of sports drinks containing carbohydrates and electrolytes should be considered in endurance-style events. Figure 18.5 shows the recommendations from Sports Medicine Australia in terms of how much fluid athletes should consume.

Acclimatisation

The hypoxia produced at altitude stimulates physiological adaptations that improve tolerance of the changed conditions, both at rest and during exercise. This process, by which the body adapts to the effects of altitude, is called acclimatisation.

The immediate responses to exercising at altitude are:

- hyperventilation (increased ventilation)—occurs within a few hours upon arrival at higher altitude, and stabilises after about one week
- increased cardiac output—due to changes in heart rate, not stroke volume (that is, the heart beats faster, rather than each beat pushing out more blood)
- increased blood pressure.

The longer-term adjustments involve:

- increase in the number of red blood cells and haemoglobin (in the first weeks)
- re-establishment of the acid-base (pH) balance of body fluids (in the first few days)
- changes to tissues and cells (after some time).

The longer someone stays at high altitude the better the person's performance becomes. When athletes who normally train or compete at sea level go to a higher altitude they will usually spend some time acclimatising before competing. The number of weeks spent acclimatising depends on the altitude. It is best done as a gradual process, with the athletes progressively moving to higher altitudes only when they feel comfortable to do so. Table 18.5 opposite suggests some rough estimates, but these will vary from individual to individual.

Adapted from 'Drink Up: Beat the Heat', Smartplay, Sports Medicine Australia, Victoria

Figure 18.5 Hydration guidelines provided by Sports Medicine Australia

Your Drink Up routine

- To avoid starting exercise dehydrated, drink plenty of fluids for several hours prior to exercise
- If you are well hydrated you should be able to pass a good volume of clear urine in the hour before exercise

- Drink at least 500 mL (2–3 glasses) ½ to 1 hour before exercise

- Drink at least 200 mL (1 glass) every 10–15 minutes during exercise

- During exercise take advantage of all breaks in play to drink up

- After exercise drink liberally to ensure you are fully rehydrated



How much fluid do I need?

- You can assess your fluid requirements by weighing yourself before and after exercise:
  – 1 kg lost = 1 L of fluid deficit
  – 2 kg lost = 2 L of fluid deficit
- Aim to keep fluid losses to a minimum by drinking before, regularly during and then after exercise
- Sweating and fluid losses continue after exercise. After exercise aim to replace at least 1.5 times the amount of fluid deficit, measured at the end of exercise.

For the first few days at altitude (above 3000 metres) many people will suffer from 'mountain sickness'. This usually results from ascending too quickly, rather than acclimatising gradually. Some people never acclimatise and continue to suffer from mountain sickness at altitude. Symptoms of mountain sickness include headache, nausea, vomiting, loss of appetite, loss of vision and insomnia.

Table 18.5 Approximate number of days to acclimatise at various heights

Height (m)	Days
2700	7–10
3600	15–21
4600	21–25

Descent to lower altitudes will help, but if the person remains at high altitude and the illness continues, even light exercise can be intolerable. The person may experience pneumonia-like signs and symptoms, such as breathing difficulties, headache and loss of appetite. In some cases, the disease can be fatal. Most people do not suffer extreme difficulties and instead gradually acclimatise.

The benefits of acclimatisation are lost within 2–3 weeks after returning to sea level. Acclimatisation will not solve all the problems associated with exercising at altitude. For example, max VO_2 will increase for some people, and decrease for others, after training at altitude.

When the heat is on

By Peter Ryan

The Western Bulldogs' preparation for this round's game against Port Adelaide in Darwin began four weeks ago when the players started their regular sessions in a temperature and humidity chamber to prepare for the humid conditions expected at TIO Stadium.

Players enter the chamber (commonly referred to as a heat chamber) for an hour session two to three times a week to acclimatise their bodies for the conditions expected in Darwin.

The Bulldogs set the heat chamber to 30 degrees Celsius with 60 per cent humidity. They set that temperature because they know that when the ball was bounced in Darwin last season, the temperature was 27 degrees with 65 per cent humidity.

Heat acclimatisation is important preparation for sport being played in humid conditions.

It causes players to sweat earlier in hot conditions. That's important because sweating is the most effective cooling mechanism a body has and keeps the core temperature stable at around 37 degrees.

More of the sweat produced is pure water too rather than electrolytes, allowing the body to maintain the important salts for longer.

Important metabolic changes also occur when players play in hot environments, causing them to use more of the body's stored glucose for energy.

Time in the heat chamber encourages the body to change its fuel source so, in simple terms, more work can be achieved using the same amount of fuel.

Such acclimatisation has been more common in individual sports but team sports are beginning to recognise its potential benefits.

The chamber has four exercise bikes and is about the size of the average uni student's lounge room.

During the eight-day break before the Collingwood game in round 13, players kept the exercise bikes at about 100 revs a minute, but with the six-day break before this game, the intensity was at around 75 revs.

Robert Murphy is confident it gives the club a slight edge when the team travels to Darwin. 'With my Irish blood, I need all the help I can get,' he joked.

Each player's body weight is measure before and after a session.

Nathan Eagleton said the players often put on weight during a session in the heat chamber, as they are so conscious of re-hydrating.

Players drink water, read the newspaper while they ride, and listen to music.

'We roll the legs and get the lungs moving a little bit so we're used to it when we train on Thursday before the game,' he said.

Sports scientist Dr Rob Aughey says the heat chamber reduces the potential negative impact extreme heat can have on performance, giving a team a relative advantage in the hot conditions.

Contrary to popular belief, players do not lose more weight than normal—a three per cent reduction in body weight is the norm—as the players and trainers are conscious of intervening to ensure hydration is maintained.

'Unchecked, we'd see five or six per cent reduction in body weight during the match and that has serious implications for performance,' Dr Aughey said.

The thinking behind the one match is enormous, revealing how hard four points are to win in modern football.

To allow for different sweat rates, each player has an individual nutritional strategy that allows for each person's unique characteristics.

Players are cooled down using cold towels, spraying mist over the players or standing them in front of a fan.

Dr Aughey can measure a player's core body temperature using an ingestible pill about the size of a vitamin tablet that contains a built-in thermometer and transmitter. Players swallow the pill and a reading unit is held next to them for a short space of time to get a reading.

Some players will immerse themselves in cold water before a match and at half-time. The players also understand that it is not advisable to wipe sweat off their body with a towel as some of its cooling value might be lost in the process. 'In preparation for one game, this is the most (lengths) the club goes to,' Eagleton said.

AFL Record, 27 June–5 July 2008

Many people believe that training at altitude can improve aerobic performance at sea level. This claim has not been fully supported by research. Some athletes show improvements, whereas others do not. The main problem is that the intensity required to improve aerobic capacity at sea level cannot be comfortably maintained at altitude.

Critical inquiry

1 Read the article on page 329, then complete the following tasks.

a **Outline** the preparation the Western Bulldogs undertook for their game in Darwin.

b **Describe** the strategies employed by these players and coaching personnel to ensure the well-being of athletes.

c **Assess** the impact of heat acclimatisation on the well-being and sporting performance of these athletes.

practical application

Acclimatisation

1 a **Construct** a chart showing the effect of altitude on heart rate and ventilation.

b **Explain** why these changes occur.

Research and Review

1 **Define** acclimatisation.

2 **Discuss** the physiological changes involved in the process of acclimatisation.

3 **Describe** how training at altitude would affect performance at altitude and at sea level.

4 **Outline** the effects that pollution would have on performance.

5 **Discuss** how hydration can be viewed as a preventative action in enhancing the well-being of athletes.

Taping and bandaging

Taping uses adhesive, often rigid, tape, while bandaging uses non-adhesive, often elasticised, bandages. Taping and bandaging are used in sports to prevent injury and assist in injury treatment and rehabilitation. For taping and bandaging to be effective, the trainer or strapper applying the tape must have a thorough knowledge of sports injuries. They must also have an understanding of the anatomy and physiology of the human body.

Preventative taping

Taping or strapping for injury prevention (known as prophylactic taping) involves the application of non-elastic adhesive tape that provides support and restricts any excessive movement that might result in injury. This type of taping can also be used to hold in place protective equipment, such as shoulder pads and shin pads. The use of taping for injury prevention is common in sports where specific injuries can be anticipated. Examples include:

- Volleyball and Australian football—Players often have their fingers taped to prevent dislocation and other tissue damage.
- Basketball and netball—Players tape their ankles to prevent ligament sprains and tears.

Remember that taping can never provide the joint with the same stability and support as are supplied by the body's natural supports; that is, connective tissues and muscles. Athletes should therefore be encouraged to undertake strengthening exercises for the sites of the body where injury is likely. They should not rely only on taping.

An additional advantage of taping is that when a joint over-extends, the tape pulls on the skin of the athlete, and this can make the athlete aware of the joint position more quickly. This will allow the athlete to initiate muscle action to correct the situation. Taping can also be used during the rehabilitation phase to provide strength, stability and support, thus preventing re-injury.

The following guidelines should be followed for effective preventative taping:

- Use tape that is the correct width and length for the body part.
- Avoid the use of elasticised bandages as they do not provide effective support.
- Ensure both the player and the person applying the tape are in a comfortable position.
- The person applying the tape must pull it from the roll and not use the player's limb as an anchor.
- Maintain an even pressure when applying the tape—if the tape is too tight, circulation can be restricted; if too loose, it will be ineffective.
- Maintain uniform application of the tape by overlapping the previous tape by about a half of the width on each turn.
- Once the tape is applied, ensure that circulation is not being restricted.
- Remove taping immediately after training or playing.

practical application

Taping and bandaging techniques

Using the most appropriate type of taping for your situation, practise the taping procedures for the ankle, wrist and thumb following the steps shown in Figures 18.6 and 18.7.



Positioning

Anchors provide a firm base to attach the other tapes

Stirrups – a vertical 'U' piece of tape, supporting either side of the ankle

Locking straps lock down the stirrups

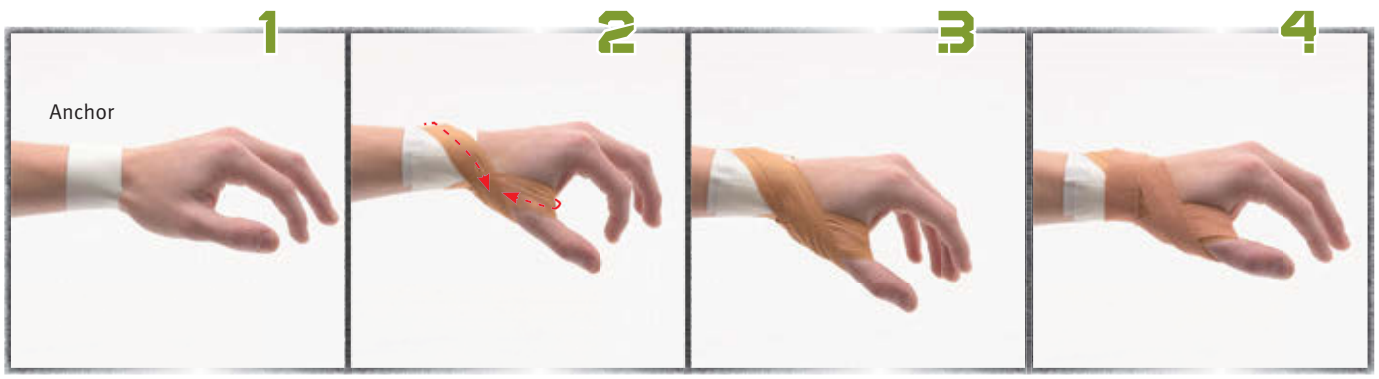


Figure sixes support and reinforce the ankle

Heel locks firmly lock in the ankle joint

Locking strap overwrapping closes down and secures the taping

Figure 18.6 Procedure for taping the ankle



An anchor provides a firm base to attach the other tapes

A spica is applied from the anchor on the back of the wrist, around the base of the thumb and back to the anchor on the palm side of the wrist

Two to four more spicas are added for further support

Locking straps to enclose the area around the wrist

Figure 18.7 Procedure for taping the wrist and thumb

WEB

Video of basic taping techniques can be accessed via www.oup.com.au/pdhpe12

Taping for isolation of injury

One of the major aims of taping is to limit movement, or allow only limited movement. When a joint has been injured, to prevent additional damage and to promote recovery, taping can be used to isolate or immobilise the joint. For instance, a sling can be applied to an injured shoulder. Attempts to limit the movement of an injured joint are not always effective. If done correctly, however, taping can isolate the joint and prevent any extreme movements that might have an impact on the healing process.



Apply triangular bandage to casualty | Tie off bandage at shoulder | Twist apex and tuck inside the sling securing elbow | Finished arm sling

Figure 18.8 Applying a sling to the shoulder limits movement and prevents further injury

Taping for immediate treatment of injury

As well as being used for rehabilitation, taping is used in the immediate treatment of injury. The dressings are usually elastic, but can sometimes be a combination of elastic and non-elastic. The most common uses of taping for immediate treatment of injury are:

- to control bleeding and prevent infection
- to apply pressure that will reduce swelling
- to immobilise and support an injured part.

Bandages applied correctly contribute significantly to the rehabilitation process following injury. If they are carelessly applied they will cause discomfort, allow possible infection and actually hamper the repair process.

practical application

Sports safety plan

1 You have given been responsibility for reducing the incidence of sports injuries in your school. Create a sports safety plan that will include a list of initiatives under each of the following three headings ('the three Ps'): policy, people and property.

a Make such a list of initiatives, with the initiatives listed under the three headings above.

b **Describe** which of your initiatives you would consider as being absolutely necessary.

c **Outline** which of your recommendations are less important, and are thus 'recommendations'.

Present your policy to your classmates. Include a variety of technology to enhance your presentation to make it visually stimulating and interesting.

Research and Review

1 **Evaluate** the role that taping plays in both the prevention and treatment of injury.

2 **Identify** the benefits of using taping in the rehabilitation of sporting injury.

3 **Discuss** why elasticised tape is not effective to support an injury.

what role do preventative actions play in enhancing the well-being of the athlete?

chapter summary

- Pre-screening of participants prior to exercise is an important preventative measure allowing identification of medical conditions and previous experiences related to exercise.
- Methods of physical preparation that ensure the well-being of the athlete are ensuring utilisation of the correct skill and technique for the sport and targeting the appropriate fitness components during training.
- Warm-up, stretching and cool-downs are essential for all physical activities and are preventative actions that play an important role in minimising injury.
- Certain rules of sports and activities have been designed primarily to ensure athletes' well-being.
- Modified rules and sports have evolved for children to ensure their safety and well-being and provide greater enjoyment for children.
- The sporting environment needs to be inspected regularly and be maintained so as to ensure that participant safety and well-being are catered for.
- The use of protective equipment by participants is strongly encouraged or enforced to minimise the risk of injury.
- Environmental and climatic considerations must be considered to maintain athletes' well-being. Athletes need to employ strategies to regulate the body's temperature-control mechanisms: convection, conduction, radiation and evaporation.
- Maintaining adequate fluid intake is an important preventative action to ensure well-being of athletes and maintain athletic performance standards.
- Acclimatisation involves becoming accustomed to the conditions in which you will perform.
- Taping and bandaging can be utilised in three ways: to prevent injury occurring (prophylactic), to isolate or support an injury or to immediately treat an injury.

revision activities

1. Select one sport with which you are familiar. **Describe** the preventative strategies to use to prevent injury when participating in this sport.
2. **Clarify** the impact of altitude on sports performance.
3. **Discuss** the importance of establishment of and adherence to sports policies and rules to promote safe participation in sport.
4. **Outline** the methods of thermoregulation used by the human body.

extension activities

1. Select a sport with which you are familiar. You have been given the job of head coach. Write a report that **outlines** the preventative strategies and physical preparation that will assist in maintaining the well-being of your athletes.
2. Design your own modified game for young children with the aim of keeping children active and helping them to have fun, as well as keeping them safe.
3. a. Research the following illnesses that relate to exposure to high temperatures: heat cramps, heat stroke and heat exhaustion.
   b. **Outline** the signs and symptoms and treatment of each condition.
   c. **Discuss** the impact that each condition may have on the well-being of athletes.
4. **Construct** a poster, pamphlet or booklet that summarises the correct taping methods for the ankle, wrist and thumb. Use Publisher or a similar program.

exam-style questions

1. **Analyse** the importance of physical preparation in the prevention of injury. (12 marks)
2. **Justify** the need for sports policies and rules and safe grounds, equipment and facilities to ensure the well-being of those participating in sports. (12 marks)
3. **Explain** the strategies an athlete could employ to ensure the body's temperature regulatory mechanisms function efficiently. (8 marks)
4. **Assess** the impact of climatic conditions on safe sporting participation. (12 marks)
5. **Explain** the guidelines for fluid intake. (8 marks)
6. **Evaluate** the role of taping and bandaging in the prevention and treatment of sporting injury. (8 marks)

chapter 10

how is INJURY REHABILITATION managed?

This chapter examines the process of managing rehabilitation from sporting injury. It also explores the determinants or indicators that show when an athlete is physically and psychologically ready to return to play.

Rehabilitation procedures

Rehabilitation after injury can take some time depending on the type and severity of the injury. A qualified doctor or physiotherapist should supervise the process. The aims of any rehabilitation program are to:

- restore optimal function of the injured area
- return the athlete to competition quickly and safely
- prevent re-injury.

The injury management procedures that follow will assist the achievement of these aims.





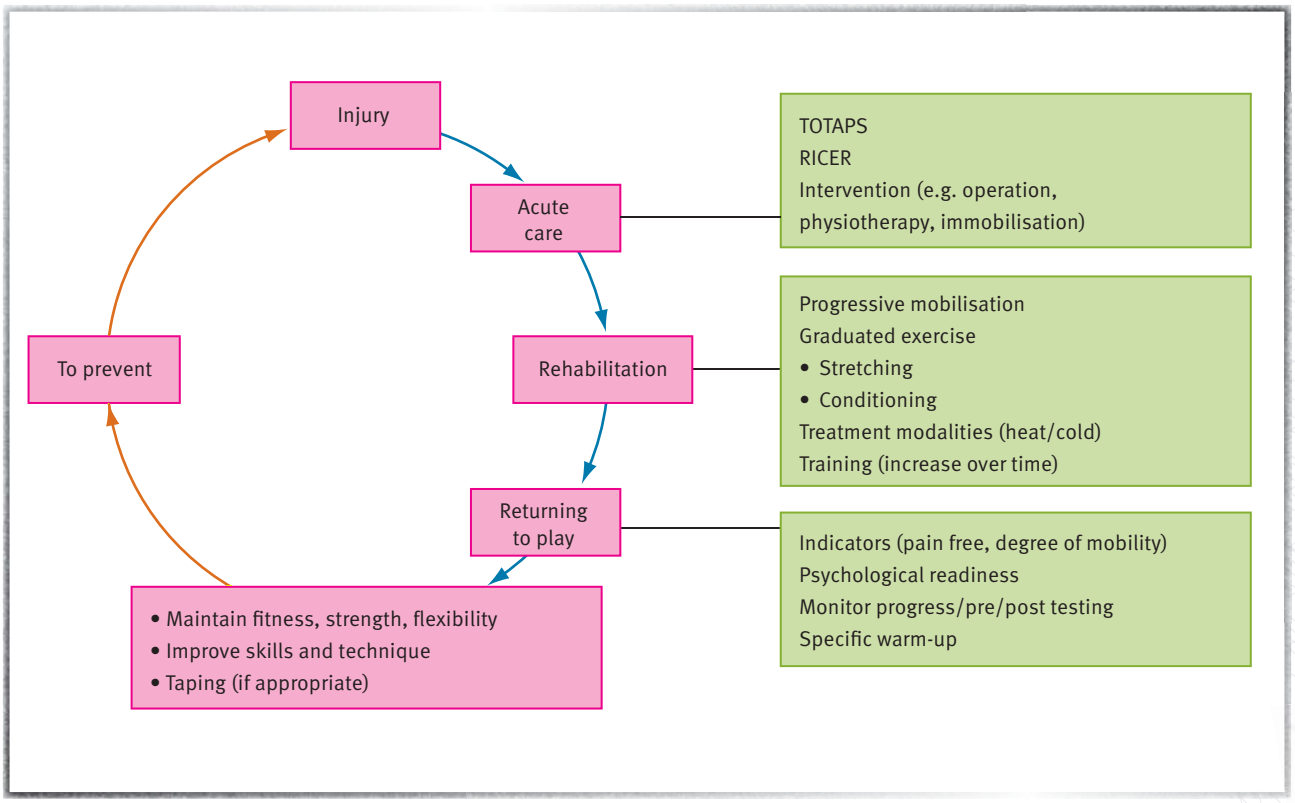


Figure 19.1 Rehabilitation procedures

Progressive mobilisation

Any injury involving the muscular or connective tissues surrounding a joint will restrict movement of that joint. Joint **mobilisation** is the freeing of hindered joints to allow improved range of motion.

Joint mobilisation can be achieved through *active* exercises (performed by the athlete) or through *passive* methods (manipulation of the injured part by another person). Mobilisation of the injured part should begin soon after the injury because joint inactivity can increase the formation of scar tissue. The process is known as *progressive mobilisation* because the range of movement is gradually increased over time until the full range of movement is restored.

To ensure the safe mobilisation of injured body parts, the following precautions should be noted:

- Thorough checks should be made to ensure that there is no fracture at the site—an X-ray may be required.
- Mobilisation should not be commenced during the acute inflammatory phase.
- Circulation to the injured area should be increased before commencing mobilisation.
- The athlete should be relaxed before and during mobilisation.
- Movements should be slow and progressive, rather than sharp and rapid.
- Movements should remain within a pain-free range.

TOTAPS stands for talk, observe, touch, active movement, passive movement and skills test.

Graduated exercise

Part of rehabilitation procedure involves the use of graduated exercise. This incorporates the use of stretching, conditioning and maintenance of total body fitness.

Stretching

Loss of **flexibility** occurs as a result of injury to muscle and connective tissue, and the formation of scar tissue. A degree of flexibility will be returned to the site through progressive mobilisation. However, attention needs also to be paid to stretching exercises. If completed correctly, these will enhance rehabilitation by:

- reducing muscle tension
- increasing circulation
- increasing muscle and tendon length
- increasing the range of motion.

Flexibility, in common with mobilisation, is restored gradually to the injured area through the use of slow static stretches and proprioceptive neuromuscular facilitation (PNF) stretching early in the repair phase. The advantage of PNF stretching is that it does not require the injured site to be moved extensively. It also stimulates proprioceptors within the muscle and connective tissue. The stretching is gradually made more active, and is increased in time from 5–10 seconds to 20–30 seconds. Stretching should be performed regularly after a warm-up, and should always remain within the pain-free range.

Stretching should be performed regularly after a warm-up, and should always remain within the pain-free range.

Passive stretching—with machines, a partner or a physiotherapist—is very common in sports rehabilitation. The purpose is to lengthen soft tissue beyond its normal resting length by applying an external force. The stretch should be held for approximately 15 seconds. The patient, physiotherapist or machine controls the direction, intensity and speed of the contraction. Passive stretches need to be explained and demonstrated carefully to ensure safety, and are good to use in a team setting.

Conditioning

The restoration of muscular strength is essential in injury rehabilitation. Muscles that are active will increase in size and endurance whereas those that remain passive will decrease in size. Even if the area is immobilised (for example, in a cast or brace) a program should be designed to prevent muscle atrophy (wasting of muscle tissue). A program of isometric exercises can be used. These exercises involve no movement at the joints, but develop strength in the position exercised. This will prevent muscle atrophy until movement is possible.

As swelling and pain lessen, exercises involving pain-free movement can be introduced. As strength is slowly regained, further resistance can be applied. The introduction of weight-bearing exercises can be considered if the injured area is thought to be capable of support. Isokinetic exercises are considered beneficial at this stage because they will develop strength through the full range of movement using uniform resistance. It is important to monitor the increase in strength of both the agonist muscles and antagonist muscles; that is, both the muscle being treated, and the muscle that moves in the opposite direction. This will ensure that an appropriate ratio of strength is being developed.

Figure 19.2 Passive stretching with physiotherapy is very common in sports rehabilitation



Total body fitness

A program of rehabilitation involves not only the restoration of the injured part to full function, but also the maintenance of overall body fitness. With some injuries this can be a difficult task because the injury might require immobilisation. However, the maintenance of flexibility, strength and endurance should be promoted with activities that are specific to the sport or activity, and that do not endanger recovery from injury.

The choice of exercises to maintain total body fitness will depend on the type and severity of injury. Examples of activities that can be used to promote total body fitness during rehabilitation include:

- using treadmills
- using rowing or cycling ergometers
- swimming and water-resistance activities
- weight training
- walking or light jogging.

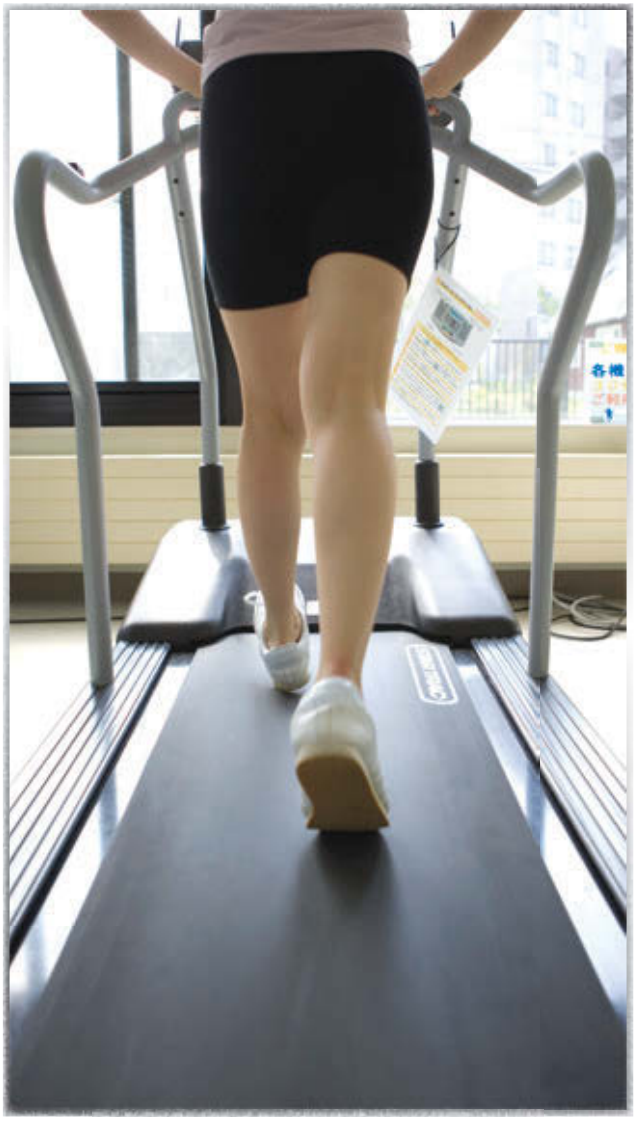


Figure 19.3 Treadmills can be used during rehabilitation to promote total body fitness

practical application

Rehabilitation procedures

Construct a total body fitness program for each of the following athletes:

- a water-skier with a gastrocnemius tear
- a softballer with a rotator cuff strain
- a gymnast with a lower back injury.

Consider strength, flexibility and aerobic endurance of non-injured parts.

Training

An athlete who has finished a treatment and rehabilitation program is not ready to return to full competition. Even though the athlete might have a full active range of movement and flexibility, and even though the person's strength might have returned to normal and total body fitness might have been maintained, the athlete is not ready for competition. If the athlete were to return to competition at this stage there would be a significant risk of re-injury because movement skills, specific game skills and confidence have not been re-established. Timing, speed and coordination are affected by rest from competition. In preparation for the physical and psychological demands of competition the athlete must undertake active training.

The final stages of rehabilitation involve developing muscle coordination and speed to full capacity. The athlete must be able to display skill proficiency equal to that of the athlete's pre-injury performance standards, including the ability to delay fatigue and to perform required skills under pressure. An athlete who 'favours' the injured part (that is, attempts to protect it) increases the risk of re-injury to the site or a new injury to a different site.

Training before recommencement of competition must be aimed at re-establishing all skills in an environment that is as close as possible to competition conditions. Only when the athlete can display full fitness and coordinated movements and skills should he or she be permitted to resume competition. A graduated, progressive sport-specific program will allow an athlete to develop the physical and psychological skills required for competition. Some athletes may be asked to play at a lower level prior to resuming at the level they were competing at prior to injury. For example, an AFL player may play reserves prior to re-entering the senior team. To determine their readiness to return, most athletes will undergo testing that is specific to their sport.

Use of heat and cold

Heat, cold, pressure and electrical stimulation are some of the modalities (forms of treatment) used in sports rehabilitation. These modalities are delivered by ice or by hot packs or by a number of machines, including ultrasound. Most modalities are used to break down the pain, muscle spasm and ischaemic (absent or reduced blood flow) responses of the body to an injury. In general, the choice of heat or cold modalities after the acute phase is dependent on the type of injury and, often, the patient's preference.

Heat

Heat modalities are used to increase circulation, either generally (in a large body area) or locally (at a given site). Superficial heating is heating to a depth of about 1 centimetre, whereas deep heating occurs to a depth of greater than 1 centimetre.

The general physiological responses of the body to heat are:

- decreased pain
- increased ability to stretch
- relaxation
- increased blood flow
- reduced joint stiffness
- decreased muscle spasm
- enhanced inflammatory response (increased flow of blood/fluid to area)
- increased tissue healing.

Heat should not be applied to acute injuries.

Heat is applied superficially via heat packs, hydrotherapy, infra-red lamps and contrast baths. Deep heat can be applied using ultrasound, shortwave and microwave machines. Heat should not be applied to acute injuries.

Cold

The application of ice to an injury is one of the most common cold modalities. The term used to describe the use of cold for treatment is '**cryotherapy**'. The most common ways of applying cryotherapy during rehabilitation are through the use of an ice pack (frozen gel), an ice bag (ice-filled plastic bag wrapped in a towel), an ice massage, ice immersion, a contrast bath (hot and cold) or a topical cold spray.

RICER reduces swelling and pain for acute injuries.

These cold modalities are commonly used:

- in the acute phase of injury treatment
- after therapeutic exercise of injured sites.

They reduce pain and swelling related to chronic and/or overuse injuries. Cold treatment also cools overheated participants.



Figure 19.4 Ultrasound: heat can be applied superficially to assist in rehabilitation



Figure 19.5 The application of ice to an injury is commonly used to reduce pain and swelling

The application of cold to an injury site has the physiological effects of decreasing:

- swelling
- circulation to injured site
- acute inflammation
- pain and discomfort
- muscle spasm
- tissue metabolism.

Care should be taken in the use of cryotherapy to avoid frostbite and other skin and nerve damage.

When used with rest, compression and elevation, cold treatment is especially effective in the treatment of swelling and pain associated with acute injuries. Stiffness is increased after cold treatment. Cold should be applied at regular intervals during the first 24–48 hours of an injury, but not for longer than 30 minutes at a time. Care should be taken in the use of cryotherapy to avoid frostbite and other skin and nerve damage.

Critical inquiry

Explain the safety considerations that need to be observed in the use of heat and cold.

practical application

Use of heat and cold modalities

1 a Contact your local physiotherapist to determine the current techniques and practices in the use of heat and cold modalities for various injuries. If it can be arranged, it would be helpful to visit a local physiotherapist or invite one as a guest speaker.

b **Discuss** how techniques have changed over time.

c With assistance from your teacher or a physiotherapist, conduct a practical session that uses a variety of heat and cold modalities. **Assess** each in terms of:

- its cost
- its effectiveness
- the feelings of the patient
- its ease of use.

Be sure to take appropriate precautions.

d **Summarise** your findings in an article that could be used in a sport magazine as a feature story. Use Publisher or a similar program when writing and presenting your article.

practical application

Rehabilitation program

1 Consider the following individuals:

- a soccer player with a hamstring tear
- a tennis player with tendonitis of the elbow
- a gymnast with a fractured tibia and fibula
- a rugby league player with a shoulder dislocation.

a Plan a rehabilitation program for each of the four individuals above. Consider:

- appropriate initial and ongoing treatment
- surgery options
- progressive mobilisation, graduated exercise (stretching, conditioning and total body fitness)
- length of time recommended for full recovery.

b **Justify** the procedures you have chosen.

c With a partner, role-play the treatment procedures you have devised for each individual.

Research and Review

1 **Outline** the important factors to remember when mobilising a joint.

2 **Describe** the benefits of maintaining total body fitness while injured.

3 **Clarify** the circumstances in which cold modalities are used.

4 **Clarify** the circumstances in which heat modalities are used.

Return to play

Returning to play or competition is not just a matter of waiting for the required time to pass. Active rehabilitation, as suggested earlier in this chapter, will ensure that the athlete's injury has recovered and that fitness and skills are close to pre-injury levels. It is important that the athlete, medical staff and coach agree on the athlete's readiness to return. Lack of confidence in the injured site will hinder psychological and physical performances. If the athlete believes that he or she is not ready, the person should not be pushed. Conversely, the athlete should not push the coach and/or medical staff to make a hasty or inappropriate decision.

Indicators of readiness to return to play

Being pain free and having mobility return to the injured area are indicators of readiness for return to play. There are many physical tests of an athlete's readiness to return to play after injury. Many of these tests are basic fitness and skills tests that are used throughout the season and measure an athlete's readiness and ability to resume play in a specific sport. These are useful because they provide a point of comparison of the athlete's previous test results; for example, in pre-season.

An athlete returning from injury should be put through a sports-specific fitness test. Some general skills that may be tested include sprinting, tackling, side-stepping, throwing, passing and jumping. For example, a netballer returning from an ankle injury would be tested on her ability to sprint (forward and backward) and her agility with no opponent through a variety of drills that include dodging and side-stepping. The netballer would then be tested under pressure with an opponent in a one-on-one situation, such as breaking for a centre pass. Her match fitness would also be tested in a practice game situation. Any weaknesses that are detected during such testing can then be worked on and improved. The athlete will also be monitored post training and testing to determine pain and degree of mobility.



Figure 19.6 An athlete returning from injury should be put through a sports-specific fitness test

Monitoring progress (pre and post-test)

The physical condition and the psychological condition of the athlete should be monitored when the athlete returns to play. This might involve:

- visual observations of the athlete
- interviews and discussions with the athlete
- ongoing testing (comparison of results pre-injury to current status)
- observation of video footage of the athlete
- use of performance-evaluation sheets.

The athlete will also benefit from feedback about performances. Appropriate visits to medical professionals to monitor the injury are also advisable. The athlete should continue to follow the advice of coaches and medical staff until recovery is complete, and until performance has returned to pre-injury levels. Ongoing therapy is advisable until such levels are reached. For instance, cryotherapy might be useful after work-outs.

Psychological readiness

The psychological readiness of the athlete to return to play can be measured by less informal means, such as discussion and observation of behaviour. Anxiety levels can also be monitored to ensure the athlete is not feeling pressure (whether internal or from external sources) to return to play before being fully ready to do so. The athlete, coach and medical staff should all feel confident in the physical and psychological readiness of the athlete to return to play. Taping the injured area, if appropriate, can also provide support and proprioceptive awareness to the athlete. It might also act as a psychological form of treatment long after the injury is recovered.

Specific warm-up procedures

An athlete who has been injured might need to go through a longer, harder or more specific warm-up and stretch routine than other athletes. Extra time and care might be needed at the injury site and surrounding tissues to ensure adequate flexibility, blood flow and readiness to perform. Many athletes develop their own specific warm-up, or have one designed by a coach or physiotherapist, to minimise the chance of re-injury.

Return-to-play policies and procedures

Coaches, sport administrators and sports medicine practitioners play an important role in establishing guidelines for athletes who are managing injury and deciding whether to play with injury and when to return to the sporting arena. Return-to-play policies and procedures vary with sports. They may be determined by overall governing bodies or by individual sporting clubs themselves. Who determines this may depend on the nature and severity of the injury itself. Priority must at all times be given to player welfare with medical advice guiding decisions and policy.



practical application

Return to play

1 Consider the following scenarios:

- soccer player with a hamstring tear
- a tennis player with tendonitis of the elbow
- a gymnast with a fractured tibia and fibula
- a rugby league player with a shoulder dislocation.

a For each athlete above, design three suitable field tests or drills to gauge the athlete's readiness to return to play.

b **Evaluate** the physical tests that could be used to indicate each athlete's readiness to return to play.

Research and Review

1 **Discuss** the factors that will determine an athlete's readiness to return to play after injury.

2 **Outline** examples of progressive involvement for a basketball player after receiving an ankle injury.

Ethical considerations

Ethical considerations can play a significant role in determining when an athlete returns to play.

Pressure to participate

The issue of determining when an athlete returns to training and competition can be very difficult. The decision has short-term and long-term health consequences. Athletes who do not allow for an appropriate recovery period after injury place themselves at risk of further complications. Unfortunately, there is a temptation for some athletes to return to competition before they are ready. Various internal and external pressures push them towards such a decision.

Internal pressures include:

- boredom
- a drive for success
- a fear of losing one's position in the team
- a sense of letting down the team.

External pressures include:

- financial pressures
- pressure from the media
- pressure from sponsors
- expectations of other players, family or the coach
- pressure from spectators.

If an athlete returns prematurely after injury it might cause the injury to become further established. This will extend the necessary recovery time, and the athlete ends up losing more time than would have been the case if the appropriate time had been spent in recovery initially.



- A boxer who is unconscious for **less than 1 minute** is not to be permitted to take part in competition boxing or sparring for a period of at least 3 months post injury.
- A boxer who is unconscious for **more than 1 minute** is not to be permitted to take part in competition boxing or sparring for a period of at least 6 months post injury.
- Before resuming boxing after any medically recorded non-competition period, a boxer must first be cleared by a qualified medical practitioner.

Figure 19.7 Guidelines determined by Boxing Australia in relation to loss of consciousness

Before being allowed to return to training or competition, three questions should be addressed:

- Is the injured area free of all pain?
- Is it possible to move the injured area through a full and normal range of motion?
- Has the injured area regained full strength?

In many cases, an experienced medical practitioner is needed to answer these answers.

Serious injuries, such as those affecting the head, require assessment by a medical practitioner before an athlete is allowed to compete again. In particular, athletes who lose consciousness, or who are suspected of being concussed, should not be allowed to participate further until medical advice is sought.

Use of pain-killers

The use of pain-killing drugs is becoming more common in many sports. The pressures on athletes to return to performance increase the use of these medications. The use of pain-killing drugs is attractive for athletes, and for the sporting clubs who rely financially on their athletes taking the field. With financial and various other pressures increasing, and with advances in drug technology, the use of medications to allow athletes to return to play before full recovery is an increasingly important issue.

The management of concussion in Australian football

Summary

- Concussion refers to a disturbance in brain function caused by trauma.
- Complications can occur if the player is returned to play before having fully recovered from injury.
- **The key components of management include:**
  - **a suspecting the diagnosis in any player with symptoms such as confusion or headache after a knock to the head**
  - **b referring the player for medical evaluation**
  - **c ensuring that the player has received medical clearance before allowing a return to play or a graded training program.**
- The cornerstones of medical management include rest until symptoms have resolved; cognitive testing to ensure recovery of brain function; and then a graded return to sport program with monitoring for recurrence of symptoms.
- In general, a more conservative approach (i.e. longer time to return to sport) is used in cases where there is any uncertainty about the player's recovery **('if in doubt, sit them out')**.
- Difficult cases, such as those involving prolonged symptoms or deficits in brain function, require a more detailed, multi-disciplinary approach to management.

A player with suspected concussion must be withdrawn from playing or training until medically evaluated and cleared.

'The Management of Concussion in Australian Football', AFL Research Board, AFL Medical Officers' Association

Figure 19.8 AFL Medical Officers' Association Position Statement on the Management of Concussion in Australian Football

Table 19.1 Concussion rehabilitation

Early rest (do nothing!)	
Graduated return to activity (to commence 24–48 hours after resolution of symptoms)	
1	Light aerobic exercise e.g. stationary bike
2	Running
3	Non-contact training drills
4	Full contact training
5	Game play

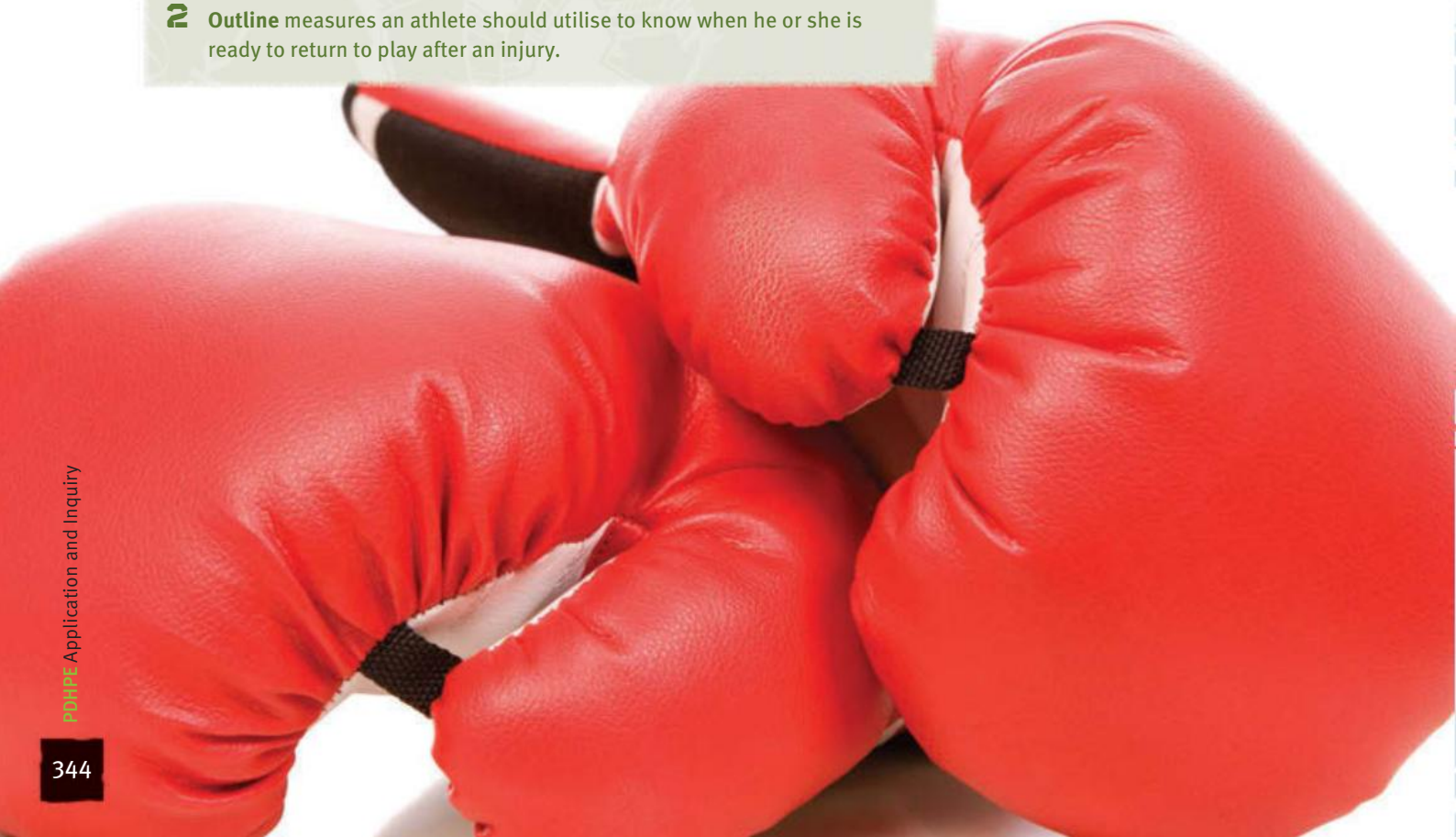
'The Management of Concussion in Australian Football', AFL Research Board, AFL Medical Officers' Association

Critical inquiry

1. Examine the guidelines determined by Boxing Australia in relation to loss of consciousness (see Figure 19.7, page 342). After loss of consciousness, a boxer is subject to the Boxing Australia guidelines regarding a return to competition.
   a. **Outline** why the guidelines are in place.
   b. **Justify** their appropriateness and suitability.
2. Examine Figure 19.8 and Table 19.1 (page 343), then complete the following tasks.
   a. **Assess** these guidelines in terms of player welfare.
   b. **Compare** these guidelines to those published by Boxing Australia.
3. Research whether similar regulations exist for other contact sports. **Summarise** your findings in a table.
4. **Discuss** why there are no universal policies across all sports governing the return to competition after experiencing a head injury.
5. **Discuss** who should have ultimate responsibility for deciding when an athlete competes after injury.
6. a. Debate the following topic: 'Should athletes be allowed to use pain-killers in order to compete with an injury?'
   b. **Summarise** the discussions and opinions presented during your debate using a three-column PMI chart (P for pluses or points for, M for minuses or points against and I for interesting or controversial points).

Research and Review

1. **Identify** the internal and external pressures that may be experienced by an injured athlete when deciding whether to return to play.
2. **Outline** measures an athlete should utilise to know when he or she is ready to return to play after an injury.



how is injury rehabilitation managed?

chapter summary

- Rehabilitation procedures aim to return an athlete back to the playing field and safely restore the full range of movement of the injured area.
- Rehabilitation procedures include progressive mobilisation, graduated exercise (stretching and conditioning), training (active participation) and use of heat and cold.
- When the decision to return to play is being made, the main priority should be the athlete's welfare and safety. Medical staff, coaches and the player should all be consulted in the decision-making process.
- Physical indicators of readiness to return to play include being pain free and experiencing a return of mobility to the injured area.
- Player progress can be monitored via physical testing that is sport specific and by comparing results pre and post injury.
- A player needs to be psychologically ready to return to play.
- Athletes who sustain an injury may need to alter warm-up procedures to reduce the risk of re-injury.
- Relevant return-to-play policies and procedures need to be examined. They vary from sport to sport and by nature and severity of injury sustained.
- To ensure athlete well-being, careful examination must be made of ethical considerations, such as use of pain-killers and internal and external pressures on an athlete to return to play before being physically and psychologically ready to do so.

revision activities

1. **Justify** the use of rehabilitation procedures post sporting injury.
2. **Outline** what may determine whether a player is psychologically ready to return to play.
3. **Describe** procedures that can be utilised to monitor athlete progress during rehabilitation to assist in making the decision to return to play.
4. **Discuss** the possible consequences for an athlete who returns to play prematurely.

extension activities

1. Research a variety of physical skill tests that could be used to indicate readiness to return to play. **Evaluate** each of these.
2. a. **Discuss** who should be responsible for deciding whether an athlete continues to play with an injury.
   b. **Outline** the problems that can be associated with leaving this decision to the athlete.
   c. **Explain** the problems that can be associated with leaving this decision to people other than the athlete.
3. Collect various policies and procedures from sporting clubs and organisations in relation to return to play post injury. **Compare** each of these in terms of timing and the decision-making process for return to play.
4. Research painkillers that may be used in a sporting situation to mask pain associated with injury.
   a. **Identify** what each painkiller is and how it works, the reasons they are used in sporting situations and any side effects that may be associated with their use.
   b. **Clarify** your stance on the use of painkillers by athletes to compete when injured.

exam-style questions

1. **Describe** the rehabilitation procedures an athlete would undertake after tearing a hamstring. (12 marks)
2. **Justify** the use of cold and heat modalities as part of rehabilitation procedures. (8 marks)
3. **Explain** how graduated exercise can assist an athlete to return to play. (8 marks)
4. **Discuss** the indicators of readiness for return to play for an athlete in a sport of your choice. (8 marks)
5. **Assess** the impact of ethical considerations on an athlete's timing and readiness to return to play. (12 marks)



outcomes

A student:

- H7 explains the relationship between physiology and movement potential
- H8 explains how a variety of training approaches and other interventions enhance performance and safety in physical activity
- H9 explains how movement skill is required and appraised
- H10 designs and implements training plans to improve performance
- H16 devises methods of gathering, interpreting and communicating information about health and physical activity concepts
- H17 selects appropriate options and formulates strategies based on a critical analysis of the factors that affect performance and safe participation.

option

4 Improving performance

coming up This Option acts as an extension of Core 2: Factors Affecting Performance. The theory and practice developed in Core 2 are expanded and developed so that you are able to examine the factors that directly influence the physiological and psychological preparation of athletes.

FOCUS QUESTIONS

- How do athletes train for improved performance? [page 348]
- What are the planning considerations for improving performance? [page 374]
- What ethical issues are related to improving performance? [page 390]





chapter 20

how do athletes TRAIN FOR IMPROVED performance?

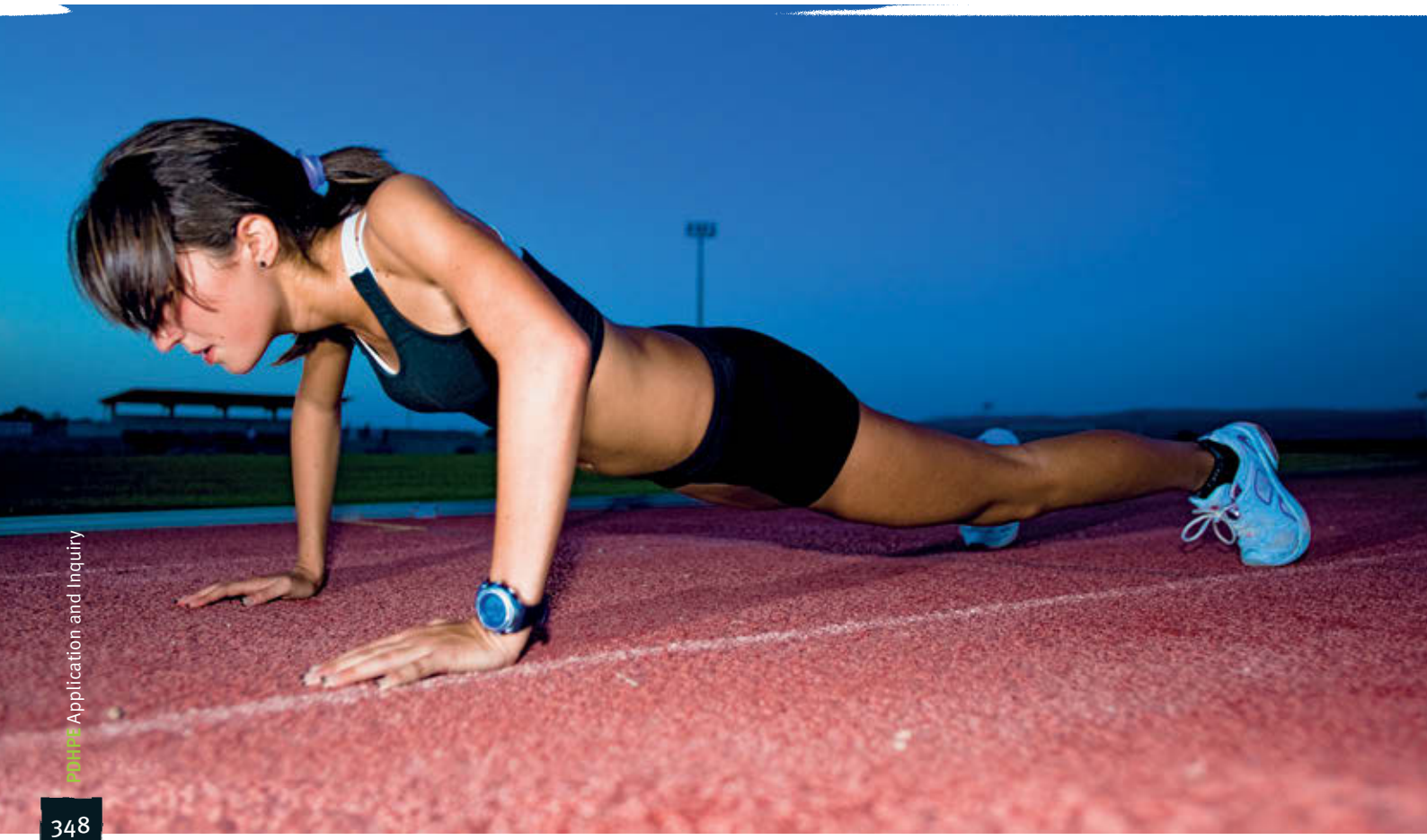
In this chapter we explore the different types of training. Not every person responds in the same way to a particular training regimen. People respond differently, for both genetic and environmental reasons. Some athletes have an advantage due to inherited factors, such as gender, muscle-fibre type and body composition. Some athletes have to train harder than others to improve their performance by an equivalent degree.

Strength training

The main goal of strength training is to increase the maximum force that a particular muscle group can generate. In general, this increase will occur provided you work against some form of resistance and exercise the muscles regularly at a sufficiently high intensity.

As discussed in Core 2 (Factors Affecting Performance), strength training can take different forms:

- resistance training using hydraulic and elastic resistance
- weight training using plates and dumb-bells
- isometric training applying a static force.





Strength training can involve a variety of techniques. During strength training, elements of isotonic, isometric and isokinetic contractions can be used. Training sessions can incorporate elements of each, depending on the types of exercises, the equipment used and the type of strength development being sought.

There is much discussion about the nature of strength training and what form is best; for instance, whether free weights are preferable to machines or elastic resistance band training. In order to determine what method best suits an individual's specific performance requirements a number of factors should be considered.

People choose to begin a strength training program for a variety of reasons. These include a desire to:

- develop muscular strength or endurance
- develop power
- lose weight
- gain muscle definition.

Some people want to commence strength training to build their upper-body strength, others seek lower-body strength, and some merely want a 'six-pack of abs'.
Some require a specific type of muscle contraction for an activity: concentric, eccentric or isometric.

Strength training programs can be tailored to the specific needs of the individual. For this reason, it is helpful to know what exercises are available for specific body parts, and how those exercises are performed using machines, resistance bands or free weights. Gyms will offer assistance in this matter, providing information, programs and supervision. Strength training books, videos, magazines and websites are also available.



Figure 20.1 Gyms can tailor strength training programs to meet the specific needs of individual clients

Types of strength training

There are three main types of strength:

- *maximum or absolute strength*—the maximum weight that can be lifted just once (one repetition maximum); for example, weightlifting
- *elastic strength (power)*— the ability to exert maximum force in a short time period; the product of strength and speed; common in explosive sports involving sprinting, jumping or throwing
- *endurance strength*—the capacity to exert a force repeatedly over an extended time; required in swimming, rowing and cross-country skiing.

The main types of strength are maximum or absolute strength, elastic strength and endurance strength.

The type of strength training undertaken is dependent on the demands of the sport.

The force exerted during strength training is proportional to the type and force of the muscular contractions. The three different types of muscular contractions are:

- *isotonic*—a force against an external load that remains constant throughout the movement
- *isometric*—a force performed at a constant angle against an immovable load
- *isokinetic*—a force generated during movement at a pre-set, fixed speed throughout the range of motion of the joint.

These three different types of muscular contractions will occur during different types of strength training.

To maximise training and to increase strength, power, lean body mass and muscular endurance, most athletes use one or more of the following:

- fixed resistance (free weights)
- variable resistance (such as Nautilus, Universal or elastic bands or tubing)
- accommodating resistance (such as Cybex).

A muscle will strengthen only if it has been forced to work beyond its customary intensity; that is, if it is overloaded.

A muscle will strengthen only if it has been forced to work beyond its customary intensity; that is, if it is overloaded. Muscles can be overloaded by progressively increasing the:

- intensity (by decreasing the number and length of rest periods)
- resistance (by lifting more weight)
- number of repetitions at a particular weight
- number of sets of an exercise
- speed of muscular action.

In the interest of specificity, strength training must target the specific muscle groups involved in the sport. It must also take into account the types of movements that occur at specific joints.

Regardless of the strength training program to be followed, the athlete can ensure the program is effective and safe by:

- undertaking a general strength program before specialising for specific movements
- performing adequate warm-up and cool-down activities
- completing exercises for large muscle groups before those for smaller ones
- using progressive overload as the body adapts to the amount of work performed
- following an individual program shaped to the athlete's level and requirements
- focusing on the correct form, technique and breathing patterns for each exercise
- allowing an appropriate recovery period between exercises during a session and between training sessions
- monitoring progress through the use of record cards or charts.

Resistance training

Resistance training occurs through the use of elastic resistance methods (bands or tubing) or through hydraulic resistance methods (specialised machines or exercises performed in water).

Elastic resistance training

Elastic resistance is achieved through the use of bands or tubes. An **elastic resistance band** is a flat piece of elastic material (band) that is cut from a roll to the desired length and is either held in the hands or tied to a stationary object. Elastic resistance tubing is bought as a kit, which contains lengths of tubing with handles attached. The handles provide a point of attachment that can be held in the hand, placed under the foot or attached to a stationary object.

The elastic resistance band or tube has become an effective and portable resistance training alternative to weight training in order to develop strength. Elastic resistance exercise has been used for both fitness training and rehabilitation for nearly a century. It works on the simple principle that as the elastic band is stretched, the resistance increases. A variety of elastic resistance exercises have been devised to target specific muscle groups; although many are the same as for weight training. Due to the nature of the equipment, exercises can be adapted to suit the needs of individual athletes and their sports. This versatility, along with its relatively low cost and portability, makes it an ideal form of strength training.



Weight training using free weights or exercise machines relies on gravity as the force to provide resistance. This can limit the athlete to upward movements and often one particular exercise on each machine. Elastic resistance, however, does not rely on gravity for resistance; rather, resistance depends on how far the band is stretched. This allows for many more movements and for exercises to be completed in a number of planes; for instance, from side to side.

For athletes this type of training can allow for greater specificity as they can train against a resistance and better mimic the movement patterns required for their sport. For instance, performing exercise movements in the horizontal plane will better prepare athletes for competitive situations and may help to prevent sports injuries. This idea is used by throwers and swimmers and is readily adaptable to most sports. Particular applications are used to replicate movements, such as twisting from side to side while swinging a baseball bat or tennis racquet, throwing a punch in boxing or passing the ball in netball or basketball.

As elastic resistance training can work single or multiple joints it allows exercises to be more functional and efficient. A high level of **neuromuscular** control is required to stabilise the body in the appropriate positions in which the exercises are performed. This improves core strength while completing the exercises. Additionally, elastic bands can help to strengthen muscles that are not targeted by weights or machines, such as those in the rotator cuff of the shoulder.

Exercises performed with elastic resistance bands increase muscle strength and size. As they are able to be performed at speed they also improve the development of speed and power. When combined with specific plyometric exercises the added resistance can be beneficial in the progressive overloading of these exercises.

Training adaptations can be monitored as, generally, there is a colour-coded progression of resistance whereby different colours indicate an increasing amount of resistance. Quality band systems also allow for multiple bands to be attached to the handles to further increase resistance and progressively develop strength to higher levels. However, it can be difficult to accurately quantify the specific resistance applied the way we can with weights. A band cannot be equated to a specific weight and the force produced by a band depends on how much it is stretched; thus the height of the user varies the resistance.

Tension is present throughout the full range of motion. This means that, starting with the least resistance and ending with the highest, the muscle is exercised in a smooth manner. In particular, since momentum is not built up, as with weights, the smoother eccentric resistance during the return phase increases safety and reduces the chance of injury. Momentum does not play a role, which means it is much harder to 'cheat' using elastic bands.

It is important to regularly check the bands as their limited durability means that occasionally they can break. The attachment to either handles or stationary support should be secure in order to prevent 'snap back' and possible injury.



Figure 20.2 Resistance bands can be used with plyometric exercises to assist in progressive overloading

WEB For video footage on various types of resistance training, go to www.oup.com.au/pdhpe12

practical application

Elastic resistance training

1 a Practise using elastic resistance bands with a range of general exercises, such as squats, bench presses, upright rows and bicep curls. **Describe** your experience in performing these exercises.

b Having completed the above, design three other exercises using elastic resistance bands (other than the exercises already performed) that mimic the specific movements for a sport in which you participate. Practise completing the exercises in the manner in which you think they would be performed. If you are unable to work out some of the exercises check with your teacher or contact a local gym for clarification.

Hydraulic resistance training

Hydraulic resistance training utilises **isokinetic contractions** where the resistance varies to match the varying strength of contraction as the muscle changes in length and mechanical advantage. This usually involves exercising using equipment that provides a constant resistance and allows the muscle to contract and shorten at a constant speed. The theory is that this form of training can produce the greatest strength gains because isokinetic exercises allow strength to be developed through the full range of movement. The resistance is a function of speed: the faster the movement, the greater the resistance. These programs are also speed-specific in that they cause maximal gains in strength and endurance at speeds slower than or equal to those used in training (but not faster).

Hydraulic resistance training may also involve exercising in water, where each effort is opposed by the viscosity of the water. In this form of training, gravity neither helps nor hinders the work-out.



Figure 20.3 Hydraulic resistance training

Programs using hydraulic resistance methods increase muscle strength and muscle size and decrease body fat in a similar manner to other types of strength training programs, but are able to specifically build speed. They are also frequently used for rehabilitation purposes. As the machines do not allow many sport-specific movements and only allow for concentric contractions their effectiveness in training for these specific movements may be limited.

Hydraulic resistance typically makes it possible for a person to perform strength training as well as cardiovascular training at the same time. Gains in isokinetic strength and endurance have been seen with as little training as one minute per day on each exercise when completed four days per week for seven weeks. Interval circuit training using hydraulic machines allows this to be accomplished easily. The gains also appear to be longer lasting than those of isometric or isotonic exercises. Hydraulic resistance machines are very expensive, however, meaning access is limited as most gyms cannot afford them.

Hydraulic machines are designed to be safe, simple and effective and the resistance is accommodating; that is, the resistance responds to the force exerted against it. Therefore, people of all levels of strength are able to benefit from them. To increase resistance, you simply push or pull harder, rather than adjust weights on barbells or machines. The result is an effective strength training method that reduces soreness, and eliminates the potential for injury.

practical application

Hydraulic resistance training

1 Visit a local fitness centre to find examples of hydraulic resistance equipment.

- a Enquire as to how and why these machines are used in strength training programs and what exercises are provided for the rehabilitation of patients with various sporting injuries.
- b Where possible, attempt a work-out on hydraulic resistance equipment. **Describe** the feelings you experienced while completing this work-out.
- c **Compare** and **contrast** the work-out completed above to one completed on weight training machines or using weights (plates or dumb-bells).
- d **Classify** the exercises as isometric, isotonic or isokinetic. How and why are each used?

Critical inquiry

1 Professional sporting teams, such as AFL and NRL teams, are often seen on television doing recovery sessions in pools. This would be classified as hydraulic resistance training. **Explain** the possible benefits of performing this type of session for these athletes.

2 **Identify** particular movements in a variety of sports where the use of elastic resistance training may be of specific benefit to the athlete involved.

Weight training

Weight training is the most common form of strength training for athletes and has been used for centuries. This type of training involves using force to resist the effect of gravity. Various objects (such as bricks or sandbags) could be used to achieve this effect. Typically, however, the athlete will use equipment specifically designed for this purpose.

Plates and dumb-bells

Nearly all the weight training people do is isotonic. In isotonic contractions, the muscle changes length under a constant load, which causes a variation in the tension produced in the muscle. Rather than using just the athlete's body weight, the resistance can be provided in the form of free weights or weights stacked on a machine. Most body builders and people seeking pure strength prefer free weights. This is because they enable the participant to completely isolate muscles, and allow the joints and limbs to move along their natural planes. This may be done with plates loaded onto a machine or barbell. Some machines may be designed for single limb lifting; however, barbells require the use of both limbs. Individual dumb-bells are designed to be used with a single limb. Athletes may also use pulleys and cables attached to plates on a machine to perform a similar movement pattern to those in their sport.

Undertaking weight training using plates and dumb-bells involves performing isotonic contractions. The most common isotonic strength training (dynamic) program was developed by DeLorme and Watkins in 1948. They first coined the term 'repetition maximum' (RM) when they devised a strength training program based on a maximum load that could be lifted 10 times, but not 11 times (10 RM). The program requires the athlete to perform three sets of 10 repetitions as follows:

- set 1—10 repetitions using a load that is half the load of 10 RM
- set 2—10 repetitions using a load that is three-quarters the load of 10 RM
- set 3—10 repetitions using a load of 10 RM.

This type of training is known as progressive resistance exercise (PRE). When more than 10 RM can be lifted, the weight is increased. This program can be performed over three to four consecutive days, or with a rest day in between.

Some successful variations to PRE also exist. These variations include:

- exercising at 3–9 RM—best for strength gains
- training at 1 RM for one set—significantly increases strength until about the sixth week
- varying the percentage of 10 RM in sets 1 and 2—as long as there is one 10 RM set
- performing one or two sets rather than three—but three sets is more effective for strength gains
- varying the frequency of exercising—with the use of several different exercises, training may be best two to three times per week, rather than four to five times per week
- using a faster rate of movement at a given resistance—results in greater strength gains.

Some of the possible free weight and weight machine exercises for working out the major muscle groups in the body are shown in Table 20.1 page 354. Notice that there are free-weight and machine exercises for each. This list is not exhaustive because new techniques and exercises are continually being developed.

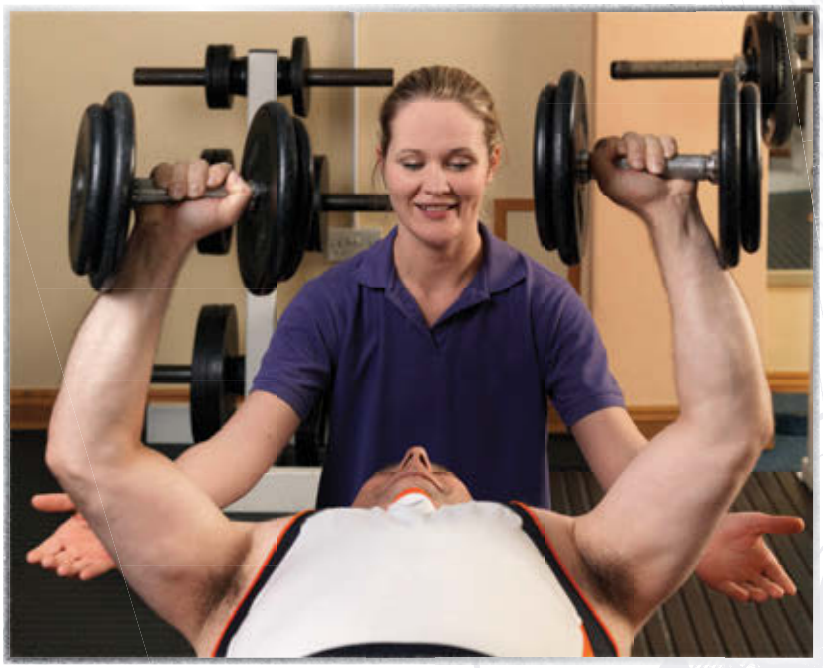


Figure 20.4 Using forced repetitions is an advanced overload technique

Weight training allows a muscle to be strengthened throughout the full range of motion (including both concentric and eccentric contractions) and exercises can be chosen to match the actions in a particular sport. It is also reasonably cheap and accessible. However, weight training can make muscles sore due to the stress applied while they lengthen (eccentric) and the muscle only gains its most strength at the weakest point of the action, rather than evenly throughout. Momentum built up during a movement can place stress on joints and cause injury so care should be taken, particularly in the eccentric phase. Working with one or more partners (spotters) is also advised as fatigue and heavy weights may lead to injury if unsupported.

Table 20.1 Free weight and weight machine exercises for working out major muscle groups

Muscle group	Exercise for the muscle group
Chest	Flat dumb-bell press; flat dumb-bell fly; incline dumb-bell press; machine press; 'pec deck' machine
Biceps	Seated biceps curl (both arms); biceps curl with a twist; alternate arm curl; double-arm cable curl
Triceps	Lying dumb-bell extension; seated one-arm triceps overhead extension; one-arm triceps kickback with a twist; triceps pushdown machine; pulley single-arm triceps kickback; overhead triceps extension on pulley; dips
Shoulder	Lateral shoulder raises; seated dumb-bell press; chin-ups; seated shoulder press; lateral side cable pulley
Back	Upright row (dumb-bell or machine); single or double bent-arm dumb-bell row; lateral pull-down (in front and behind head, narrow and wide grip); seated pulley row
Abdominals	Knee-raised crunches; alternate knee in crunches; side crunches; static contractions with crunches; abdominal machine
Quadriceps	Variety of squats; leg-extension machine
Hamstrings	Hamstring curl machine
Calf	Calf raises (standing or seated, weighted or not, toe in or out, machine or free)

practical application

Weight training

1 Study the exercises listed in Table 20.1.

a Based on the descriptions given, draw a picture of how you think each exercise should be performed.

b Practise completing the exercises in the manner in which you think they would be performed. If you are unable to work out some of the exercises check with your teacher or contact a local gym for clarification.

c **Identify** two other exercises (free or machine) for each major muscle group.

Overload techniques

There are many techniques for achieving overload in weight training.

Blitzing is the practice of working a muscle or muscle group with different exercises from different angles on any one training day.

Forced repetitions are exercises in which a partner assists where the biomechanical advantage is least, and the muscle is thus weakest. The partner gently supports the weakest point.

Cheating is used by experienced trainers to overcome the weakest point of the muscle in order to overload the strongest part of the muscle. This is done by gently using other muscles to assist in lifting the weight over the weakest point. For example, in a very heavy arm curl, the trunk is bent slightly forward and the muscles of the small of the back are used to lift through the weakest point.

Negative repetitions are said to increase bulk and strength by using eccentric isotonic contractions after the muscle is fatigued. For example, after the biceps muscle is fatigued by performing biceps curls, a partner assists by lifting the weight and allowing further lowering (eccentric contractions) of the weight by the athlete. The extra work is said to be performed as a negative repetition.

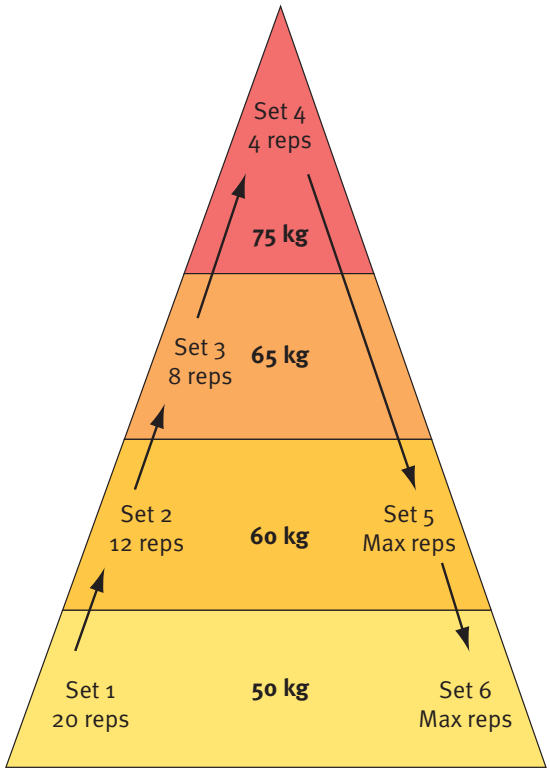


Figure 20.5 Pyramid training

Pre-exhaustion refers to exercising to isolate and fatigue a muscle, and then once more using the muscle (along with other muscles) in a more complex (compound) exercise so that it works further. For example, leg extension is used in pre-exhaustion followed by sets of squats.

Rest pause refers to fatiguing a muscle by overloading it to such a degree that only 1 RM can be performed, then pausing for 10 seconds before performing the exercise again and again. This technique is used by experienced lifters. Caution is required due to the high intensity of this technique.

Pyramid training involves the practice of increasing resistance up to the optimal weight, and then decreasing the resistance.

Up and down the rack is similar to pyramid training. It uses light to heavy weights arranged on a weight rack. The athlete works up the rack (increasing weights) and then back down it (decreasing weights). See Figure 20.5 for an example of a pyramid squat workout.

Compound training involves combining exercises of the same muscle group and the antagonist muscle group with minimal rest between exercises. This can be done in:

- *super sets*—exercise the agonist, then the antagonist (for example, a biceps curl, and then a triceps extension); alternatively, complete a different exercise with the same muscle group (for example, a bench press followed by a dumb-bell fly)
- *tri sets*—work the same muscle three times (for example, complete three different exercises for the deltoids)
- *giant sets*—carry out super sets with more than two exercises, with no rest in between.

Hybrid exercises (compound repetitions) involve moving through a greater range of motion because more than one joint is involved. Thus, instead of doing three or four different exercises, the athlete can complete just one.

Triple drop involves decreasing the weight during a set of repetitions so that more repetitions can be done. It is usually reduced three times, or until complete fatigue is reached.

An isolation exercise involves exercising one muscle group completely before moving onto the next exercise.

A compound exercise involves combining exercises of the same muscle group and the antagonist muscle group with minimal rest between exercises.

Guidelines for various types of weight training

A basic principle of weight training is to allow time for muscles to achieve optimum growth, repair and recovery. Allowing a rest period of about 48 hours will help to avoid over-training and muscle soreness. An exception to this general rule is to work the upper body one day and the lower body the next. Either way, there should be a rest of one day for each muscle group between sessions. The abdominal muscles can be worked every day, however, because of their size.

Table 20.2 Weight training guidelines for different goals

Building muscular strength

- Use a resistance greater than 80 per cent of 1 RM
- Complete 3–6 sets of fewer than 6 repetitions
- Use 3–4 exercises per body part
- Use compound exercises most often
- Use training cycles that attempt to maximise strength/power, while minimising the probability of overtraining
- Use a variety of exercises

Building lean body mass

Beginner

- Use a moderate weight so as to obtain 8–12 RM
- For each body part, select one isolation exercise and one compound exercise
- Perform 2–3 sets of 8–12 RM for each exercise in every work-out
- When more than 12 RM can be performed in the final set, increase the resistance by 2.5–5 per cent
- Use one set of each exercise for the first 2–4 weeks
- Exercise every second day with rests in between

Intermediate to advanced

- Use advanced overload techniques, as discussed above
- Use split work-outs: one half of the body one day, then the other half the next
- Increase the number of exercises to work each muscle from different angles
- Increase the total number of sets (4–5) per exercise

Muscular endurance

- Use a resistance that is high enough to allow for the tolerance against fatigue to develop following high-repetition work (15–20 RM)
- Vary each set between 20 seconds and 60 seconds, depending on fitness levels
- Vary rest or recovery periods, depending on the desired training intensity (generally 0–10 seconds)
- Monitor intensity using heart rate



practical application

Pyramid and PRE strength training

1 a Design your own pyramid and PRE strength work-out for a muscle group of your choice. Work out your 1 RM first, then adjust the other weights around it.

b Practise your work-outs.

c **Evaluate** each of the work-outs.

Isometric training

A few years after DeLorme and Watkins revolutionised isotonic training, Hettinger and Müller revolutionised isometric strength training (static strength training). Their study in 1953 showed increases in maximum strength of 5 per cent per week by isometrically contracting a muscle group for six seconds once per day over five days per week. Repeating the contraction five to 10 times per day produced greater strength gains.

This study led to many further studies in which the amount of tension and the duration and number of contractions were varied to see what differences these changes made. The studies found considerable individual variations; however, they did, generally, confirm that isometric contractions can improve muscular strength and endurance.

Isometric exercises can be performed anywhere as equipment is not required. Isometric training is not ideal in the sports setting, however, because it requires static contractions, and this very rarely occurs in sporting events. This type of strength training is therefore unsuitable for sporting activities involving dynamic muscle action. However, it is a very useful rehabilitation tool. Care should be taken when performing isometric training if heart or blood pressure problems exist as during an exercise blood flow to the muscle can stop and blood pressure rises.



Critical inquiry

1. Interview an employee of a local gym to determine which style of strength training is most popular for particular groups of people (such as adolescents, competitive athletes, females and the elderly) and for particular sports, and why.
2. Contact a local physiotherapy centre and ask what exercises are provided for the rehabilitation of patients with various sporting injuries. **Classify** the exercises as isometric, isotonic or isokinetic. How and why does the centre use each?

Research and Review

1. **Describe** the advantages and disadvantages of each type of strength training; that is, resistance, weight and isometric.
2. **Define** delayed-onset muscle soreness. **Explain** how it relates to strength training.
3. **Explain** why overload techniques are used in strength training.
4. **Describe** the key features of resistance, weight and isometric training.
5. **Identify** safety procedures that should be followed when conducting strength training.

Aerobic training

Aerobic capacity will be improved by a training program that is designed to progressively overload the cardiovascular and respiratory systems, and to stress the oxidative capacities of the muscles; that is, their ability to utilise oxygen. The program should be specific to the sport or event; that is, runners run and swimmers swim. The principal training methods used to develop aerobic capacity are continuous/uniform training, Fartlek training and long-interval training.

WEB

Internet support for aerobic training can be accessed via www.oup.com.au/pdhpe12

Continuous/uniform training

Continuous/uniform training is long, slow distance training (running, swimming or cycling). It involves working for longer than is the case in the performance or competition, and at a uniform intensity of approximately 70 per cent of maximum heart rate (55–60 per cent max VO_2). The form of training is effective in preparing for long-distance events (for example, marathon), but does not substantially improve max VO_2. Athletes and coaches should be aware that, when training, more is not always better, and the volume of training undertaken should be an important consideration.

When training, more is not always better.

High-intensity, continuous training has been shown to improve max VO_2 and lactate tolerance. The exercise intensity required to produce these improvements varies from athlete to athlete, but should be around 80–90 per cent of max VO_2; that is, greater than 90 per cent of maximum heart rate. Work rates equal to or slightly above the **lactate threshold** produce the best results. An



Figure 20.6 Continuous/uniform training involves working for longer than is the case in the performance or competition, and at a uniform intensity

individual's lactate threshold can be established by determining the person's heart rate and ventilation, as opposed to performing invasive blood tests. The duration of the training session depends on the fitness of the athlete, but should be for approximately 25–50 minutes for best results.

Individual differences between athletes, and the nature of their sports, determine which method is most effective for improving max VO_2 in particular activities. Intensity seems to be a more important factor than duration. Another principle of training can be applied here—that of variety. Using a combination of the types of aerobic training listed above is helpful to keep athletes interested and motivated.

Training methods for improving aerobic capacity should aim to increase max VO_2, improve tolerance to lactate and improve economy of effort.

Fartlek training

Fartlek is a Swedish term meaning 'speed play' and is a variation of continuous training. In this type of training, athletes vary the pace at which they run and may also vary the terrain. Typically this would involve some uniform pace exercise interspersed with short sprints and returning to steady state to recover. Inclusion of uphill and downhill or stair work would assist in providing the variation required. This type of training is a more demanding form of aerobic training and aims to have athletes work both aerobically and anaerobically. By its nature it helps to improve max VO_2 and is very beneficial for athletes requiring changes of pace and for team games.

practical application

Fartlek training

Plan a 30-minute Fartlek training session utilising the local environment around either your school or home. Attempt the course, ensuring that your heart rate is above the aerobic threshold during the steady-state sections and rises above the anaerobic threshold during the speed play sections.

Long-interval training

In common with Fartlek training, in long-interval training there are periods of work interspersed with periods of recovery. To achieve a specific effect there are a number of variables that can be manipulated. These include the:

- duration of each interval and rest period
- intensity of the interval
- duration of the recovery interval
- number of work/rest intervals per session.

The key to effective and specific overload is the work:rest ratio. For aerobic training, long intervals are used with a work:rest ratio of 1:1. Each exercise interval would typically be 2–5 minutes in length and be done at a sub-maximal pace. The number of intervals to be completed would be four to eight repetitions.

Long-interval training allows work of a high quality to be performed as the recovery periods delay the onset of fatigue. Also the athlete can complete more work than in an equivalent continuous training session.

Effective long-interval training depends on identifying the level of fitness of the athlete and setting the appropriate variables. A period of continuous training may be required to build aerobic fitness before introducing intervals.

As there are a number of variables available it can be easy to build progression into a long-interval training program. Measuring and monitoring training adaptations is achieved through the use of cards or charts to record each of the variables involved. It can be effective to use a heart rate monitor as the rest periods would allow the work intensity to be recorded.

Research and Review

1 a **Define** max VO_2.
  b **Outline** the role it plays in sports performance.

2 Suggest a suitable training program for a triathlete combining the necessary elements required for improved performance.

3 **Compare** and **contrast** each of the types of aerobic training.

4 Research a sub-maximal aerobic test and **explain** how it is performed and how the results from this can be used to estimate an athlete's max VO_2.

Anaerobic training (power and speed)

In developing the anaerobic system, consideration must be given to activities that tax the alactacid system (ATP–PC system) and the lactic acid system. Each of these systems operates without oxygen to replenish the body with a readily available energy in the form of ATP.

Table 20.3 Resistance training for power and speed events

- Resistance should be 30–70 per cent of 1 RM
- 2–3 sets with 6–8 repetitions performed with high velocity
- 9–10 seconds rest between repetitions
- 4–6 minutes rest between sets
- 8–10 minutes rest between sequences

WEB Internet support for anaerobic training can be accessed via www.oup.com.au/pdhpe12

Developing power through resistance/weight training

Power is the explosive aspect of strength, and can be developed by improving maximum strength and/or the speed of coordinated muscle contractions. Power is the product of strength and speed of movement. It can therefore be represented by the following formula:

Power = force (strength) x distance ÷ time taken

For example, if player A can bench press 200 kilograms in 8 seconds, and player B can do it in 4 seconds, player B has twice the power of player A because player B took half the time.

Power is the product of strength and speed of movement.

In most sporting activities, power is more important than maximum or absolute strength. For example, a player who can bench press 1 RM of 200 kilograms might have difficulty in tackling a player who can bench press 1 RM of 150 kilograms if this latter player can move his or her 1 RM at a faster speed. The first player is 50 kilograms stronger, but the second player's good strength and faster speed gives this player more power and a performance edge in contact situations.

The greatest single contribution to increasing power is through ballistic and plyometric exercises (discussed later in this section), which focus on specific sport-related exercises. The main difficulties encountered in developing such exercises are:

- determining which aspect of strength is optimally required; that is, strength or speed
- determining when (in the game or activity) this is required.

For example, in a scrum, a front-row forward needs maximum strength but, in a tackle, this person requires strength and speed (power).

Power exercises should not be performed in the three or four days before a competition.

It appears that if heavy loads are lifted in training to develop strength, speed will increase automatically for that load. Problems arise when the load is less, because there will not be an accompanying increase in speed. In addition, if the load is light, speed will be developed only for that load, and other muscle groups can be fired to compensate if the load is outside the practised range. Therefore, to improve power, it is best, in each training cycle, to use a combination of increasing maximum strength and light, resisted sport-specific plyometrics. Power gains will be seen with sessions conducted at 75 per cent of maximum strength, with 4–6 sets of 6–10 repetitions, and 5 minutes of rest between sets. Power development requires longer periods of recovery than are required for orthodox maximum strength training. For this reason, power exercises should not be performed in the three or four days before a competition.



Figure 20.7 Anaerobic training

practical application

Anaerobic training for power

1 Over the next four weeks, an athlete is planning to do three sets of 15 RM, three times per week on all exercises. Suggest how the athlete might be able to overload the muscles during the following four weeks to ensure an increase in:

a maximum strength b elastic strength c strength endurance.

Developing speed

Speed is the greatest velocity at which the following occur:

- a limb or body part is moved
- a whole body is moved
- an implement is projected
- a reaction to a stimulus is made
- a number of repetitions of a task is made.

Speed is the determining factor in power sports (for example, sprints, jumps and most team sports), and in sports involving speed of response (for example, combat sports, motor-driving, cricket and baseball). The relative contribution of speed to the sport depends on the athlete, the demands of the sport, and the specific techniques practised by the athlete.

Speed needs to be developed, modified and learned. Training has the capacity to enhance speed in the following areas:

- achieving maximum speed
- maintaining maximum speed
- reacting to a signal
- accelerating
- adjusting rapidly and rebalancing
- choosing the correct option.

The development of speed depends mainly on the characteristics of the athlete. These include muscle elasticity, muscle-fibre type, biochemical responses and use of energy, nervous system responses and willpower. Aspects of the environment (such as temperature, footwear, clothing and equipment) will also affect speed development.

Practices for the development of speed should be specific to the technical demands of the sport. Such demands will vary according to the requirements of maximum speed, strength, endurance and joint mobility of the particular sport.

Mastery of technical skills and technique should precede speed or strength development. This applies in all sports, including sprinting (both swimming or running).

Recovery is very important and should be quite lengthy when working at maximum intensity. This will ensure that every effort is made at 100 per cent. Different aspects of speed can be improved through different types of anaerobic training. A large number of sets with a small number of repetitions of very high intensity and over variable distances (dependent on the sport) is suitable for increasing absolute speed. Throwing speed can be increased by throwing lighter objects and using plyometric training. A variety of plyometric and sports-specific activities can be designed to improve jumping speed, and to improve a change in direction at speed.

Critical inquiry

Based on the information presented above, and on your own research, **describe** a series of exercises that will provide resistance to performers in the development of maximum speed in swimming or running. Include strength, endurance and game-like activities, which might or might not involve equipment.

practical application

Anaerobic training for speed

1 Devise two speed-training activities designed to develop the speed of each of the following:

a a tennis stroke

b the reaction of a slips fielder in cricket

c a swimmer off the blocks.

Plyometrics

Plyometrics is a training method used to enhance power and explosiveness. A plyometric exercise is one that produces stretching of a muscle group undergoing an eccentric contraction, followed by a rapid concentric contraction of the same muscle group. This is often called the stretch–shortening cycle, and the basic premise is that when a muscle is stretched much of the energy required to stretch is lost as heat, but some of the energy can be stored in the elastic components of the muscle. This stored energy is then available to the muscle only in an immediate subsequent contraction. The energy boost is lost if the eccentric contraction is not followed immediately by a concentric contraction in the shortest possible time.

The principle of specificity is very important in choosing appropriate plyometric exercises. For example, a line-out jumper in rugby union is concerned with increasing vertical height, whereas a javelin thrower is aiming for explosive upper-body power to launch the javelin.

When designing a plyometric program the focus should be on quality of work, not quantity. Exercises should be completed with maximal effort and appropriate rest periods should be applied. Typically, there should be 1–3 minutes between sets and 3–5 minutes between each exercise. It is vital that the athlete has a good level of basic strength, begins with appropriate exercises, follows proper progression and performs the exercises correctly. An adequate warm-up routine is imperative. This should begin with general activity and proceed to specific exercises and dynamic stretches that mimic the exercises to be performed. A rating scale, such as the one in Table 20.4, should be used to determine the appropriate training load for the athlete and monitor his or her progress.

There are many other considerations to take into account in order to ensure the safety of the athlete. These include:

- the weight and age of the athlete
- the plane of the exercise—horizontal is less stressful than vertical
- limb involvement—single or double
- additional loading (weights)
- the skill and stability of the athlete.

Table 20.4 Plyometric demand rating scale (Vern Gambetta)

Rating	Recovery time	Example
1 Very low stress	Very rapid recovery	Jump rope or ankle bounces or other low-amplitude jumps
2 Low stress	Rapid recovery: one day required	Tuck jumps, heel kicks, 360° jumps
3 Moderate stress	One to two days recovery	Stair jumps, stride jumps
4 High stress	Slow recovery: at least two days required	Hops, bounds or jumps for distance
5 Very high stress	Very slow recovery: three days required	Depth jumps or other shock jumps

Adapted from V Gambetta, 'Plyometrics: myths and misconceptions'

Appropriate progression is paramount, especially in the teaching phase of the exercises. Stabilisation tests, such as those in Table 20.5, can be used to determine the level an athlete is capable of.

Table 20.5 Plyometric stablisation tests (Vern Gambetta)

- Static stand (hip flexed) for 10 seconds
- Single-leg squat
- Hop for distance—hold landing for 10 seconds
- Hop down off 30 cm box—hold landing for 10 seconds
- Repetitive jump test (maximum effort)—tuck jump for 30 seconds, checking for switch time, movement from starting position and jump count

Adapted from V Gambetta, 'Plyometrics: myths and misconceptions'

Some examples of common upper-body and lower-body plyometric exercises are described below. These exercises should be given only to conditioned athletes, and should start out with low impact and then increase in intensity.

Upper-body plyometric exercises

The trunk, being the link between the legs and hips and the upper body, is extremely important for the efficient and powerful execution of many upper-body movements. Exercises for the trunk focus on swings and twists, while the arms and shoulders are engaged through thrusts, throws, passes and swings.

Handstand jumps

While performing a handstand, the person goes down on both hands (in the same manner as doing a push-up), and then immediately springs back up and down on both hands.

Push-up claps

During a series of push-ups, a clap is added in between each push-up. The pre-stretch occurs when the hands arrive back on the ground after the clap and the chest sinks, followed quickly by an explosive upwards action. Keep ground contact to a minimum.

Plyometric push-ups

The person kneels on the ground with a near vertical torso. The person uses gravity to fall towards the ground with arms extended as shown in Figure 20.8. The person contacts the ground, allowing the force to flex the elbows. The person drops down until the chest almost touches the ground. The person rapidly extends the arms to full length. The extension should be forceful enough to propel the upper body close to the starting position. This is not a continuous exercise as the person must always return to the starting position.

WEB

Internet support for plyometrics can be accessed via www.oup.com.au/pdhpe12

Table 20.6 Plyometric training advantages and disadvantages

Advantages	Disadvantages
• Exercise is performed more explosively than with traditional weights, leading to a more rapid development of force, which promotes more muscular power	• There is an increased risk of musculoskeletal injuries due to high impact forces
• The continual acceleration throughout the exercise produces high forces during the entire range of motion, which is more sport specific	• A limited range of exercises are able to be performed
• The exercises are able to be performed at higher velocities than with traditional weight training; for example, they allow increased specificity to the competitive situation	• Research has concluded that power is minimised at an approximate load of 30–40% of maximum; the use of one's own body weight in plyometrics does not represent this
• The exercises enable the utilisation of elastic energy and minimise the stretch reflex by training for a specific activity to increase power	• It is difficult to gain feedback from plyometrics; for example, the amount of force, speed, weight and so on are variables and are difficult to standardise when compared with weights • Higher velocities of contraction lead to lower forces and therefore lower muscular strength



Starting position

Drop down

Bottom of push-up position

Extend arms

Figure 20.8 Plyometric push-up

Medicine ball

The person lies on the ground face-up and has a partner drop a medicine ball towards the chest. The person catches the ball (the pre-stretch) and immediately throws it back. This is a good exercise for throwers.

Plyometric sit-ups

The person lies on the back with the legs slightly flexed and perpendicular to the floor. A partner stands with his or her feet on each side of the person's head, facing the person's feet. The partner grasps the person's ankles and the person grasps the partner's ankles. The partner thrusts the person's legs toward the ground by rapidly extending the arms. The person provides slight resistance to the partner's push and allows the legs to slightly accelerate towards the floor. The person quickly lifts the legs to the perpendicular position before they touch the floor.

Lower-body plyometric exercises

The majority of plyometric exercises are specific to the hip and leg action as these are the centre of power for movement in most sports. Exercises for the lower body involve bounds, hops, jumps, leaps, skips and ricochets.



Starting position | Leg thrust | Leg lift

Figure 20.9 Plyometric sit-up



Starting position | Step off platform | Land on both feet, flex knees | Jump upward or outward | Extend body

Figure 20.10 Depth jump



Starting position | Jump over first cone | Jump over second cone, in opposite direction; repeat for all cones

Figure 20.11 Double-leg zig-zag hop

Depth jumps

From a box 1 metre high, drop down (do not jump) to the ground (the pre-stretch), and then immediately jump up (concentric contraction). Minimise the length of time on the ground.

Bounds and hurdles

The person uses oversized strides to stay in the air longer and, on landing, springs off quickly. Two-legged or one-legged jumps can be used along the flat, up stairs or even over a series of obstacles.

Split squat jumps

The person assumes a stance with one leg extended forward and the other oriented behind the midline of the body as in a lunge position. The forward leg should be almost fully extended. The person starts with a countermovement of approximately 15–25 centimetres. The person jumps explosively off the front leg, using the calves (plantar flexion) of the back leg.

Double-leg or single-leg zig-zag hops

Place about 10 cones 45–60 centimetres apart in a zig-zag pattern. The person begins with the feet shoulder-width apart, arms flexed at a 90° angle and at the sides of the body. The person jumps diagonally over the first cone. The person then propels the body in a forward diagonal direction, while keeping the shoulders perpendicular to an imaginary straight line through the centre of all cones. Immediately upon landing, the person changes direction and jumps diagonally over the second cone. The person continues, hopping over all cones. The person emphasises explosive hops and tries to attain maximum height.

Critical inquiry

1 a **Identify** the other training methods that are used in sports to develop power.

b **Compare** and **contrast** each with plyometrics.

2 **Explain** the value of plyometric training.

practical application

Plyometrics

1 Design two other plyometric exercises that are suitable for the upper body and the lower body.

2 Try some of the plyometric exercises listed earlier. **Evaluate** the difficulty of these.

3 **Explain** why is it important for plyometric exercises to be low-impact first and then harder.

4 Recommend sports that would most benefit from plyometric training.

Short-interval training

Short-duration interval training sessions of high-intensity activity (near maximal) are used to develop the anaerobic systems. Training to improve the ATP–PC system should be short (5–10 seconds), of high intensity and use the muscle groups involved in the sport. Rest periods should be of approximately 30–60 seconds duration with a work:rest ratio of 1:3. This is necessary because recovery is quite

rapid due to only a small amount of lactic acid being produced. The number of repetitions per set is largely dependent on the fitness of the athlete and environmental considerations, such as temperature. An example of a suitable session for a fit soccer player is shown in Table 20.7.

Training the lactic acid system involves using methods that are more than 10 seconds in duration. The system must be overloaded by intervals of medium to high intensity of 20–60 seconds. It is recommended that this type of training not be undertaken at every training session as it is very taxing, both physically and mentally. Allow for adequate rest and recovery of glycogen stores between training sessions. An example of a suitable interval-type training session to improve the lactic acid system is shown in Table 20.8.

Table 20.7 Suitable short-interval training session for fit soccer player

Rest	30–60 seconds
Distance	10–30 metres (with direction changes) taking 5–10 seconds
Sets	3–5
Repetitions	6–10

Table 20.8 Suitable short-interval training session to improve lactic acid system

Rest	Work: rest ratio of 1:3 (for example, work 1 minute; recovery 3 minutes); the recovery can be active as this assists with lactate removal
Distance	Vary: 200–800 metres depending on the sport
Sets	3–4
Repetitions	2–4

Research and Review

1. Research other training methods that can be used to develop anaerobic capacity.
2. **Propose** a speed-training session for a cyclist, and one for a centre in netball.
3. a **Outline** the sort of training a surfer requires.
   b **Recommend** some ways for a surfer to improve power and speed.

Flexibility training

Static flexibility is the range of motion about a joint. It is relatively easy to measure using a flexometer. Dynamic flexibility is the opposition of resistance of a joint to motion. It is more concerned with the factors that limit movement than with the range of movement possible. It is quite difficult to measure.

Flexibility is limited by the structures in and around joints, such as the bones, muscles, ligaments, tendons and overlying skin. Most of these are elastic, to a greater or lesser degree, and therefore their ability to stretch can be improved with practice. Bones, of course, are not elastic, and the flexibility of some joints (for example, the elbow) is limited by the shape of the bones involved, and cannot be improved past a certain point.

WEB

Internet support for flexibility training can be accessed via www.oup.com.au/pdhpe12

Regularly scheduled stretching programs over 2–5 days per week, for 15–30 minutes per day, will improve flexibility in a few weeks. Stretches can be held for 10–30 seconds, and are repeated twice. A stretching regimen can form part of a warm-up or warm-down, or might be a training session on its own.

Types of flexibility training

Stretching exercises can be performed statically, dynamically or ballistically.

Static flexibility training

Static flexibility training is achieved by the athlete moving slowly and steadily into a position beyond the point of resistance in order to stretch the muscle. The stretch position is then held for 10–30 seconds. Performed correctly, without any jerky movements, this is a safe method of gaining flexibility.

Proprioceptive neuromuscular facilitation (PNF) is a form of static stretch and is the most effective method of improving flexibility. In PNF stretching the muscle is stretched as in static stretching; however, it is then contracted isometrically for 6–10 seconds against a resistance, which is often provided by a partner. The muscle is then relaxed and stretched to its maximum. This allows a greater range of movement and improved flexibility.



Figure 20.12 PNF training



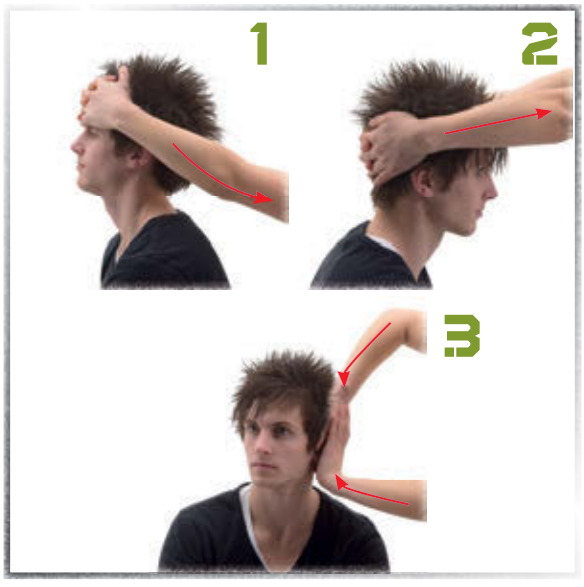
Hamstring stretch



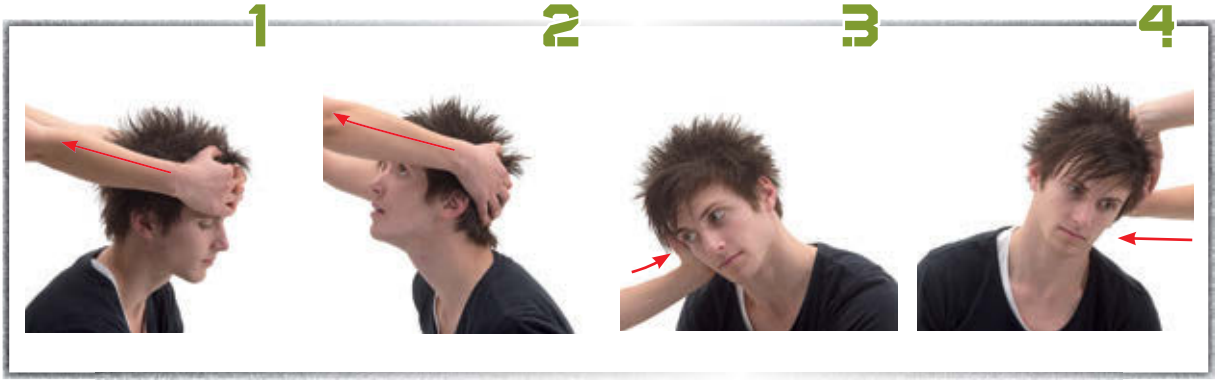
Calf stretch



Quadriceps stretch

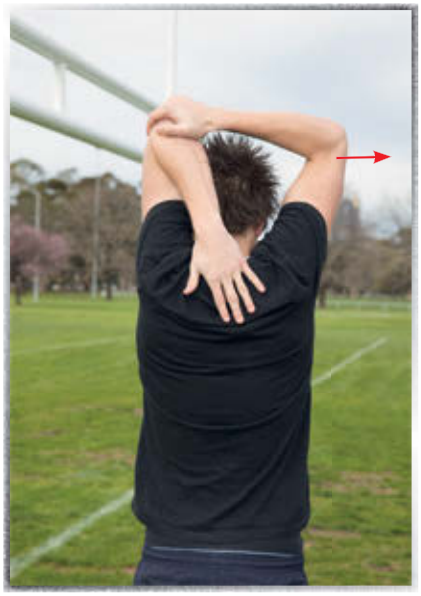


Static exercises



Dynamic exercises

Figure 20.13 Various stretches



Triceps and shoulder stretch

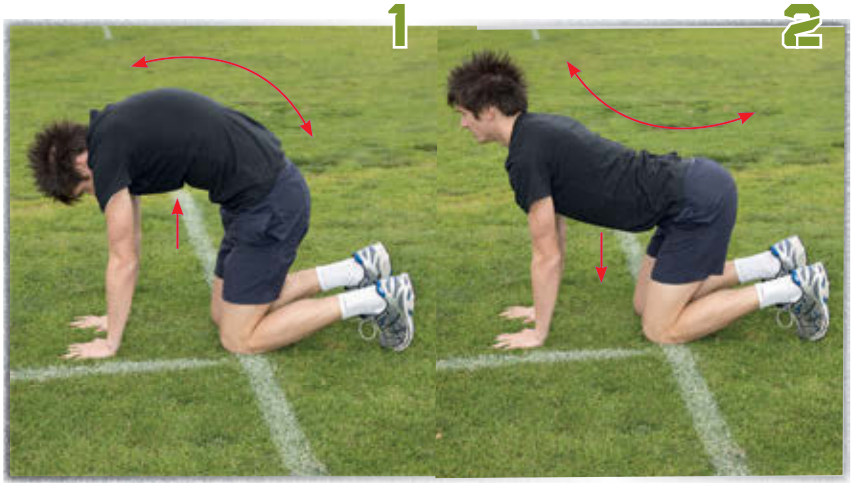


Biceps shoulder and chest stretch





Neck stretches



Lower back arch and sway stretch



Lower back lumbar stretch

Figure 20.13 Various stretches (continued)

Dynamic flexibility training

Dynamic or range of motion (ROM) stretching involves movement. While not generally used to improve flexibility it has a useful application in warm-up routines. The movements replicate those required in a sport or activity and stimulate elongation of tissues by increasing temperature. Examples are torso twists and arm circling, which can be performed before competing in team sports or swimming.

Ballistic flexibility training

Ballistic stretching involves using momentum to force muscles up to and past their normal range of motion. The exercises typically involve swinging or bouncing movements and great care is required as tearing of muscles can occur. This type of stretching is *not* recommended as a safe way to improve flexibility. If done, it should only be completed by already flexible athletes and after a comprehensive warm-up.

Assessing flexibility

Physiotherapists and sports trainers often use tools such as the flexibility screening test (Figure 20.14 (page 369) to predict possible sites of injury, weaknesses in the athlete and suitability to different sports.

Research and Review

1. **Compare** and **contrast** the different types of flexibility training.
2. Design a sport-specific flexibility program for an athlete of your choice.
3. Research different forms of yoga.
   - a **Describe** how they vary.
   - b **Explain** the purported benefits of each.
4. Contraindicated exercises are exercises that are potentially dangerous. **Identify** specific flexibility exercises that are considered dangerous.

practical application

Flexibility training and screening

1. For each exercise in Figure 20.13 (pages 366–7), determine how to make the exercise each of the following types of stretch: static, dynamic, ballistic and PNF.
2. a Study Figure 20.14. Conduct the flexibility screening test on a partner.
   - b **Identify** possible sites where injury might occur as a result of over-flexibility or under-flexibility.
   - c **Recommend** sports that might be suitable for your partner.
   - d **Propose** a flexibility training program that focuses on developing your partner's weaknesses and maintaining his or her strengths.

Skill training

Most individual and team sports require the athlete to be able to perform skills competently. Training and participation are not always concerned with aerobic or anaerobic capacity, strength or flexibility. Long periods of time are spent by coaches and athletes on improving the performance of basic and complex skills involved in the sports. Even a marathon runner needs to develop skills to run; it is not merely a matter of developing max VO_2.

WEB

Internet support for skill training can be accessed via www.oup.com.au/pdhpe12

Movement	1	2	3	4	Rating
Arm horizontal extension					
Arm abduction					
Forearm flexion					
Forearm hyperextension					
Hand flexion					
Hand extension					
Trunk flexion					
Trunk hyperextension					
Trunk lateral flexion					
Thigh flexion					
Thigh extension					
Leg flexion					
Leg hyperextension					
Foot dorsiflexion					
Foot plantarflexion					

Adapted from J Bloomfield, T Ackland & B Elliott, *Applied Anatomy and Biomechanics in Sport*, Blackwell Scientific Publications, Melbourne

Figure 20.14 Flexibility screening test

It is important for the coach to plan activities in a training session that challenge the athlete. The following questions should be considered by the coach:

- What is the purpose of the drill; that is, is it for skill, team strategy or conditioning?
- Can participants perform the drill?
- How many people are involved?
- What equipment is necessary?
- How is it set up?
- How much time will be spent on it?
- What level of performance is expected?

Before beginning a new skill activity the coach should explain it to the players.

A key point to remember in skill training is variety. Athletes are motivated to perform if training is kept interesting and challenging. A variety of drills for the practise of particular skills will aid this process. Modifying well-learned drills by adding defence, obstacles or other variables adds variety to the training session, and makes it more game-like. Variety can also be provided by employing a number of different practice methods (such as individual, team and pairs) under a range of conditions (such as minor games, small games, skill practice and full games). Demonstrations and explanations should be clear and concise, and feedback about practice and performance should be given frequently and appropriately.

Skill practices vary according to the:

- performer's skill level
- performer's motivation
- practice methods used (for example, closed/open and massed/distributed)
- length of practice session
- use of mental and physical practice
- requirements of the sport.

Drills practice

Skills are developed through repetition, observation and visualisation. Drills practice, either individually or in groups, allows this to occur. Drills can be designed to practise a specific movement or technique; for example, kicking or throwing a ball or completing a forward roll. Drills practice forms an effective part of individual training when not practising with a team or partner. Examples of this include hitting a tennis ball against a wall or shooting a basketball. Drills practice is well suited for particular sports where individual skills need to be precise, such as gymnastics or athletics.

Figure 20.15 Drills practice allows a specific skill to be refined



Modified and small-sided games

Modified and small-sided games provide variety and are an important and effective component of training. Well-designed games on small fields with fewer players can ensure each player experiences maximum involvement. Modified games enable time-efficient skill practice. They also provide a valuable forum to develop various important game-related skills, such as decision-making, reaction and vision skills. They can place a player in a game situation with a desired outcome by focusing on specific skills (such as passing and catching) or specific aspects (such as fitness or evasion skills). Varied levels of pressure can be applied by changing the format; for example, 2 versus 3.

Games for specific outcomes

Specific outcomes can be applied to modified or small-sided games and this can be used for practice in larger or actual game play situations. In this case the coach would identify a specific outcome to be achieved by the team or certain groups of players.

Decision making

By performing skills in a competitive environment the athletes would be placed in situations requiring quick decisions to be made. Games can be directed at allowing attackers to develop and practise deception skills and, in turn, allowing defenders to read the attempts at deception. Small-sided games assist here. Decision-making opportunities are created by varying field dimensions, varying the position on the field of a start and altering numbers in attack and defence.

Tactical awareness

To raise tactical awareness, the focus of modified and small-sided games could be on important tactical aspects, such as maintaining possession, delaying the opposition or pressuring or manoeuvring to regain possession. Moments of transition—where a ball changes possession—are important as they cause defenders to become attackers and provide opportunities to outnumber defenders. Games beginning with a turnover situation provide opportunities to practise simple tactics. They may also involve the use of specific set plays or team patterns in certain areas of the field. Tactics in this situation may be a more complex system based on exploiting a predictable response by a defender.

practical application

Training program

1 a **Analyse** two of the training methods you have studied in this chapter. In your analysis, examine each method and how it best suits the specific program requirements of a particular athlete.

b **Design** a training program based on each of the two chosen methods and include how the coach can measure and monitor training adaptations. Include safety guidelines and identify potentially harmful training procedures.

practical application

Skill training

1 a Allocate each of the following skills to pairs or individuals in your class:

- serving in tennis
- rucking in rugby
- goal-shooting in netball
- hurdling
- performing a handspring vault
- putting in golf
- kicking in Australian football
- tackling in hockey
- throwing the javelin
- trapping and passing in soccer.

You might need to make up some more skills.

b Devise three drills that can be used to practise your allocated skill. Make the drills progressively more difficult and/or taxing in nature.

c Each pair or individual then teaches the drills to small groups in the class.

d **Evaluate** the practice session and recommend changes that you would make.

2 a In pairs or as individuals, devise a modified or small-sided game for a sport of your choice.

b Each pair or individual then teaches and controls the game to small groups in the class.

c **Discuss** your experience with others in your class.

Critical inquiry

1 In order to be effective, training methods need to be suited to the specific requirements of the athlete. **Explain** which methods would be best suited to the following athletes:

a a shot putter
b a hockey team
c a 110-metre hurdler
d a cross-country runner
e a springboard diver.

2 **Examine** a number of case studies of elite athletes showing how training methods vary within the same sport. For example, consider two athletes in netball, rugby league, swimming or 1500-metre running. **Analyse** the training methods used by each individual.

a In what ways are the training methods different or similar?

b Why are the training methods different or similar?

c **Describe** the types of feedback that the coach might give to the athletes.

d How do the specific requirements of each sport influence training?

Research and Review

1 **Compare** and **contrast** the different types of skill training available to a coach.

2 Design a skill circuit for a sport of your choice in which each group or individual performs between five to eight drills of 3 minutes duration.

3 **Describe** the benefits of using a variety of approaches in the training of a skill.

how do athletes train for improved performance?

chapter summary

- An appropriate strength training program is vital for an athlete wishing to achieve particular outcomes. Regardless of the type of contractions used, variables (such as resistance, sets, speed, repetitions and rest) can be manipulated to suit an individual's specific performance requirements.
- Resistance training can be performed using elastic or hydraulic resistance. This can allow for greater specificity as the athlete can train against a resistance and better mimic the movement patterns required for the sport.
- In weight training, many techniques may be used in order to vary the way overloading is achieved to improve strength. Advanced techniques include blitzing, forced repetitions, compound training and pyramid training.
- Isometric training improves strength but is more useful for rehabilitation than for most sporting situations.
- Aerobic training improves the body's ability to utilise oxygen. Common methods are continuous/uniform, Fartlek and long-interval training.
- Anaerobic training is used to develop speed and power.
- Plyometric training utilises the elastic nature of muscles to effectively develop speed and power.
- Training for flexibility can be static or dynamic.
- Variety is important in programs to develop skill and technique. A range of drills practices, modified and small-sided games and games for specific outcomes should be used to challenge the athlete.

revision activities

1. **Describe** the benefits of elastic resistance training.
2. **Recommend** which type of flexibility training is best suited to each of the following, and **propose** reasons for your answers:
   a. golf
   b. down-hill skiing
   c. beam in gymnastics
   d. skateboarding
   e. Australian football.
3. **Compare** and **contrast** the effects of aerobic and anaerobic training on the body.
   a. Are there any similarities?
   b. What are the differences?
   c. **Explain** why they are different. Do they need to be?
4. **Compare** the use of modified or small-sided games and games for specific outcomes in the development of skill and technique in athletes.

extension activities

1. a. **Investigate** the use of a range of plyometric activities for the development of power and speed in different sports.
   b. **Describe** and illustrate plyometric activities for upper and lower body.
   c. **Explain** the importance of rest days when training anaerobically.
2. Training adaptations need to be measured and monitored. **Construct** tests that could be used to measure the improvements in an athlete for each of the following: strength, endurance, power, speed and flexibility.
3. **Compare** two different sports analysing how the specific skill development necessary for the sport has an influence on the type of skill practices used during training sessions.

exam-style questions

1. **Explain** how flexibility training is used to improve performance. (8 marks)
2. **Describe** how athletes use plyometric training techniques to improve speed and power. (8 marks)
3. **Evaluate** the use of different overload techniques when training to improve strength. (12 marks)
4. **Recommend** the variety of activities that could be included in a training session in order to stimulate and challenge the athlete. (8 marks)
5. **Compare** the benefits of resistance, weight and isometric training when preparing an athlete for competition. (12 marks)

chapter 21

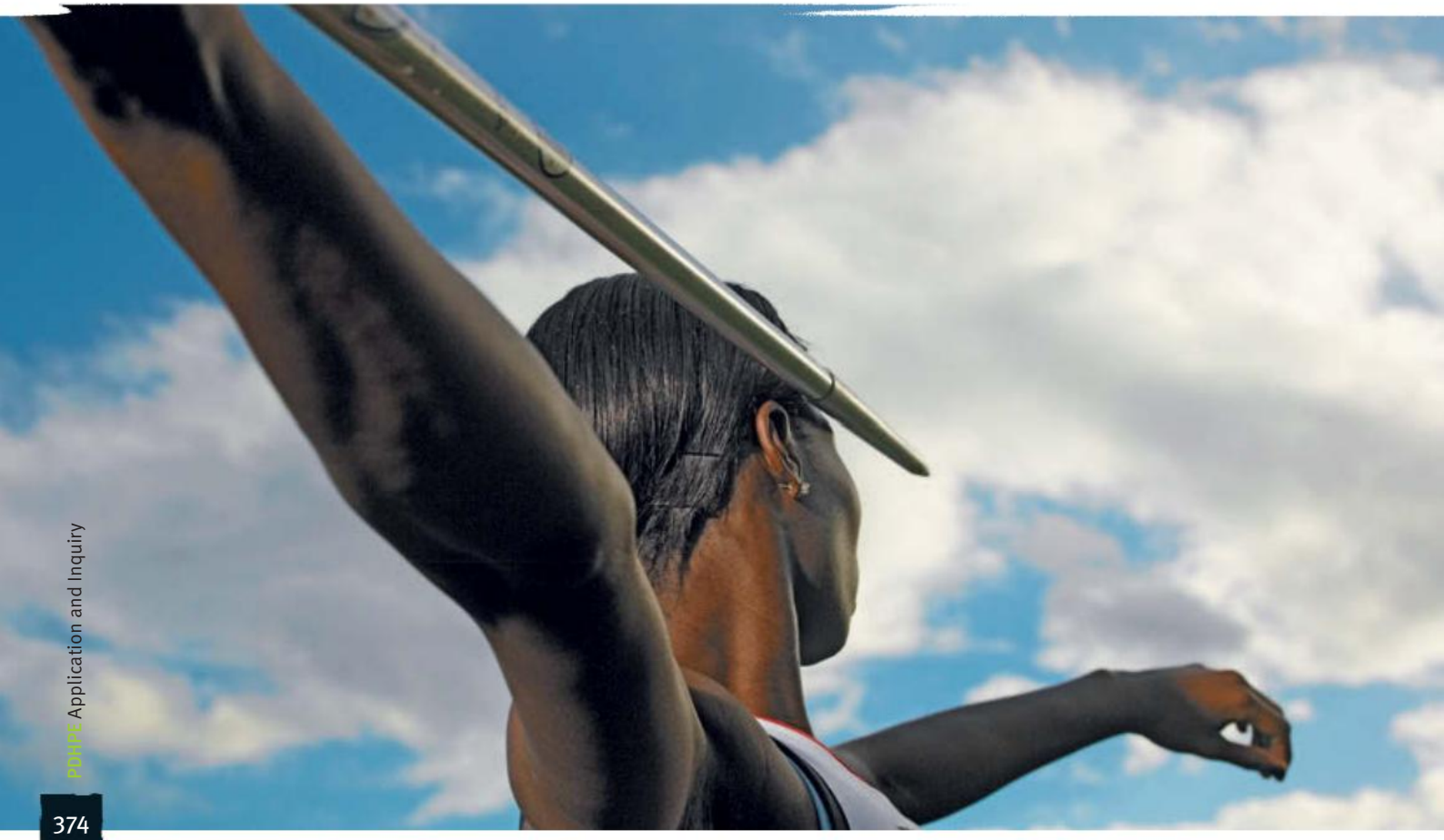
what are the planning CONSIDERATIONS FOR IMPROVING performance?

When individuals decide that they would like to play a sport or join a team they have certain expectations about their involvement. These expectations determine their effort, commitment and enjoyment—all of which help to determine the fun, sense of belonging and skill development to be derived from the involvement. Sports are fun if skills are learnt, performance improves and if people enjoy themselves.

One of the enjoyable aspects of sport is the development of skills in training, and the transfer of those skills to a game situation. This chapter looks at training, and how training sessions are structured to maximise learning, enjoyment, fitness and skill development and avoid the burn-out that can come from trying to do too much.

Initial planning considerations

Careful planning will ensure that an athlete is appropriately prepared for competition. Consideration needs to be given to the various aspects that, when combined, will make a difference to the success of the athlete and/or the team. These aspects can be divided into performance and fitness needs, the competition schedule and the climate and season.





Performance and fitness needs (individual and team)

When a coach arrives at a training session most participants will expect the coach to have arranged a series of activities to develop skills and fitness. Most coaches do this. Whether the coach is preparing a single training session or a program for a whole year, the coach's ability to plan, organise and implement a training session will often determine the involvement and commitment of the participants. This applies equally at both the beginners' level and at the elite level. It is therefore very important that coaches consider the fitness, skill level and goals (both team and individual) of the athletes under their care; the athletes rely on them.

An effective coach is one who can plan, organise, implement, observe and evaluate a program to meet the needs of athletes. The coach should gather information about the athletes in order to appropriately address their specific needs. This can be done through surveys to determine previous experiences and goals for the season and aspirations. It can also be done through athlete assessment incorporating tests for both general and specific physical requirements. The age of the athlete and level of competition should be taken into account. Different approaches are required to cater for the age and expectations of the athlete.



Figure 21.1 The coach must plan to develop athletes technically, physically, psychologically and tactically.

Table 21.1 Professional football preparation models

Traditional model							
	Monday	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**	**Sunday**
am	Rest	W	Sk	W	Rest	Rest	Rec
pm	Sk	Sk	Fitness	Sk	Rest	Match	Rec
'Funnel' model (used by the Wallabies, 1998–2001; Brisbane Broncos, 1995–2003)							
	Monday	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**	**Sunday**
am	W + Sk	Sk	W + Sk	Rest	Run*	Rest	Rec
pm	Sk + run	Rest	Fitness	Rest	Rest	Match	Rec
New AFL model used by some clubs in Australia							
	Monday	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**	**Sunday**
am	W	Sk	Rest	Sk	Rest	Rest	Rec
pm	Sk	Sk	Rest	Sk	Rest	Match	Rec + fitness

W = weights; Sk = skills; Rec = recovery sessions; * = brief, intense session

D Jenkins (ed.), *Sports Science Manual for Rugby*, 2nd edn, The Australian Rugby Union

Structuring training sessions

Training sessions should be:

- safe
- relevant
- well balanced (between training for skills and training for fitness)
- structured to allow for practice and improvement
- structured to a familiar routine while allowing flexibility and variety.

The coach must plan to develop athletes technically (skills), physically (conditioning), psychologically and tactically.

When structuring the training sessions the coach should bear in mind the length of time players have for recovery. Elite athletes often train twice a day and consideration needs to be given as to how this is planned. It is recommended that the more important session, based on the phase of competition, be completed first.

Three preparation models are used by professional football teams (of all codes) in Australia. These provide a guideline for effective scheduling of the different components of the training program. Other professional sports would develop their own models to accommodate the training components important to their sport. Amateur teams, having fewer sessions, would place emphasis on seasonal requirements. The professional football models can be summarised as shown in Table 21.1 (page 375).

Schedule of events/competitions

Initial planning considerations for many team and individual sports must take into account the schedule of particular events and competitions, and it is essential to optimise the performance of athletes around these. Planning is affected by the:

- competition structure
- phases of the competition
- special events in the season
- availability of resources
- motivations and attitudes of the athletes
- demands of the sport
- climate.

An annual plan should be based around a build-up to a specific event or, as with some sports, a series of events. The aim of this is to produce the best performance at the appropriate time. Highlighting these events on a calendar enables training to be divided into a series of cycles, each with a specific focus. For example, a team in a team sport competition generally aims to reach the final series, along the way adapting training for particular games. In the final series a particular approach will be taken to maintain maximum performance.



Optimal performance is structured around the athlete's schedule of events and competitions.

Climate and season

A coach needs to take a sensible approach to training and competition in adverse weather. Planning should involve variations to a program to cater for potential adverse conditions. The yearly training plan should take into account the season where each phase falls and anticipate the likely weather patterns. Adverse weather conditions (such as when it is too hot or cold) may mean changing the training time or the length of the session. Alternate venues can be considered and booked in advance. These venues include gyms, pools and indoor courts. 'Classroom' sessions may be held to review tactics and plan ahead.

Acclimatisation to conditions can also be part of the planning for a season. Elite athletes may attend training camps in conditions similar to those in which they may be competing. Athletes competing at altitude will often travel to these areas up to a week in advance in order to acclimatise.

Plans to take into account the climate should also encourage individuals to do all they can to minimise the effects of adverse weather on themselves. In the case of hot weather, for example, athletes should ensure that their clothing and headwear is appropriate, that they have ensured their hydration levels are adequate and that they have acclimatised to the exertion levels required in the prevailing conditions. (For a discussion of the effects of exercise in hot, cold and humid conditions, and how the body regulates temperature, see Option 3: Sports Medicine.)

Critical inquiry

Describe how the initial planning for a competition would differ for an elite athlete and for a recreational/amateur competitor.

Research and Review

1. Research particular teams or athletes and **describe** how they acclimatise for the different conditions in which they may be required to compete.
2. **Construct** a survey that can be used to gather information about an athlete's previous experiences, goals for the season and further aspirations.
3. **Investigate** the types of activities that are used during the recovery sessions implemented by professional football codes and outline the benefits of these.

Planning a training year (periodisation)

The division of the training year into certain periods must be considered when designing a yearly training program. Peaking for major events must also be taken into consideration. A long-term training plan is required so that the coach and athlete can set goals and work towards the achievement of those goals over the year. Long-term and short-term goals should be decided on in consultation between the coach, the athlete and the team.

It is not uncommon for athletes to train all year round. Even though the cricket season is in summer, cricketers train in the winter. Athletes of the winter sports—rugby league, soccer, netball, rugby union and AFL—train during the summer months. This is done to maintain fitness and, in some cases, skill levels.

The dividing of a program into phases is called periodisation. Subtle and important differences in training exist in each of these stages.



Figure 21.2 AFL team in pre-season training

Phases of competition: post-season, pre-season and in-season training

The total training program of athletes can be broken down into three distinct phases:

- post-season or off-season (transition)
- pre-season (preparatory)
- in-season (competition).

Table 21.2 suggests some activities for various training phases throughout the year.

Table 21.2 Suggested activities for the phases of a year-round training program

Activity	Post-season	Pre-season	In-season
Weight training	3 days per week	2–3 days per week	1 day per week
Running	Low intensity: 1–2 days per week	High intensity; 3 days per week	High intensity: 1–2 days per week
Skills	Skills practice	Skills practice	Skills and drills practice
Other	Limited sport-specific practice	Learning strategies	Game-like activities; regular competition

Adapted from E Fox, R Bowers & M Foss, *The Physiological Basis for Exercise and Sport*, 6th edn, WCB McGraw Hill, USA; SK Powers & ET Howley, *Exercise Physiology Theory and Application to Fitness and Performance*, 3rd edn, WCB McGraw Hill, New York

Post-season training

Post-season (or *off-season*) training varies from sport to sport, but has the following general aims:

- to prevent weight gain
- to maintain the aerobic fitness base (low intensity)
- to maintain strength (increase endurance, strength and power)
- to maintain a reasonable sports skill level (participate in games)
- to repair injuries
- to recuperate physically and mentally.

An off-season program involves post-season competitions in the athlete's sport (or a similar sport) and also involves recreational and social activities for fun and enjoyment. For example, an endurance runner might focus more on aerobic capacity maintenance than on strength, a spin bowler might focus more on skill development, a tennis player with an injury might concentrate on rehabilitation and mental strategies, and a netball team might play in a touch-football competition to maintain ball skills.

Post-season training is usually of low intensity, but of high volume.

Regardless of the sport, variety is the key to post-season training programs. Post-season training is usually of low intensity, but of high volume (a large number of long sessions). This time also allows athletes to concentrate on areas in which they might be weak.

Pre-season training

Pre-season training usually occurs 8–12 weeks before the start of the season or competition. The predominant energy systems used in the sport are increased to maximum capacities. The principal difference between post-season training and pre-season training is the intensity. The post-season weights program should be continued during pre-season. A shift is made from low-intensity, high-volume training to high-intensity (progressive overload), low-volume training. Sports-specific skill training is also intensified. If specific components of fitness or skill are required, significant time should be allocated to practising these in the pre-season.

In pre-season training a shift is made to high-intensity, low-volume training.

In-season training

The general aim of the *in-season training* program is to maintain the fitness, strength and skills developed during the pre-season. There is an increased emphasis on game-like skills and strategic development, and on practice involving opposition. Practice should still be of sufficient volume and intensity to maintain strength and endurance throughout the season.

The involvement of athletes in actual games and game-like practices allows less emphasis on aerobic capacity and strength-conditioning at training. Drills with components of game skills and fitness are important. The only exception is athletes who do not receive much game time. They might need to engage in alternative high-intensity conditioning or skills practice during the week for three days.

Critical inquiry

1. Study the article opposite about marathon training. **Identify** some basic features of this program that demonstrate it is appropriate for the athlete in the competition phase.
2. **Identify** the types of testing that would be conducted in a yearly plan. Why are they repeated?
3. Suggest pre-season training programs for a:
   - a. downhill skier
   - b. high jumper.
4. What would happen if an athlete:
   - a. continued the post-season program for the whole year?
   - b. stopped training at the end of the in-season, and then started up again at the beginning of the in-season of the next year?

practical application

Phases of competition

1. Choose a team sport and an individual sport/activity.
   - a. Design a suitable eight-week post-season training program for each.
   - b. What other factors should the athlete consider in this period?
2. Design a typical week of an in-season program for a team sport of your choice. Include:
   - a. two team training sessions, giving specific details of activities to be included in each session
   - b. one match-day session
   - c. suitable individual training for the participants during the week.

An individual sport guide to the competition phase of training: specific marathon training

In the last month before the event you should be focusing on running efficiently at race pace. The important sessions will therefore be repetition runs over 2–4 km at a pace, which varies between your expected marathon pace and a pace that is about five seconds per kilometre faster. Thus the athlete who is hoping to run 2 hrs 24 mins will do their repetitions from 5.30 to 5.20 per mile or, if working in kilometres, from 3.25 to 3.18 per km. As well as this, you will be doing timed 'pace runs' at your marathon speed, up to 10 miles in training, or possibly in the form of a controlled half-marathon race.

Whatever you do in training is no good unless you can reproduce it in race conditions. It is important, therefore, to rehearse as fully as possible the situations you are likely to encounter. These include getting up and breakfasting early for an early start, practising the pre-race diet before long training runs, taking drinks during the run and wearing the shoes you are going to wear in the race. The best way of doing this, of course, is to incorporate some races into your programme, preferably over distances from 10–20 miles (15–32 km).

Recuperation

This is an essential part of the training, which must be programmed in, to take account of the effects of the hardest training runs and the races. Proper post-run routines should be worked out, including eating, drinking, bathing and, if possible, massage.

Countdown to the race

13 weeks to go	From now on marathon training takes preference over races. First two-hour run. These will be repeated every two weeks.
12 weeks to go	Introduce the quality sessions, once a week at first, increasing to two a week, plus one long run, pace run or race. A typical session would be 6 x 1 mile or 5 x 2 km, with 3–4 minutes rest between each.
11 weeks to go	Assess the training load of the first two weeks. From now on you should establish a pattern, based on either a 7-day or a 14-day cycle, which will enable you to do the hard work and recover from it by the beginning of the next cycle.
9 weeks to go	After four or five weeks you should be running a race to measure your progress, and also getting up to two-and-a-half hours for your long run.
8 weeks to go	At the end of this week you should allow yourself a recuperation period to absorb what you have done.
7 weeks to go	The next four weeks will include the hardest training, but you should rest up before having a serious race or pace run.
5 weeks to go	This is probably the best time to put in your three-hour run. It also gives you an opportunity to try out drinking before and during the run.
4 weeks to go	Your last race. Rehearse the pre-race routines of carbo-loading in the last two days before the race, and the pre-race meal. Decide on the right shoes. During the next three weeks most of your serious running will be done at marathon pace to get into the right rhythm.
3 weeks to go	Your last long run, about 20 miles, with a few stretches at marathon speed, the rest easy.
2 weeks to go	From now on you are tapering. The mileage should be cut to two-thirds of normal and you should concentrate on feeling good, just doing a bit of striding out to keep the leg speed and the stride length. Run no more than 15 miles with 2 weeks to go.
The last week	You will have done 8–10 miles with seven days to go, and after that it doesn't really matter. I advise a little running each day, no more than half an hour. If you are going to carbo-load, the right period is from the Thursday evening to the Saturday evening before a Sunday race. It is advisable to be at the race venue the day before to check out the exact finish of the race and the arrangements regarding getting to the start.
Race day	For a morning race, get up three-and-a-half hours before, breakfast three hours before, and bring a drink with you to take 10 minutes before the start. Make sure that you have clothing for either a warm day or a cold day. Finally, run the first mile as close to your target time as possible. After that? You have done all you can so enjoy it!

Source: Brian Mackenzie, UK Athletics Senior Coach, Sports Coach webmaster, www.pponline.co.uk

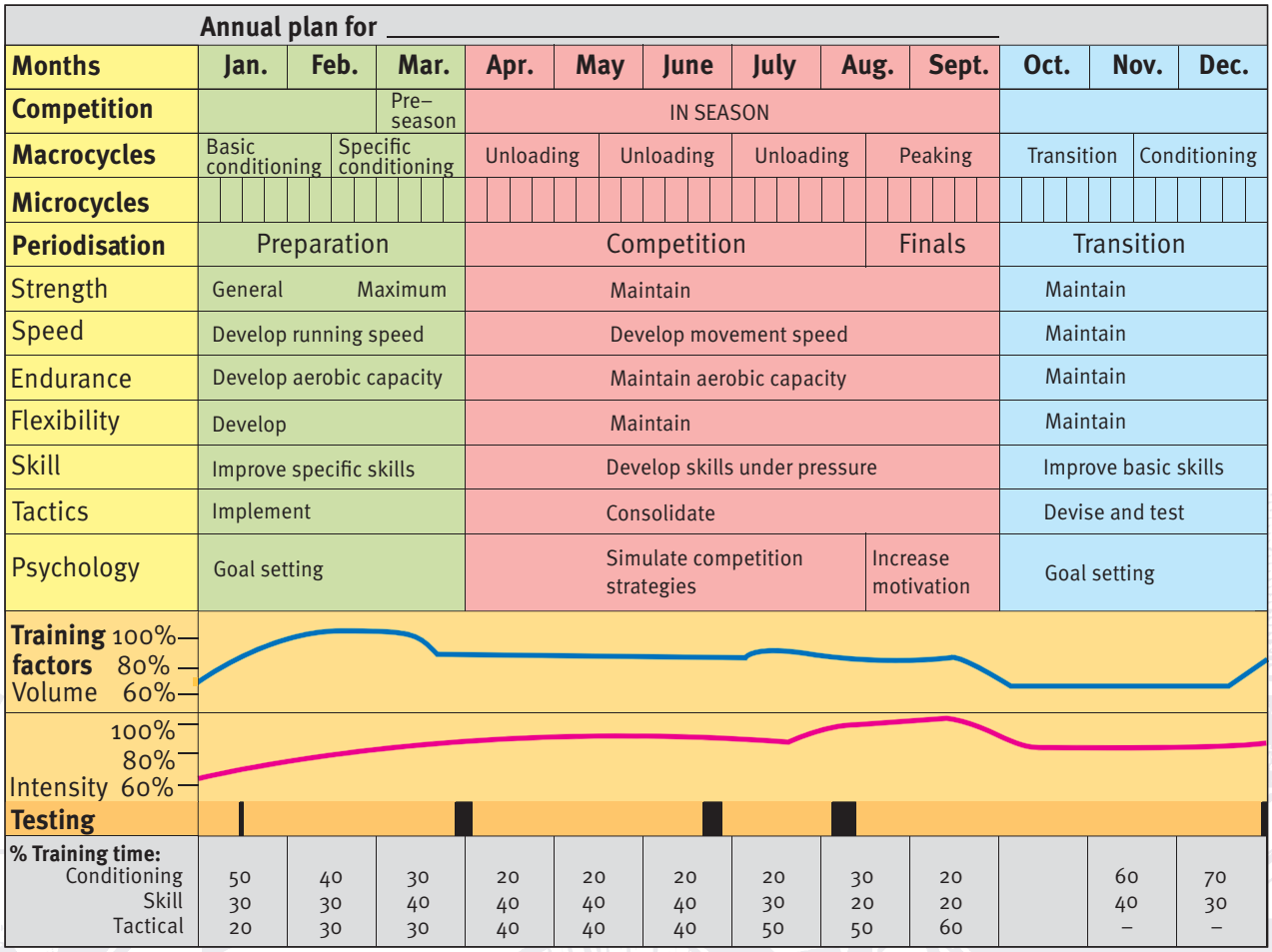
Subphases: macrocycles and microcycles

While a yearly training program can be divided into phases of competition, it can be broken down further to allow a coach to plan a comprehensive yearly training program.

Macrocycles are large blocks within a cycle of training that usually last for 3–6 weeks and vary throughout the year depending on the phases of competition and training outcomes required.

Microcycles are smaller blocks within a macrocycle. Microcycles usually last for 7–10 days. These allow for the manipulation of training volumes, intensities and recovery.

Figure 21.3 provides a great deal of information for a coach wishing to construct a yearly training plan. Note how each daily training session in a microcycle (7–10 days) forms an important part of the larger cycle of training in the macrocycle (3–6 weeks), and that these longer cycles vary in content throughout the year; depending on the phases of the competition and the training outcome required. Note also how different types of training are emphasised at different stages of the year. The transition period or post-season is a period of low impact and regeneration. The unloading phases in the macrocycle refer to a decreasing extent of training, but an increase in intensity. It is hoped that performance will follow the intensity curve (that is, will peak at the end of the season), with a decrease in the volume (amount and duration) of training.



Adapted from TO Bompa, *Theory and Methodology of Training: The Key to Athletic Performance*, 3rd edn, Kendall/Hunt, Iowa

Figure 21.3 Annual training plan

practical application

Annual training plan

1 Study Figure 21.2.

- a To which sports could this training plan be applied?
- b How many training sessions would you suggest for a microcycle during the in-season?
- c Design a rough outline of a week of training in the pre-season to put into this yearly plan.

2 a Choose a team or individual sport and devise a yearly plan for that sport. Present the plan in a table similar to that shown in Figure 21.2.

- b Develop a suitable training microcycle for each competition phase in this sport. (There is no need to be specific about the exact structure of each training session on each day.)

Peaking for performance

Peaking is an optimal state of athletic readiness aimed at the highest possible performance.

As competitions begin, the training regimen should be adjusted to achieve peak performance, both physically and psychologically. The peak performance might be required in September for a rugby league player (for the grand final) or in a few years time for a swimmer (say, the 200-metre final at the Olympics). Coaches design training programs that take into consideration the development of fitness, skills, tactics and competition throughout the season, all aimed at peak performance at particular times of the year.

Peaking for performance results from the athlete's ability to adapt to various training methods and types. It does not occur 'overnight', and it must be planned. It involves a sequential, cumulative training program that focuses on preparing the athlete for a peak performance. The peak performance is a temporary state that occurs when the psychological and physical capacities of the athlete are at a maximum, and when the technical and tactical preparation is optimal.

Peaking is an optimal state of athletic readiness aimed at the highest possible performance. It is characterised by the following:

- good health
- adaptability to training
- quick recovery
- functional synergism (everything acting together)
- extreme efficiency
- adaptability to stress
- self-confidence
- high motivation and aspirations.



Tapering

To achieve peak performance in major competitions, many athletes reduce aspects of their training sessions in the weeks leading up to the event. This allows the body and mind to have a break from vigorous physical exertion, and provides an opportunity to heal injuries and recharge energy reserves. This is known as the 'taper period' or 'tapering'. Tapering can be achieved by decreasing the volume or intensity of training. Reducing training volume, but maintaining intensity, is preferable during the taper. It should be accompanied by rest and good nutrition.

The time to begin tapering varies from sport to sport. A taper period of approximately 7–10 days appears to be appropriate for most sports. A taper period of at least two weeks is recommended for swimmers, and a period of one to two weeks for runners. Tapering in swimming improves performances, with increases noted in both max VO_2 and arm strength. In running events, however, no changes occur in performance, although slight improvements in leg power are evident.

Little research has been done on tapering in team sports, cycling and marathon running. In general, as tapering allows for muscle glycogen stores to be increased in preparation for a match, a reduced volume of training prior to the game must be accompanied by a high-carbohydrate diet. Speed, endurance, strength and power cannot be improved within three days of a match. Therefore, any training session held in the 36 hours before competition needs to be brief and intense, so as not to significantly deplete glycogen reserves.



Any training session held in the 36 hours before competition needs to be brief and intense, so as not to significantly deplete glycogen reserves.

Tapering each week for matches could induce gradual detraining during the course of a season. The coaching staff need to ensure that a well-planned periodised program helps prevent loss of previously acquired adaptations.

The following changes might occur in athletes during the taper period:

- increase in max VO_2
- increase in muscular strength
- decrease in blood lactate levels
- healing of minor injuries
- disappearance of soreness
- replenishment of glycogen stores.

Not all of these will occur in all athletes in the taper period; in fact, none might occur in some athletes.

practical application

Tapering

Suggest a taper program for a team sport of your choice leading up to a grand final.

Sport-specific subphases (fitness requirements, skill requirements)

The phases of competition require different approaches in order to effectively prepare an athlete for competition. The preparation phase (pre-season training) begins with a general conditioning program. This develops to the later stages where emphasis is more focused on the specific requirements of the sport and on skill and strategy practices.

The competition phase is marked by an emphasis on skill and strategy development while continuing with specific conditioning for the sport. Much of this conditioning can be achieved through intense skill practices and small-sided games.

It is important to mix conditioning and skills practice through the competition phase. Planning should emphasise the different aspects across a macrocycle, microcyle and even an individual session.

Figure 21.4 demonstrates macrocycles in the competition phase where one aspect of training is given greater emphasis. Using a systematic approach to plan the pattern of the cycles within a phase of competition, the coach is able to find the correct balance between fitness and skill requirements for the athlete.

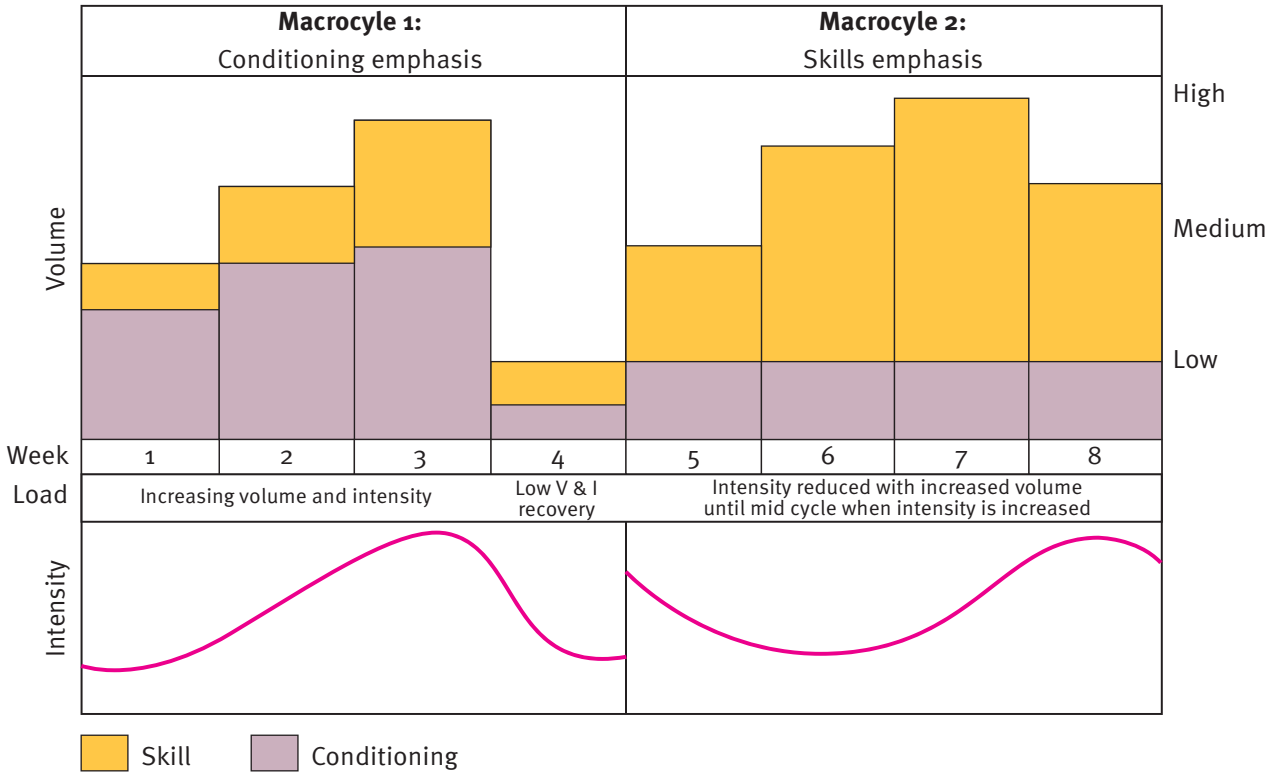


Figure 21.4 Macrocycles in the competition phase

practical application

Sport-specific subphases

1 a Design a post-season, pre-season and in-season training program for a swimmer who has to compete in two major events (January and July) in one training year.

b Specify the particular fitness and skill requirements for this athlete.



Research and Review

1 **Distinguish** between microcycles and macrocycles. What is the role of each?

2 **Explain** the nature of peaking for a team throughout a season.

3 What value does a taper period have in a team sport?

4 Apart from the physiological changes, what other benefits can be derived from tapering?

5 Using an Excel spreadsheet, draw a graph that represents the process of peaking during the season. What modifications to training occur during the peaking stage?

Elements to be considered when planning a training session

Certain important elements must be included in all training sessions if improvements in performance are to occur.

Health and safety considerations

Consideration needs to be given to safety. To ensure that athletes can participate safely, equipment and facilities should be safe and well maintained. Coaching methods should be based on safe practices to minimise the risk of injury to participants. Plans should be adapted to take into account the prevailing weather conditions.

Training session sections

Regardless of the age or experience of the athlete, a training session should be broken up into the following sections.

Providing an overview of session to athletes

To psychologically prepare the athletes for the training session, the coach briefly meets with them to explain the objectives and activities involved in the session. Athletes then need to be instructed effectively if they are to perform the tasks well. Effective instructions are clear, concise, relevant, factual, well timed, constructive, positive and informative.

Warm-up

The objective of the warm-up is to prepare the athlete physically and mentally for the demands of the training session. The warm-up increases in intensity until the athlete is prepared for the full training demands. A slight sweat is a good indication of readiness. The warm-up should be followed by a period of stretching.

The warm-up should be followed by a period of stretching.

Figure 21.5 Coaching methods should be based on safe practices



TRAINING PLAN FORMAT

Date: _____ Venue: _____

Attendance: _____ Conditions: _____

Principal objectives of the week: _____

Principal objectives of the session: _____

Outline of activities performed	'Don't forgets'/Comments Things to be done
	Injuries
	Evaluation

Figure 21.6 Training plan pro forma

WEB

Video of warm-up and cool-down stretching exercises can be accessed via www.oup.com.au/pdhpe12

Skill instruction and practice

After the warm-up and stretch, the coach explains what will happen in the series of drills to follow. The explanation should be brief so that the effect of the warm-up is not lost. Alternatively, the coach might give these instructions before the warm-up, and review them briefly after the warm-up.

The practice of skills and strategies is usually the main part of the in-season training session. If a new skill or strategy is to be learnt, it should be taught straight after the warm-up while the athletes are still fresh. This should be followed by practice. Other skills and strategies from previous training sessions should also be revised. In team sports, drills involving all players may also be practised. This section of the training session will consist of a number of skills taught in a variety of learning activities (drills) to individuals and to groups. These drills will begin to resemble game-like situations as proficiency increases.

Conditioning

General fitness conditioning should occur after skill practices to avoid the practice being adversely affected by fatigue or poor light. Fitness conditioning should last for about 15–20 minutes. The only exceptions are Fartlek training and fatigue-loading, which involve tiring the athlete to practise performing skills when fatigued. These should occur after the warm-up.

practical application

Training plan

1 In pairs, choose a sport and design a 30-minute training session using Figure 21.6. Take members of your class or another group through your training session. Remember that if you have young athletes in the group, the instructions and drills will need to take into account the age of the participants.

a **Describe** how the activities matched the abilities of the group. Provide examples.

b **Describe** the reaction of the group to the training session.

c **Explain** how your training session could be modified.

d **Describe** the hardest part of this activity and why it was the most difficult.

e **Identify** the easiest part of this activity and why it was the easiest.

Cool-down

A cool-down of 5–10 minutes, plus stretching, helps to remove waste products and gradually bring the body back to resting levels. See Chapter 5 for more on warm-ups and cool-downs.

Evaluation

An evaluation of the training session should occur during or after the cool-down. This is an opportunity for the coach and players to reflect on training objectives and performances during the session. It might be a good time to talk about intensity and application in training, punctuality, the next training session, player availability and the coming game. The evaluation should involve the players giving feedback about the training session. This will help to guide future training sessions.

It is important that training starts and finishes on time so that athletes know exactly what is expected of them. Games can also be added into the training session during the warm-up or cool-down, or after conditioning. These serve to motivate, and to reinforce execution of skills in a competitive setting. They can be modified to focus on fun or fitness.

Critical inquiry

Use relevant Internet sites to **examine** different skills and drills that can be used to vary the structure of training sessions. Create a Word document to keep a journal of a number of examples of these.

WEB

Internet support for the task can be accessed via www.oup.com.au/pdhpe12

practical application

Minor games in training

1 Minor games can be used in the training sessions for different sports. Choose three sports and **identify** minor games for each of these sports. For each sport, name a game that can:

- a develop skills
- b be used for warm-up
- c be just for fun.

Research and Review

1 **Recommend** three conditioning activities that also allow skills practice in each of the following sports:
   - a netball
   - b soccer.

2 **Distinguish** between a skill and a drill.

3 **Explain** why a training session should be evaluated.

4 **Describe** why games are used in training sessions.

Planning to avoid over-training

Amount and intensity of training

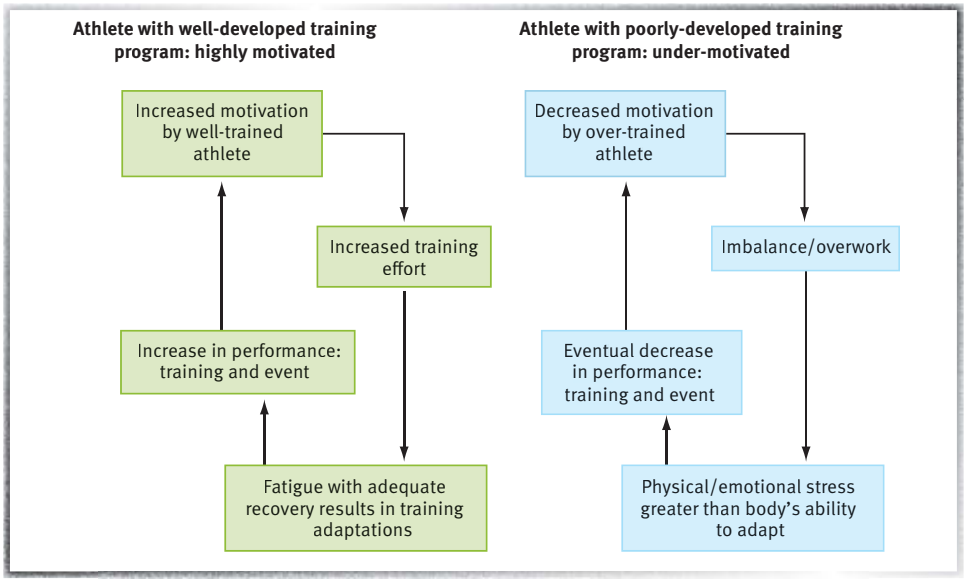
Undergoing months of training with a session every day, or every few days, has the potential to place considerable stress on athletes, both physically and psychologically. Errors may occur when designing and implementing training programs, and this will compromise athletic performance. Careful planning of all phases and cycles can help to avoid problems. Some common errors include:

- under-training or over-training
- use of exercises and work rates that are not sport specific
- failure to plan long-term training programs to meet goals
- failure to taper training before competition.

Very few athletes are under-trained, but many are over-trained—often in the belief that more is best. Over-training occurs when work-outs are:

- too long and too frequent (training volume)
- too strenuous (training intensity)
- conducted with inadequate recovery times between work-outs.

Over-training occurs when an athlete does more work than can be physically tolerated and the amount of training exceeds the body's ability to recover and adapt. This results in more damage to tissue, and not enough time to repair it.



Experiencing fatigue and tiredness during a training program is not always an indication of over-training.

WEB

Internet support for training can be accessed via www.oup.com.au/pdhpe12

Figure 21.7 Effects of training programs that are well-developed and of those that over-train the athlete

Critical inquiry

1 a **Define** 'training volume' and 'training intensity'.

b **Describe** how these factors affect athletic performance.

Physiological considerations

Physiological considerations, such as lethargy and injury, need to be considered when assessing whether an athlete is over-training. It is natural for athletes to experience periods of fatigue and tiredness during a training program. This is not always an indication of over-training. Many of these periods can be corrected by more rest, alternative practices (for example, swimming) and a good diet (high in carbohydrate). Athletes training regularly sometimes become tired and run-down. Over-training should be suspected when a rapid decline in performance is not remedied by the above methods after a few days. The signs and symptoms listed in Table 21.3 might indicate over-training.

Psychological considerations

It is also natural for athletes to lose motivation throughout a training program. As for physiological considerations, this may be corrected by various means. Athletes sometimes lose their desire to train and perform and, in turn, perform badly. The signs and symptoms of mental fatigue caused by over-training include those listed in Table 21.4 (page 388). These symptoms vary from individual to individual. An over-trained athlete might exhibit various combinations of these signs and symptoms. Over-training should be suspected when a rapid decline in performance is not remedied easily, and when some or all of the listed signs and symptoms are noted.

Table 21.3 Possible physiological signs and symptoms of over-training

Physical performance
• Decline in physical performance • Loss of muscle strength • Loss of coordination • Decrease in maximal aerobic capacity • Injury (chronic or acute)
Biological functions
• Increased resting and sub-maximal heart rates • Elevated heart rate in recovery after exercise • Increased blood pressure • Increased oxygen uptake and blood lactate during sub-maximal exercise • Loss of weight (or no weight loss) • Muscle tenderness • Head colds, allergic reactions, sore throats (increased risk of infection) • Occasional nausea • Chronic fatigue • Early onset of fatigue when training/competing • Decreased max VO_2 • Decreased muscle glycogen • Decreased appetite and libido

Adapted from ML Foss & SJ Keteyian, *Physiological Basis for Exercise and Sport*, 6th edn, WCB McGraw Hill, New York; SK Powers & ET Howley, *Exercise Physiology Theory and Application to Fitness and Performance*, 3rd edn, WCB McGraw Hill, New York; JH Wilmore & DC Costill, *Physiology of Sport and Exercise*, Human Kinetics, Champaign, Illinois

Table 21.4 Possible physiological signs and symptoms of over-training

- 'Staleness'
- Sleep disturbances
- Increased feelings of physical, mental and emotional exhaustion
- Decreased self-esteem
- Negative change in dealings with others
- Social withdrawal
- Feelings of overall chronic stress
- Emotional instability
- Decreased motivation and commitment

Adapted from ML Foss & SJ Keteyian, *Physiological Basis for Exercise and Sport*, 6th edn, WCB McGraw Hill, New York; SK Powers & ET Howley, *Exercise Physiology Theory and Application to Fitness and Performance*, 3rd edn, WCB McGraw Hill, New York; JH Wilmore & DC Costill, *Physiology of Sport and Exercise*, Human Kinetics, Champaign, Illinois

Prevention of over-training

Every possible attempt should be made by the coach and athlete to avoid over-training. With increasing pressures to perform, however, many athletes and coaches push too far. Also it is difficult to measure what volume or intensity of training is beneficial or harmful to an athlete. To help prevent over-training, the following measures should be taken:

- Ensure proper nutrition.
- Ensure adequate rest and recovery between work-outs.
- Monitor training loads.
- Vary exercise intensities.
- Monitor physiological changes (for example, increased heart rate, increased oxygen consumption and blood lactate levels—all occurring at fixed work rates).
- Use psychological strategies (for example, mental rehearsal and relaxation).
- Keep a training diary that monitors feelings.

The damage done by over-training cannot be undone in a couple of days. It can take weeks, or even months. Athletes need a marked decrease in the training regimen, or perhaps even complete rest.

Critical inquiry

1. **Explain** the possible links between training intensity and volume and over-training.
2. Choose three sports and, for each, suggest how much training is too much.
3. **Describe** how, by maintaining a daily diary, an athlete may be able to avoid over-training as well as modify programs.

practical application

Strategies to avoid over-training

1. **Outline** the strategies that could be used in an effort to prevent over-training in the following cases:
   - a A sprinter considers she is not improving quickly enough. She increases her number of training sessions per week. After a few weeks she becomes lethargic, finds it hard to motivate herself, has no improvement in times and complains of a sore hip.
   - b A footballer, on the recommendation of a friend, goes from doing interval sprints for improved speed to doing stair drills in the stadium. He complains of sore shins and is unable to play.
2. As a coach, at the junior level it is difficult to monitor what each child is doing away from your training sessions. Use Microsoft Publisher (or similar) to design a letter/pamphlet to give to the parents/carers of children you coach. In the letter/pamphlet:
   - a **Describe** to them what over-training is.
   - b **Explain** what they can do to help identify over-training and prevent it at home.



what are the planning considerations for improving performance?

chapter summary

- Effective planning of a session or a yearly program should take into account the athlete's fitness and skill levels and goals.
- Establishing an annual plan based on the distinct phases of competition allows emphasis to be placed on specific types of training in order to improve performance.
- The competition year has three phases: post-season (or off-season), pre-season and in-season. These can be divided into smaller blocks, called microcycles and macrocycles, to allow more specific setting of training type, volume and intensity.
- Peaking requires effective program design in order to achieve optimal performance at one or more specific times during the yearly program.
- Tapering, by reducing training volume, allows the athlete to maximise physical and mental preparation prior to an event.
- Each training session needs to have certain elements in order to ensure safety and improvement in performance. These include appropriate warm-up, skill instruction and practice, conditioning, cool-down and evaluation.
- Ensuring that an athlete's program has the correct blend of training volume and intensity, rest periods, variety and appropriate diet can avoid the symptoms of over-training.
- Coaches should be aware of the physical and mental signs of over-training as often athletes consider that more is better.

revision activities

1 a **Define** 'periodisation'.
b **Explain** the types of activity recommended for each training phase.

2 a **Describe** the components of an individual training session.
b **Outline** reasons for including each of these components.

3 **Outline** the steps you, as the coach, would take to assist an athlete who is over-trained.

4 Design a checklist to recognise the signs and symptoms of over-training in a 100-metre swimmer.

extension activities

1 **Examine** a sport in which you are currently participating. The following questions provide a guide for your examination.
a Critically **evaluate** the training program you are following with respect to the phases of competition. (Highlight features such as training volume and intensity and the types of activity performed.)
b **Compare** your training with that of another sport played during the same season. (What aspects of your training are specific to your sport and not to the other sport? Are there aspects of your training that may be relevant to the requirements of the other sport? What may be the value of cross-training?)
c **Justify** the appropriateness of your current training program and, if necessary, make recommendations as to how it could be improved.

exam-style questions

1 **Explain** how periodisation of an athlete's program can help the athlete to improve his or her performance. (8 marks)

2 **Compare** and **contrast** the focus of the preparation (pre-season) stage of an annual program with that of the in-season stage. (12 marks)

3 Skill and tactics are vital components of an athlete's overall success. **Analyse** the development of these components during the phases of competition. (12 marks)

4 **Propose** strategies you would use to ensure that each of the elements of a training session is addressed for an under-12 cricket team that you are coaching. (12 marks)

5 **Describe** the signs that would assist in identifying an over-trained athlete. (8 marks)

chapter 22

what ethical issues are RELATED TO IMPROVING performance?

Ergogenic aids

'Ergogenic' is Latin for 'energy-producing'.

An ergogenic aid is any procedure, process or substance that enhances performance (or is perceived to enhance performance). An ergogenic aid can have one or more of the following effects: delay the onset and perception of fatigue, act directly on muscle fibres, supply fuel for muscular contraction, act on the heart and circulatory system, affect respiration, mask pain and hasten recovery.

Ergogenic aids are not only drugs. There are five classes of performance-enhancing aids. They are:

- mechanical aids (equipment, skill development and biomechanics)
- pharmacological aids (drugs)
- nutritional aids (dietary manipulation)
- psychological aids (mental rehearsal, goal-setting and hypnosis)
- physiological aids (blood-doping, training, recovery procedures and oxygen uptake).

Most of these aids are accepted as legal and safe methods of improving athletic performance; however, some are illegal. Ergogenic aids that pose ethical, clinical or legal questions are banned from use in athletic events.





Certain techniques are continually modified and improved to enhance performance in a fair manner. These include:

- carbohydrate-loading
- water, vitamin and mineral consumption
- training techniques
- warm-up techniques
- improved equipment
- mental rehearsal.

Use of drugs

The use of drugs to enhance performance has occurred throughout the history of sport. Success and fame have brought rich rewards from a variety of sources, and competition for a portion of these is intense. The intrinsic desire to win and the lure of millions of dollars in prize money, and more than this again in sponsorships and endorsements, cause some athletes to take any measure to improve their performance.

The use of illegal performance enhancing drugs and methods is a significant problem in modern sport. The International Olympic Committee (IOC) has developed a list of banned substances and practices in sport. The IOC believes that doping:

> ... contravenes the ethics of sport and medical science. Doping consists of the administration of substances belonging to prohibited classes of pharmacological agents and/or the use of various prohibited methods.

The Australian Sports Drug Agency tests athletes in Australia for the presence of doping agents.

Various methods are used in order to gain a vital edge over an opponent. While some are safe and within the rules of the sport it is the illegal performance enhancing drugs and methods that are the focus of sporting bodies. The classes of substances that are prohibited are stimulants; narcotics; anabolic steroids; diuretics; and peptide hormones, mimetics and analogues.

The methods that are prohibited include blood-doping and pharmacological, chemical and physical manipulation.

Some drugs are subject to certain restrictions. These drugs are alcohol, cannabis, local anaesthetics, corticosteroids and beta-blockers.



Internet support about drug use in sport can be accessed via www.oup.com.au/pdhpe12

Harms of performance enhancing drug use

The use of ergogenic aids, many of which are prohibited by sporting bodies, can be seen to be a major temptation to gain an edge over competitors. For some, the risk may seem to be worth it given the relatively small penalties for illegal use (maybe as little as six months suspension), the effectiveness and more undetectable nature of modern drugs, and the low rate of testing outside the immediate top competitors in many countries; especially when compared with the prospect of being rewarded with a multi-million-dollar lifestyle. At risk, however, is not only the health and general well-being of the athlete but also the true spirit of sport, the rights of hard-working athletes and the perception of certain sports by the general public. Athletes from many sports succumb to the temptation and may then suffer devastating consequences (see the article on Dwain Chambers on page 392).

There is also an opposing point of view that by legalising the use of drugs the potential harms will be lessened as the drugs can then be taken under medical supervision. Those holding this view claim that such legalisation would also 'level the playing field' and provide an even competition (see article titled 'Aussie legend "supports drug use"' on page 393).

Dwain Chambers's race for respect

Controversial British sprinter Dwain Chambers opens up to Adrian Proszenko about drugs, suicide and a desire to race Usain Bolt again.

It is only now, years after they were inked onto his arm, that the words make sense to Dwain Chambers. Tattooed in Japanese is 'courage to win', a motto he is starting to live by. 'It never meant much to me at the time but [the words] are coming into effect now,' Chambers told *The Sun-Herald*. 'That's what drives me. Initially that was going to be the title of the book but it was taken.'

The book sprinting star Chambers refers to is his autobiography, *Race Against Me*, which will have British sporting officials in the foetal position when it is released on … It's the story of a national hero turned villain, a cautionary tale of what can happen when you give into temptation and fear. It also takes aim at the officials that have prevented Chambers a shot at redemption with the national track team.

In his prime, the British runner was one of the fastest men in the world. When he trained alongside world record-holder Usain Bolt, Chambers claims the honours were split in 100-metre match races.

But in 2003 his life imploded when he was exposed as a drug cheat, a mistake that left him penniless and friendless. During that dark period, Chambers considered suicide.

'I'm sure we've all been down that road,' he said. 'At the lowest point in our lives you think about calling it a day. On many occasions I did.

'… I thought about it, I really did. It's something people [say] lightly but it's really serious …'

Only his family—the 30-year-old has three sons—prevented him from following through.

'If I didn't have something to keep me going, I would have been selfish and walked away, maybe taken my life. Who knows?

'In life, they say everything happens for a reason. What the reason is for me going down the road of taking drugs, I don't know. I'm sure the answer will come to me at some stage of my life.'



Picking himself back up … Dwain Chambers is back on the track again after being just one of many sprinters suspended for testing positive to performance enhancing drugs

What Chambers does know is that he doesn't want anyone else to make the same mistake. To that end, he details his relationship with Victor Conti, the head of the infamous Bay Area Laboratory Co-operative (BALCO) implicated in some of sport's greatest doping scandals. Everything is laid bare. The horrific side effects of drugs, the hospital visits, being pursued by the FBI… 'All sorts of crazy things happened to me during this period,' Chambers said.

'The transformation I had to go through from a regular guy to a superhuman—it's a crazy affair.

'[Drugs] come as a high and it's a quick fix, but when you get caught, the punishments will be far worse. It's an easy trap to fall into but it's not worth it at the end of the day. These are things you hear upon the grapevine but I'm prepared to talk and expose the experiences and give an insight into my life.' …

Chambers had hoped to join Bolt at the starting blocks of the Beijing Olympics but his bid to overturn his Olympic ban was thwarted in court, a decision that shattered him.

'I know [Bolt] is not going to be bold enough to come forward and say it, but I beat him very often in training,' Chambers said of his 2006 training partner.

'Based on my performances of 6.64 [over 60m] indoor, that equates to about 9.89 [over 100m], which would have got me the silver medal. It doesn't make no sense; I'm the best this country's got and they continue to put individuals far slower than me into positions they're not capable to handle. But there's no point crying over spilt milk. That's gone and we'll never know what would have happened if we'd got out there. I hope to race [Bolt] this year.'

Boasting a personal best time of 9.97 seconds over 100 metres, Chambers says he can run a 9.8. More importantly, he has assured a sceptical public that the times he posts will be clean.

'The problem we have in the sport is that if you run fast, people think you're dirty anyway,' he said.

'That's sad. There's still that [stigma] around the topic of drugs in sport.

'At the end of the day, I'm routinely tested. There's no reason for me to lie any more.'

Scorned by the British public and the national selectors, Chambers had relatively unsuccessful stints with American football and rugby league sides. However, he has returned to the sport in which he made his name and aims to win a medal in the World Championships.

'I'm a sprinter, I'm not anything else,' he said.

Sun-Herald, 25 January 2009

Aussie legend 'supports drug use'

Former middle-distance runner Ron Clarke, one of Australia's most revered sporting figures, has launched an unexpected defence of drug use in sport.

Clarke told the Australian Associated Press (AAP) on Wednesday that athletes should be permitted to use performance-enhancing drugs, including steroids and EPO, as long as they did not harm their health.

'If it's not dangerous, no (it should not be banned), it just levels the playing field,' Clarke was quoted as saying.

'As soon as something comes along like EPO … they'll say it's a drug and you can't use it (but) it's the only thing that levels the playing field.'

Clarke, a former multiple world record holder who retired in 1970, said athletes born at sea level should be allowed to use drugs to give them a fairer chance against competitors raised at altitude.

'There are two competitions in the world, the altitude runners and the others,' he said.

'I'm not advocating drugs, I'm saying until there is a drug, there won't be any parity in any future competition.

'We'll never break another world record by our sea level athletes from 1,500m or above for another century.'

Clarke broke numerous world records during his glittering career but never won the Olympic gold medal.

BBC Sport online, 3 July 2002

Critical inquiry

1 Read the article 'Dwain Chambers's race for respect', then complete the following tasks.

   a What is the significance of the tattoo on Dwain's arm for him now?

   b **Identify** the consequences of Chambers's decision to use performance-enhancing substances.

   c **Describe** the stigma that surrounds the topic of drugs in sport. What problems can this stigma create?

2 Read the article 'Aussie legend "supports drug use"'. **Discuss** Clarke's belief that the controlled use of drugs will bring parity to competition in the future.

Physical effects

Athletes take drugs to make their muscles bigger, recover from hard training sessions much more rapidly, increase blood volume and oxygen-carrying capacity, reduce pain and speed up or slow down the central nervous system. The aggressive feelings that come from taking certain drugs may also make them appealing to various athletes. While giving the athlete an unfair advantage over others there are many physical harms that come from the use of these drugs. As many athletes may take these drugs at doses that are significantly higher than those prescribed for medical reasons, the harmful effects can be magnified.

Reputation

Sport is considered to be an important part of life. Many countries have built their reputation around the sporting success of teams and individuals. Sport is also considered to be enjoyable and fair. When the aim is about winning at all costs the reputation of countries, individuals and the sport itself can be tarnished. Already, certain sports such as weightlifting, cycling and athletics have achieved this unwanted status. Improved performances and victories may be tainted by questions raised about the legitimacy of the athletes. As many athletes are considered role models around the world, implicated athletes lose the respect of their peers and the spectators and may be vilified by the media. This may, in turn, affect the athlete's own psychology.

Sponsorship and income

Millions of dollars are invested in sports by governments and sponsors. The suspicion of illegal drug use in a sport may so tarnish the reputation of the sport and associated individuals that funding and sponsorship are withdrawn. This can result in the sport finding it difficult to grow and even the honest competitors may lose income.



Figure 22.1 The team Astana was banned from the 2008 Tour de France after team member Alexander Vinokourov tested positive for blood-doping

Cycling has found itself in this situation where its premier event, the Tour de France, has been tarnished by riders using a variety of drugs to gain an advantage. Whole teams have folded after sponsorship has been removed as the result of just one rider on the team testing positive to drugs. Teams have also found it difficult to attract sponsorship as companies maintain that cycling teams are 'a marketing nightmare'.

The reputation of weightlifting has often suffered at the hands of individuals who test positive. This has even led to governments withdrawing funds to support national teams and has left amateur athletes unable to continue.

Table 22.1 shows a number of drugs and methods that are banned for their effects on performance, or for health and ethical reasons.

Drug use for strength

Increased muscle size provides additional strength for an athlete, which provides an advantage over opponents. Athletes use various training methods to achieve this. However, some athletes may look to drugs to assist with this gain in strength. The two most commonly used drugs for this purpose are human growth hormone and anabolic steroids.

Table 22.1 Banned drugs and practices

Drug or method	Description	Possible harm
Anabolic steroids	Synthetic derivative of testosterone Anabolic (muscle-building) effect Androgenic (promotes male secondary sex characterisitics) effect Commonly used in strength and power events	Liver dysfunction Cancer Infertility Shrinking of testes in males Menstrual dysfunction in females Development of male secondary sex characteristics in females Increased acne Increase in heart problems
Analgesics	Depress the central nervous system Reduce pain Reduce inflammation Can be used in most events	Liver problems Mask real injuries Slow the healing process Often used without medical advice
Beta-blockers	Slow down heart rate Commonly used in shooting sports (in which competitors fire between heart beats)	Decreased heart rate Decreased blood pressure Drowsiness
Blood-doping (blood is drawn from the athlete, stored and reinfused at a later date)	Increased blood volume Increased oxygen-carrying capacity Commonly used in endurance events	Blood incompatibilities (if not own blood) Disease transmission Blood infection Air embolism Blood clot Decreased training after blood is removed
Diuretics	Increased fluid released from body Can be used to mask anabolic steroids Commonly used in sports with weight restrictions (jockeys, boxing)	Kidney damage Dehydration and electrolyte loss
Erythropoietin (a naturally occurring hormone that stimulates production of red blood cells; made synthetically, and then injected)	Increases oxygen-carrying capacity Used in endurance events	Thickens blood (can lead to heart attack, clots or stroke) Disease transmission via injections Determining amount to inject is difficult
Human growth hormone (occurs naturally, but is available synthetically)	Decreased body fat Commonly used to increase size, strength and power	Similar to anabolic steroids Acromegaly (enlarged hands, feet and face) Increased risk of heart disease Adverse, irreversible effects on growth

Critical inquiry

1 a **Identify** the restrictions that are placed on the use of the last five drugs listed in Table 22.1.

b What effects do each of these five have on performance?

Research and Review

Study Table 22.1. Research other types of drugs and doping methods that athletes may use.

Human growth hormone

Human growth hormone (HGH) is a powerful anabolic hormone that occurs naturally in the human body. It is produced by the pituitary gland in the brain and stimulates the growth of muscle, cartilage and bone. A sportsperson is likely to take HGH to increase muscle size. Because there is a close relationship between muscle size and strength, competitors in events that require power and short bursts of explosive strength would benefit the most. It also allows muscles to recover more quickly, therefore allowing the athlete to train harder and more often. HGH also increases the number of red blood cells, boosts heart function and makes more energy available by stimulating the breakdown of fat. This can provide some benefit to endurance athletes. Strengthening of connective tissue is reported to reduce injury.



A coarsened facial appearance (such as protruding jaw and eyebrow bones) can result from use of HGH.

There are, however, many potential health risks. One of the most common side effects of HGH misuse is acromegaly. The major symptoms of this are swelling of the hands and feet and a coarsened facial appearance, such as protruding jaw and eyebrow bones. Organs such as the heart, liver and kidneys will also undergo excessive growth, leading to potentially life-threatening problems. The most common of these problems is cardiomyopathy, where the heart loses its ability to pump blood and the rhythm becomes irregular. Hypertension and diabetes may also occur. There is also a risk of menstrual irregularities and impotence as well as an increased risk of cancer due to the abnormal growth of cells.

Anabolic steroids

Anabolic steroids are drugs that resemble testosterone, a hormone that is produced in the testes of males and, to a much lesser extent, in the ovaries of females. Testosterone is partially responsible for the developmental changes that occur during puberty and adolescence and is also involved in controlling the development of all tissues, including muscle. Because testosterone and related drugs affect muscle growth, raising their levels in the blood can help athletes increase muscle size and strength. This is known as the anabolic effect and allows the athletes to train harder and longer, with improved recovery from training sessions. Athletes who use anabolic steroids also claim that they reduce body fat and recovery time after injury. Steroids may also promote increased aggression and competitiveness in athletes.

Anabolic steroids are often taken in cycles during training prior to competition and then stopped for several weeks before a competition to reduce the likelihood of positive testing.

Testosterone is responsible for stimulating development of male sexual characteristics (androgenic effect) as well as the build up of muscle tissue (anabolic effect). Effects such as increased body hair and a deepening of the voice are not always desirable, particularly in women. To counteract these side effects, manufacturers of anabolic steroids aim to minimise the androgenic effects and maximise the anabolic effects.

As anabolic steroids mimic naturally occurring hormones they can interfere with normal hormone function. This may result in a wide range of harmful side effects, such as increased risk of liver and cardiovascular diseases (particularly hypertension), acne, male and female infertility, abnormal menstrual cycles, shrinking testicles, stunted growth in teenagers as a result of premature closure of the growth plates of the bones, premature baldness, increased aggression and mood swings. They may also produce psychological dependence.

Drug use for aerobic performance

Manufactured naturally by the kidneys, erythropoietin (EPO) is a peptide hormone that acts on bone marrow to stimulate the production of red blood cells and regulates the concentration of red blood cells and haemoglobin in the blood. EPO can be produced artificially using DNA technology. By injecting EPO,

athletes aim to gain a benefit by increasing their concentration of red blood cells, which are responsible for supplying oxygen to the cells, including muscle cells, and consequently, increasing their aerobic capacity. EPO may also increase the body's capacity to buffer lactic acid.

There are various health risks associated with the use of EPO. If EPO levels are too high the body will produce too many red blood cells. This can lead to thickening of the blood, which clogs capillaries, causing blood clotting, heart attack and stroke. It can also place the user at increased risk of contracting infectious diseases, such as hepatitis and HIV/AIDS. Users of EPO are also at risk of having an autoimmune reaction whereby EPO antibodies destroy the EPO that is produced naturally by the body, which then leads to anaemia. In fact, EPO has been implicated in the deaths of several athletes.

Drug use to mask other drugs

With increased use of drug testing and severe penalties for those caught, athletes will look for ways to avoid detection. There are drugs available that may assist the athlete in returning a negative test. Two commonly used drugs to mask other drugs are diuretics and alcohol.

Diuretics

Diuretics are agents that reduce the amount of fluid in the body by increasing the amount of urine produced. Athletes may use these substances to conceal prohibited substances (for example, anabolic steroids) by diluting their urine in an attempt to mask a drug test. Drug tests require a minimum concentration in order to detect the presence of a substance. The increased urine produced reduces the concentration of other matter. However, the detection of a diuretic in a urine drug test constitutes a positive test.

Side effects from the use of diuretics include dizziness or even fainting; electrolyte imbalance and dehydration; muscle cramps; a drop in blood pressure; loss of coordination and balance; inability of the body to regulate temperature; confusion, mental changes or moodiness; and cardiac disorders.

Alcohol

Alcohol is a diuretic. It actively encourages the body to lose more water than it takes on by halting the production of the body's anti-diuretic hormone. This speeds up the loss of fluid from the body, which may mask drugs in a test or assist in removing traces of drugs taken before a test.

Alcohol use is banned in-competition in certain sports as it can increase self-confidence, which may result in the person taking risks that he or she would not normally take. It may also cause loss of coordination and balance and, through dehydration, the inability of the body to regulate temperature. Generally, though, it reduces athletic performance and is not widely used.

Benefits and limitations of drug testing

Drug-testing procedures are highly sophisticated and reliable. However, the people who manufacture and use banned substances or practices are often able to stay ahead of testing procedures by authorities. The Australian Sports Drug Agency (ASDA) is responsible for drug testing in Australia.

Drug testing involves the testing of urine of athletes. This can be done:

- randomly
- in bulk (a large number of athletes at once)
- according to their finishing positions.

The drug tests are designed to detect and deter abuse of performance enhancing drugs by competitors. This is deemed to ensure a fair competition where the characteristics and training of an athlete are the factors that produce the winner. It also benefits the athletes by promoting good health above the desire to win at all costs and protects athletes from the inherent harms of many drugs.



Figure 22.2 Testing procedures for drug abuse in sports are strict

The testing procedures for drug abuse in sports are strict and the testing procedure must be closely adhered to so that all athletes receive the same treatment. Yet, at times, some athletes deem tests to be unfair. Athletes may suggest a test is unfair because the athletes themselves are responsible for knowing what is banned, despite the fact that additions are made almost daily to the list of banned substances. As such, the best possible solution for an athlete is to avoid the use of any drugs unless listed on the allowed substance list.

For the testing procedure to be of benefit it is vital to ensure that the sample actually comes from the athlete, so the testing officer must be able to see the urine flow from the athlete into the bottle. Male athletes are required

to strip to their waist and lower their shorts to their knees to ensure no devices may be used to transfer foreign material. Female athletes must also be observed very closely while they produce a sample. While necessary, this procedure can be very awkward and embarrassing. For young athletes, producing a urine sample under these conditions can be traumatising. For many people, irrespective of age, being observed while giving a urine sample is not a comfortable situation. The testing procedure can be further complicated if the athlete involved has been taking part in an endurance sport and is dehydrated and therefore unable to comply.

Drug testing is no longer restricted to being done at competitions but is now carried out year round, with random tests occurring any time, any place. The athlete is notified of the requirement for a test by phone, in person or by letter. This benefits the authorities as this year-round short-notice and no-notice testing is seen as the most effective means to reduce the use of 'training drugs', such as steroids. The purpose is to make the athlete feel at constant risk of being tested and hence avoid taking any banned drugs. However, some athletes will try to beat the testing. Some athletes may try to predict when a drug test will occur and prepare for it by cycling their drug taking or attempt to neutralise the effects of testing for drugs and/or masking agents.

Tens of millions of dollars are spent on drug testing yearly, yet the effect of this may be limited as drug manufacturers are constantly researching new and improved drugs that are less detectable. Other drugs occur as natural substances in the body and so tests for them may lack validity. Recent developments in terms of blood testing and the requirement that manufacturers place certain markers in drugs may prove to be of benefit to sporting authorities.

Critical inquiry

1 a Select a number of sporting organisations. **Compare** their:
- drug-testing policies
- drug-testing procedures
- sanctions for drug use.

b In your view, which of the organisations studied in the task above has the best procedures?

2 Research the role that drugs have played in sport since ancient times.

3 **Outline** the changes in society that have led to the current situation with regard to drug use in sport.

4 **Assess** the implications of classifying some drugs as legal and some as illegal.

5 **Identify** other factors that can be considered in the debate about drug use in sport? Matters to consider include equity, politics, health, role of sport in society, influence of the media, and money.

6 The Olympic motto is 'Citius, Altius, Fortius' ('Faster, higher, stronger'). This motto encourages athletes to use any means in order to win. **Discuss**.

7 **Explain** what is meant by 'the true spirit' of the Olympic Games.

practical application

Performance enhancing drugs

Write a letter to the International Olympic Committee (IOC) in which you explain your position on the use of performance enhancing drugs. Offer suggestions to the IOC with regard to how the drug problem can be addressed.

Research and Review

1 **Describe** why urine is used predominantly to test for evidence of drug use.

2 **Identify** some of the advantages and disadvantages of using blood for drug-testing purposes.

3 If you had authority to change drug-testing procedures, **recommend** how you would change them.

4 Should athletes be tested for the use of recreational drugs, even if the drugs don't improve performance? **Justify** your answer.

5 **Explain** how the principles of harm-minimisation can be applied to drugs in sport.

6 **Identify** the advantages and disadvantages of drug testing.

7 **Propose** the level of competition at which drug testing should be introduced.

8 **Propose** various consequences of a positive drug test.

The use of technology

Coaches have at their disposal a number of techniques that can aid training, skill development and performance. Some are ground-breaking technological developments, whereas others are 'tried and true' and inexpensive.

These various aids are designed to correct technique, create resistance, offer support or padding and improve performance. Many of them have revolutionised how sports are played and trained. Most have made the work of coaches easier because they enable coaches to more closely simulate game or competition situations or to evaluate athletic performance. Some are as simple as socks that absorb moisture. Others are high-tech $5-million pursuit bicycles. Whether simple or complex, sports technology presents numerous opportunities and dilemmas. The tools of the athlete's trade are now stronger, faster, lighter and better designed than they were even a few years ago. Science and technology are advancing at a rapid rate in every sphere of life, including sport.



Figure 22.3 Wind tunnel testing allows for analysis of optimum technique

Training innovation

Astute coaches keep abreast of training advances in their sport. They can do this by reading, watching others and attending seminars. Various sources provide information about current coaching techniques, equipment, psychological techniques, nutrition, testing, coaching aids and technology.

Some technological innovations that have improved sports performance include:

- clothing (type of material, swimsuits, aerodynamics, shoes)
- protective equipment (tackle suits and bags, helmets, mouthguards, shin pads, shoulder pads, head gear)
- computer programs and software (statistics, performance simulators)
- the Internet (interactive sports websites)
- electronic scoreboards and score sheets
- engineering technology at sporting venues (retractable roofs, modern seating, replay screens)
- equipment modifications (such as in cycling, surfing, sailing, cricket, tennis)
- testing procedures (max VO_2, float tanks, wind tunnels, sprint gates, beep tests)
- nutrition (high-energy food and drinks)
- heart-rate monitors and biofeedback (lactate threshold testing)
- training facilities (non-wave pools, specialised playing surfaces)
- video analysis and photographic equipment
- assignment of specific tasks to coaching staff, such as doctors, physiotherapists, psychologists and tacticians
- match performance analysis sheets
- fitness equipment (treadmills, weight machines, sprinting sleds)
- rehabilitation equipment (artificial joints, ligaments and tendons, ultrasound, laser)
- media technologies (globalisation of sports, television, multimedia marketing companies)
- drugs (improving performance, avoiding testing)
- alternative therapies.

WEB

Internet support about use of technology in sport can be accessed via www.oup.com.au/pdhpe12

These training innovations have enabled athletes to go faster and higher, and be stronger. World records are frequently broken these days; rarely do records stand for a number of years, as used to be the case. Winning performances depend on technology; but is the athlete or the technology responsible for the win? Perhaps the real competitors are the manufacturing companies, and the athletes are a means by which these companies compete against each other.

Lactate threshold testing

Lactate analysis has been used by many athletes and physiologists over the last decade as a tool for predicting endurance performance. Specifically, the higher the percentage of max VO_2, or the higher the pace at which the lactate threshold occurs, the fitter the athlete.

The maximal lactate steady state (or lactate threshold) is the best indicator of endurance performance as, generally, the athlete who achieves this at the higher effort level will be faster in an endurance event. Increases in the maximal lactate steady state are almost always accompanied by improvements in race performance for endurance events.

Frequent lactate threshold testing is an effective measure of improvements due to training. With proper protocols a portable lactate analyser enables the coach to measure both the aerobic and anaerobic conditioning of an athlete. Information about both is necessary for the coach to optimise the conditioning of each athlete, whether he or she is a 50-metre freestyle swimmer (about 22 seconds plus per race) or an Ironman triathlete (over 8 hours per race for the world's best). With information the coach can plan, control and monitor the training of athletes with a precision not available before. Lactate testing provides the important information that enables the coach to individualise the intensity of each athlete's workout and control the training so the athlete is able to reach performance objectives.

Biomechanical analysis

Many coaches film the performances of athletes and teams so that they can evaluate the performance of individuals later using biomechanical analysis. This also allows the coach to concentrate more fully during the actual competition.

Some coaches have assistants who analyse these recordings; others perform the analysis themselves. By using visual recordings, the coach is able to replay movements, correct techniques and evaluate performance. The coach is also able to assess the performance of the opposition. Visual recordings provide valuable information to coaches and athletes about past performances, and provide similarly valuable information for planning future performances.

Data can be gathered during the performance, and afterwards by replaying the footage. Coaches, assistants and other athletes can watch the performance of certain individuals and complete a data sheet on them. They can record how many tackles an individual made, how much ground was made, how many successful kicks were made, and so on. The strengths and weaknesses of the opposition can also be evaluated.

This type of statistical information is used to evaluate performances, isolate weaknesses and strengths and improve future performances. When used together, visual recordings and data analysis are valuable coaching tools.

Ross looks to bare bones

By Mike Hurst

This is Australia's fastest man like you have never seen him before.

Make no bones about it, exciting new technology is enabling biomechanical experts at the NSW Institute of Sport to give Josh Ross and other Olympic aspirants an edge in the countdown to the Beijing Games in August.

Winner of the past four national 100m championships and two Stawell Gifts as backmarker, Ross, 26, is the best sprinter in the country but he still has plenty of shortcomings.

NSWIS staff, including biomechanics expert Mark Moresi, himself a former international 400m runner, are studying Ross on special video film that has helped his new coach identify technique problems.

But the most intriguing and potentially most valuable scientific evaluation may come through the use of the Vicon computer program, which provides a three-dimensional perspective of the subject.

The athlete appears as a skeleton that can be viewed either as a still picture or on the move. This is done by using a series of infra-red cameras.

The Vicon system creates a 3D reconstruction of the athlete in motion, enabling a detailed analysis of his movement pattern, be it sprinting from the starting blocks or hurling a discus.

'Once we've got the reconstruction on the computer it allows us to get any sort of measurement, such as joint velocities, distances from toe to knee, toe to hip or whatever so that we can work out the athlete's centre of mass,' Moresi said. 'Ultimately we can track all of the athlete's movements, efficient or otherwise.'

Ross and his new coach, Paul Nancarrow, have embraced the science as part of an overhaul Ross wants to make to his training in a bid to produce his best at an international championship.

National sprints coach Paul Hallam, who works at NSWIS and is working with Nancarrow, said analysis had revealed Ross has a few technical problems. 'He yields at the hip and knee on his left leg which means his foot collapses after an initial good contact with the track,' Hallam explained. 'You're only as strong as your weakest link in the chain of movement so we're working to correct this.'

Ross will target the world indoor 60m title this summer. Nancarrow believes that if his training goes to plan Ross will be faster off the starting blocks at the indoor tournament in Valencia, Spain, from March 7 to 9.

The indoor meet follows the annual Australian championships in Brisbane the previous week (Feb 28–March 2) when Ross will be gunning for his fifth consecutive national 100m crown.

Daily Telegraph, 23 November 2007



Sprinter Josh Ross has had technique corrections since a biomechanics computer program identified problems with his technique

practical application

Training innovation

1 Collect a number of data-gathering sheets from a variety of sports.

a **Explain** the sort of information that is available to coaches on each.

b **Propose** how it could be used in future performances.

Equipment advances

Swimsuits

Significant progress has been made in swimsuit development since the 1980s. It has reached a stage where questions are being asked about the influence of this technology on the athlete's performance.

Light, thin and extremely close fitting swimsuits were designed in the 1980s to minimise contact area with the water and even repel water. After the 1992 Olympic Games contrasting stripes were printed onto close-fitting swimsuits to generate two currents: one slow, one fast. When the fast and slow currents interact, vertical vortexes or spirals are formed. As a result, the speed of water flow increases and stays closer to the body longer.

By the 2000 Olympics, swimsuit designers had created a swimsuit that imitated the skin of a shark. The cut and seams on the suit were designed to cover the whole body without impeding the swimmer. Body scanning took measurements to design individual suits, which improved streamlining.

The most recent developments have produced widespread calls for the total banning of high tech swimwear. 'Bodysuits' have always had performance-enhancing qualities. However, the Speedo LZR exponentially increased this and more recently at the 2009 World Championships a new range of suits by Adidas, Arena and Jaked saw an unprecedented 46 world records broken. These suits are made from a special ultra-lightweight water-repellent material that, through compression, reduces skin vibration and offers low drag friction while improving buoyancy. Internal stabiliser supports hold the swimmer in the best position in the water and overall the design optimises the shape of the swimmer. Technological advances in these designs have seen the question raised as to the advantage swimmers receive from the suit and even caused many swimmers and coaches to call for restrictions in technological advances. From January 2010 these suits will be restricted by the issuing of new rules that restrict body coverage, buoyancy levels and the actual materials used. Rules will also put a stop to custom suits for individual athletes.



Figure 22.4 The latest swimsuits optimise the shape of the swimmer

Golf ball

Golf balls no longer curve as much as they used to. Players can just swing as hard as they want at the ball and it goes straight at the flag.

Research developed a new golf ball, introduced in the mid-1990s, which achieved the unimaginable: it merged a high-spinning, soft-feeling Balata type of ball (with a rubber-band-wound core) with the low-spinning, long-flying and durable distance ball into a whole new class of product, which allowed distance and control.

A few years later, the original breakthrough was improved upon by making the urethane outer covers of the balls more durable and thinner and firmer for added distance. At the same time, advances in rubber systems allowed ball makers to design cores that were more energetic or 'faster'. This provided even more distance on shots hit with the longer clubs, while maintaining a soft feel.

Further improvements to the core and cover have reduced spin on drives to increase distance and allow greater control.

Critical inquiry

1 With continued advances in the use of technology, **discuss** whether innovations are creating an unfair playing field. Provide examples.

2 **Discuss** whether, as with performance enhancing drugs, all forms of ergogenic aids should be banned from competition.

3 **Propose** examples of sports that are technologically dependent and ones that are not.

Research and Review

How has technology influenced the coach's role in improving the performance of athletes?

what ethical issues are related to improving performance?

chapter summary

- Athletes may use drugs as a performance enhancing aid. Various benefits can result, including increased strength, increased size, improved endurance and an increase or decrease in nervous stimulation.
- Drugs commonly used to gain performance enhancing effects are steroids, human growth hormone, EPO, amphetamines and analgesics. Some drugs, such as alcohol and diuretics, may be used in attempt to mask other drugs.
- Sporting organisations regularly test competitors for drug use during competition or randomly out of competition. Urine testing is most commonly used but blood testing may also be used. Despite this, some athletes continue to use drugs and may escape detection as advances in drug manufacture outpace drug detection methods.
- Ethical, medical and legal problems may result from an athlete's choice to use drugs.
- Physical harms are wide ranging and may be increased through the use of drugs from unknown sources.
- Other harms that may be faced by athletes who use drugs include loss of reputation, loss of income, psychological and social problems and various legal issues.
- Technology has produced many advances in sport. These advances assist the coach with analysing performance and designing effective training programs and the athlete with improving their performance. Examples include data collection devices, computer analysis software, and equipment and clothing design.
- While benefiting performance, technological advances have also raised ethical issues and resulted in regulations being introduced in some sports.

revision activities

1. **Identify** the various harms an athlete may encounter from the use of drugs.
2. Technosport refers to the merging of the human body and sports technology. **Propose** any human factors that might be eliminated from a competition because of technosport.
3. **Describe** the benefits it is hoped will be achieved through the use of drug testing.
4. **Identify** the role that the media have played in sports technology.

extension activities

1. Research current newspaper and magazine articles and search on the Internet for stories relating to the use of drugs and technological advances in sport. Create a journal of these articles. Record a brief summary of each article.
2. Research an athlete who has tested positive for taking performance enhancing substances and **describe** the substance taken, the possible future harms, the reasons for taking it and the penalty and other losses the athlete has or will encounter.
3. **Extrapolate** the role that pressure created by the media and the unrealistic expectations of the public play in athletes choosing to use performance enhancing substances.
4. **Examine** a sport of your choice and report on how technology has been used to improve training methods and performance in that sport.

exam-style questions

1. **Discuss** the issues arising from the suggestion to allow the use of performance enhancing drugs in sport. (8 marks)
2. Critically **analyse** the ethical issues raised by the use of drugs in sport. (12 marks)
3. **Justify** the use of drug testing in sport. (8 marks)
4. **Evaluate** the use of technology by coaches in order to improve performance. (12 marks)
5. **Discuss** how the use of technology in providing training innovations, improved equipment and performance analysis has created an uneven playing field in sport. (8 marks)
6. **Assess** the impact that the use of technology has had on training methods and performance in sport. (12 marks)



outcomes★

A student:

- H1 describes the nature, and justifies the choice, of Australia's health priorities
- H2 analyses and explains the health status of Australians in terms of current trends and groups most at risk
- H3 analyses the determinants of health and health inequities
- H5 explains the different roles and responsibilities of individuals, communities and governments in addressing Australia's health priorities
- H14 argues the benefits of health-promoting actions and choices that promote social justice
- H15 critically analyses key issues affecting the health of Australians and proposes ways of working towards better health for all
- H16 devises methods of gathering, interpreting and communicating information about health and physical activity concepts.



option 5

Equity and health

coming up Within the Australian population certain groups experience a poorer health status than others. This Option examines the social, economic, cultural and political factors that influence the health of particular groups. It also examines the various strategies that can be implemented to reduce the gaps in health status among groups in the population. This Option also discusses the health inequities experienced by particular groups in Australia.

FOCUS QUESTIONS

- Why do inequities exist in the health of Australians? [page 404]
- What inequities are experienced by population groups in Australia? [page 412]
- How might the gap in health status of populations be bridged? [page 436]







chapter 2.3

why do inequities exist in the HEALTH OF AUSTRALIANS?

This Option further explores concepts that were raised in Core 1, such as equity, social justice and the determinants of health. In this chapter you will study the factors that create health inequities and identify how these factors contribute to the inequities experienced by different population groups in Australia. You will also explore how multiple risk factors contribute to health inequities and how these inequities may be managed to improve the health of Australians.

> Without peace and justice, without enough food and water, without education and decent housing, and without providing each and all with a useful role in society and adequate income, there can be no health for the people, no real growth and no social development.
>
> WHO, quoted in F Baum, *The New Public Health: An Australian Perspective*, Oxford University Press, Melbourne





Factors that create health inequities

There are many factors within society that act as barriers to achieving optimal health. The major causes of health inequities in Australia are:

- daily living conditions
- quality of early years of life
- access to services and transport
- socio-economic factors
- social attributes (such as discrimination and social exclusion)
- government policies and priorities (in health, economic and social contexts)

Unfortunately, many Australians simultaneously experience a number of these social risk factors that affect health. Most of these are beyond the control of the individual, so it is inappropriate to 'blame the victim' and to say that people should 'get a job', 'move house' or 'get an education' to improve their circumstances. As a society, Australia needs to consider how the levels of disadvantage experienced by many people today can be reduced so that everyone has the same opportunities to reach optimal health. To do this effectively, we must recognise the underlying social causes of the health inequities that exist, and consider health in its broadest sense. Action to achieve equity in health needs to be underpinned by principles of **social justice**.

Daily living conditions

Secure and adequate living conditions are essential for maintaining health. A person's daily living conditions include whether the person has access to:

- a water supply
- nutritious food
- garbage disposal
- sewage disposal
- adequate lighting and heating
- a dwelling that is not overcrowded in relation to the number of people living in it.

People living in urban areas take for granted the many services they receive, such as clean water and garbage disposal. In some outer-urban, rural and remote locations, residents are not always guaranteed access to clean water, garbage disposal and waste removal. This greatly affects the health of people in those communities because without those services they become more susceptible to communicable diseases. Living in crowded conditions can also increase susceptibility to those diseases and can create stress, which can influence an individual's mental health.



Figure 23.1 Daily living conditions include access to garbage disposal services

We cannot assume that all Australians live in a particular type of dwelling. Homeless people, for example, have to survive in conditions that are not conducive to good health. They experience high levels of stress due to living in crowded and often chaotic conditions. Many homeless people encounter difficulties accessing health services, and many are susceptible to **exploitation** in terms of drug use and prostitution. They suffer higher rates of tuberculosis, cardiorespiratory illness, skin conditions, inadequate nutrition and sleep deprivation. Many homeless people lack the basic requirements for health.

Where people live can also lead to differences in health status. People living close to industrial areas can experience health problems associated with pollution. People residing in crowded cities with a large number of cars and associated traffic congestion can experience health problems due to high levels of lead in the air. This can be particularly harmful to the development of young children.



Figure 23.2 The foundations of adult health are laid down before birth and in early childhood

Quality of early years of life

The foundations of adult health are laid down before birth and in early childhood. Slow growth and poor early experiences become biologically embedded during development. They increase the lifetime risk of poor emotional health and reduce physical cognitive and emotional functioning into adulthood. Poor experiences during pregnancy (such as nutritional deficiencies; maternal smoking, alcohol and drug use; and inadequate **prenatal** care) can lead to poor **foetal** development, which is a risk factor for poor health later in life.

Access to services and transport

It is important that all Australians have equal access to health care and transport. This requires the provision of services that are within the reach of the population and meet the needs of the population. To ensure this is achieved involves an analysis of the characteristics of the population in terms of:

- age
- gender
- ethnic background
- socio-economic status
- disability
- geographic location
- educational level.

People will be more likely to access services if they believe that those services are culturally appropriate, and employ health workers who are sensitive to their situation. It is also important that health services are available to people in terms of the distance they have to travel, how long they have to wait for service, the physical access to the building in which the service is located (such as adequate wheelchair access) and the amount they have to pay for the service. In Australia, **Medicare** ensures that all citizens have access to basic health care (see Chapter 3).

Some areas are not well serviced by public transport. This means that those without cars can experience social isolation and an inability to access essential services. Some people live a long distance from health services. This is particularly true in rural and remote areas.

There are other factors of life in rural and remote locations that can contribute to variations in health status. Access to health care can be an issue in many rural centres. This is particularly true in smaller towns because many rural centres in Australia have difficulty attracting doctors and other health staff to work there. Also more people experience accidents and injury in these locations. Many young people have to leave towns in rural and remote areas to seek employment and educational opportunities elsewhere. This has led to a reduction in the population and, as a result, many services have been cut in these areas.

Cycling and walking (including to and from public transport) promote health as they are forms of exercise, reduce the incidence of vehicle accidents and air pollution, and increase social contact. People without private transport and people in places with poor or no public transport are less able to participate fully in the life of the community. This has associated health impacts.

Research and Review

1. **Identify** experiences in the early years of life that may positively and negatively contribute to the inequities experienced by different population groups in Australia.
2. **Analyse** the factors that make it difficult for some individuals to access health services.
3. **Discuss** how a person's geographic location can influence that person's health.

Socio-economic factors

A number of **indicators** determine an individual's socio-economic status. The Australian Bureau of Statistics (ABS) uses **indices** of socio-economic advantage to determine socio-economic conditions in an area. These indices include:

- relative socio-economic disadvantage (measured by income, tertiary education and occupation)
- economic resources (measured by dwelling size, income and multiple car ownership)
- education and occupation (measured by higher education qualifications and high level of skill).

The greater a person's level of socio-economic disadvantage, the poorer will be that person's health status. If an individual has few economic resources, that person might not, for example, be able to afford nutritious food and quality housing. Men and women of low socio-economic status have a higher death rate, and report higher levels of illness and reduced levels of activity due to illness. They make greater use of primary and secondary health services, and less use of preventative and screening services. Therefore, their health worsens before they seek care. In addition, they are more likely to have lifestyle risk factors, such as consuming an inadequate diet, smoking, drinking excessively and engaging in an inadequate level of physical activity.

Although it is known that individuals who are socio-economically disadvantaged experience poorer health status compared with the rest of the population, it is not known exactly why this relationship exists. Studies have not determined whether low socio-economic status actually causes poor health. What these studies have revealed is that lower levels of economic resources and inadequate social support negatively affect health, directly or indirectly.

Occupation

There are enormous differences in the types of work that individuals perform. Occupation influences health status in a number of ways. First, it determines the amount of economic resources that individuals have at their disposal. Second, occupation influences health by the nature of the work required in that occupation. Some occupations are more hazardous, and safety issues in these occupations are therefore of greater importance. 'Blue-collar' workers have the highest incidence of occupational ill-health, and make up a high percentage of those with reported occupational illness and injury.

WEB

Internet support concerning **occupational health and safety** can be accessed via www.oup.com.au/pdhpe12

The influence of occupation on health goes beyond physical health as a result of safe work practices. Job satisfaction and having the freedom to make some decisions about one's work can also impact on a person's health status. Healthy workplaces take into consideration these psychological and social aspects of work, as well as the physical safety of employees.

Access to, and level of, education

Groups with the worst health status tend to have the least education. Adequate education can provide people with the necessary knowledge, skills and attitudes to lead healthy lives. Education also contributes to employment prospects, which can determine the economic resources that a person will have.

One important aspect of education is development of literacy skills. Without basic literacy skills, individuals might not be able to read instructions on medications or safety warnings in the workplace. This can have direct effects on their health. Individuals with a low literacy level are less able to use written information; that is, less able to read, comprehend and act on the information. This can lead to feelings of powerlessness and low self-esteem. It is therefore important that all people in society have access to education.

Unfortunately, this is not the case. Individuals face many barriers in gaining access to educational opportunities. These include:

- cultural **alienation** from the school system
- insufficient resources to participate fully in the school's community
- pressures to leave formal education early to earn money.

In addition, with the trend towards increased fees, access to tertiary education is becoming increasingly difficult for those with limited economic resources.

Australia's population has a high proportion of migrants who need opportunities to learn English. In the late 1990s, funding for such programs was reduced. This means that only those migrants who can afford access to these programs will be able to improve their opportunities to participate fully in Australian society.

Critical inquiry

1 **Describe** what you consider should be the minimum standard-of-living conditions for all Australians. What actions would be needed to attain these?

2 a **Investigate** the responsibilities of both employers and employees under occupational health and safety legislation.

b **Evaluate** the effectiveness of such legislation, particularly with regard to the psychological aspects of work (such as stress and employee involvement in decisions that affect them).

Social attributes

Groups experiencing disadvantage or difficulty may be exposed to multiple risk factors contributing to health inequities. These include social exclusion, racism and discrimination.

Each of these social risk factors, in isolation, can create inequities in health status. The reality is that many people in Australian society experience a number of these factors. This exposure to multiple social risk factors can make some individuals within a population more vulnerable. For example, for a male living in a small rural town, there might be limited employment opportunities because of the downturn in many rural economies. This can lead to the inequities that are experienced by those who are economically disadvantaged and unemployed. This man's location might also limit his access to health care. This compounds the health problems he faces. His personal circumstances are thus very disadvantageous in terms of protecting and promoting his health status.

Although generalisations can be made about groups with certain characteristics, there are differences within each group. For example, not all individuals experiencing socio-economic disadvantage will necessarily experience the health inequities generally associated with that group. Although a person might not have a high level of economic resources, this person might have sound living conditions, a job that is challenging and satisfying (even if not well paid), access to health care and strong social supports. This person might also engage in health-enhancing behaviour, such as eating well and participating in regular physical activity. Therefore, although factors such as socio-economic disadvantage put people at risk, they do not automatically create health inequities.



Although factors such as socio-economic disadvantage put people at risk, they do not automatically create health inequities.

Social exclusion

Poverty has a major impact on health and premature death. Poverty denies people access to full participation in the life of the community. Those who are homeless have the highest rates of premature death. Social exclusion also results from racism, discrimination, stigmatisation and unemployment. The greater the length of time that people live in disadvantaged circumstances the greater the risk of ill-health, particularly cardiovascular disease. Some people move in and out of poverty during their life, which means the prevalence of people who have experienced social exclusion (and its negative impact) is greater than the current incidence.

Racism

Racism refers to the unequal treatment of people on the basis of their racial background. Australia has a history of racism, particularly with regard to the treatment of the Indigenous Australian population. Racism can contribute to health inequities in a number of ways:

- Racist attitudes can limit an individual's access to employment and educational opportunities.
- People who encounter health professionals who are insensitive to their needs and cultural beliefs about health care will be less likely to seek preventative care.
- When individuals are made to feel different and not accepted as part of their community this can affect their feelings of self-worth, perhaps leading to depression.

Social isolation can also result from racist attitudes, and this has negative effects on mental health. In a statement on social justice, the federal government outlined the importance of valuing cultural diversity. This statement identified the Commonwealth *Racial Hatred Act 1994* as an example of legislation introduced to make racial vilification illegal. This Act enabled people to complain to the Human Rights and Equal Opportunity Commission if they have been victims of racial vilification in the form of public humiliation or intimidating racial behaviour. This is an example of how public policy can influence the health of groups within Australia and how governments can lead in this area by taking a position on important social issues.

Discrimination

Discrimination can be based on a number of factors. As noted earlier, individuals can be discriminated against because of their racial background. People can also be discriminated against on the basis of:

- age
- gender
- marital status
- education level
- place of residence
- having a disability.

When an individual is discriminated against it results in that person not receiving the same opportunities as others. People who experience discrimination might not, for example, gain access to employment, education or health or other services. Those who are discriminated against can feel powerless, have a lack of control over their situation, and develop a sense of hopelessness, which affects their mental health.

Society, as a whole, sometimes discriminates against certain people, such as older age groups. A 50-year-old person trying to gain access to the workforce might discover that there is a general perception that people of this age are 'past it', and no longer capable. This misconception can lead to depression in many of those people who are retrenched in their middle age. A society that claims to promote principles of social justice must recognise and acknowledge discriminatory practices, and must implement policies and programs to address those practices.

Critical inquiry

1 With respect to racism in Australian society:
   a **Describe** the actions that can be taken at government, community and individual levels to eliminate racism from Australian society.
   b **Propose** how you would contribute to addressing the health priorities of Australia.

2 Certain social risk factors create health inequities. **Discuss** all the possible risk factors to which an individual could be exposed.
   a **Discuss** which public and private sectors in Australia need to contribute to addressing these factors.
   b **Propose** how the management of addressing the risk factors could be coordinated to ensure that health inequities are reduced.

Research and Review

1 Discrimination can be based on a number of factors, such as age or disability. **Discuss** the barriers to health that could be encountered by an individual experiencing discrimination.

2 **Investigate** a program that is specifically targeting a disadvantaged group. Your local community health centre or local area health service health promotion unit could advise you about this.
   a **Describe** the strategies being implemented in this program.
   b **Discuss** how these strategies are contributing to reducing a health inequity.

Government policies and priorities

Health

The government may, at various times, identify particular priorities for investment in health, including public–private partnerships. Health and medical research is influenced by policy decisions at all levels of government, as well as within organisations, such as universities, hospitals and research institutions. For this reason, health professionals look to engage with policy-makers to obtain support for additional high-quality health and medical research.

WEB

Internet support concerning government policies can be accessed via www.oup.com.au/pdhpe12

Social

The social and political dimensions of health and illness present important challenges to practitioners, administrators and policy-makers. For example, government policies need to acknowledge and value Australia's cultural diversity.

Certain social policies can contribute to health inequities. For example, in the 1990s, the federal government changed the allocation of funding to child-care centres. An allowance was paid directly to families rather than to child-care centres. This caused a significant increase in the cost of child care. Many parents on lower incomes could no longer afford child care, even with the government allowance. It was no longer economically
viable for both parents to work. This government policy decision had an impact on health in a number of ways.
It could be argued that those children who were no longer able to attend a child-care centre had less opportunity for social interaction. They may have also missed the educative value of attending a child-care centre. Participating in work provides adults with the opportunity to socialise and meet challenges, which contributes to their feelings of self-worth. Non-participation in work can increase an individual's sense of social isolation.

Economic

Government can only deliver high-quality health services and infrastructure by maintaining disciplined budgets and encouraging strong economic growth.

The changes in child-care arrangements described above meant that some parents had limited choices and a reduced opportunity to work. It could be argued that this funding allocation discriminated against women. Its greatest effect was on women in poorly paid, part-time or casual work. Also, because women are still the primary carers of children, it is likely that they were more affected than male parents.

Government economic policies that are not directly related to health may still have an impact on people's health and well-being. Consider the example of funding of tertiary education. This can influence people's opportunities to access education. Only those who can afford tertiary education will be able to attend. This might not appear to be directly related to an individual's health status, but education increases a person's literacy level, and this, in turn, influences the person's health.



Figure 23.3 Government policies and priorities, such as in the area of child care, can affect people's health directly and indirectly

Research and Review

1 Choose one of the following population groups in Australia:

- Aboriginal and Torres Strait Islander peoples
- the homeless
- people living with HIV/AIDS
- the incarcerated
- the aged
- those from culturally and linguistically diverse backgrounds
- the unemployed
- geographically remote populations
- people with disabilities.

Discuss how the factors listed below contribute to the inequities experienced by the group:

a daily living conditions
b quality of early years of life
c access to services and transport
d socio-economic factors
e social attributes (such as discrimination and social exclusion)
f government policies and priorities (in health, economic and social contexts).

Critical inquiry

1 The federal government introduced a goods and services tax (GST) in 2000.

a **Investigate** how this policy has affected individuals on low incomes, and how it has affected the prices of various essential goods and services.

b **Describe** the effect that this government economic policy has had on health status.

c **Discuss** the contribution of this government economic policy to social justice in Australia.

2 Critically **analyse** the potential for populations to be exposed to multiple risk factors contributing to health inequities and the implications for managing the inequities.

Why do inequities exist in the health of Australians?

chapter summary

- There are many factors within society that act as barriers to achieving optimal health.
- The major causes of health inequities in Australia are daily living conditions, quality of early years of life, access to services and transport, socio-economic factors, social attributes, and government policies and priorities.
- Action to achieve equity in health needs to be underpinned by principles of social justice.
- Secure and adequate living conditions are essential for maintaining health.
- The foundations of adult health are laid down before birth and in early childhood.
- It is important that all Australians have equal access to health care and transport.
- The greater an individual's level of socio-economic disadvantage, the poorer that individual's health status will be.
- Government economic policies (such as the funding of tertiary education) can influence people's opportunities to access education.

revision activities

1. **Outline** the factors that create health inequities.
2. **Identify** the population groups that experience health inequities.
3. **Describe** the risk factors that contribute to health inequities.
4. **Outline** the implications for managing health inequities.

extension activities

1. **Discuss** the reasons why inequities exist in the health of Australians.
2. **Identify** how the factors that create health inequities contribute to the inequities experienced by different population groups in Australia.
3. **Analyse** the potential for populations to be exposed to multiple risk factors contributing to health inequities.
4. **Discuss** the implications for managing health inequities for Aboriginal and Torres Strait Islander peoples and one other population group.

exam-style questions

1. **Outline** factors that create health inequities. (3 marks)
2. **Describe** how a social justice framework addresses a factor that creates health inequities. (5 marks)
3. **Clarify** how social risk factors contribute to health inequities in Australia. (5 marks)
4. **Analyse** the potential for populations to be exposed to multiple risk factors contributing to health inequities and the implications for managing the inequities. (10 marks)
5. **Discuss** the factors that contribute to the inequities experienced by different population groups in Australia. (8 marks)

chapter 24

what inequities are experienced BY POPULATION GROUPS in australia?

On the whole, Australians enjoy good health. This is due to our high living standards and the good standard of the Australian health care system. Not all Australians share good health. There are many health inequities that cannot be explained by individual characteristics or behaviour. These inequalities are most apparent among Indigenous Australians and the socio-economically disadvantaged. Other groups that may experience varying levels of health inequities include the homeless, the aged, the **incarcerated**, the unemployed, people living in remote areas, those from culturally or linguistically diverse backgrounds, and people living with HIV/AIDS. This chapter examines some of the social, economic and political factors that have an impact on standards of health and access to health services.

WEB

Internet support concerning the health of Indigenous Australians can be accessed via www.oup.com.au/pdhpe12

Populations experiencing health inequities

Aboriginal and Torres Strait Islander peoples

Estimates indicate that Aboriginal and Torres Strait Islander peoples comprise approximately 2.5 per cent of the Australian population. They experience a much greater proportion of the ill-health of the population. This is an area of major inequity that requires urgent attention.





There are two key difficulties associated with data relating to Aboriginal and Torres Strait Islander peoples:

- The definition of Aboriginal and Torres Strait Islander persons varies from one set of data to another.
- There have been different ways of collecting data about Aboriginal and Torres Strait Islander peoples.

This has led to different estimates of the Aboriginal and Torres Strait Islander population.

For almost every health condition, Aboriginal and Torres Strait Islander peoples are disproportionately affected. The Indigenous Australian population has an overall age-standardised rate of disease burden two and a half times greater than that for the general Australian population. The Indigenous Australian population also has higher DALY rates than does the total Australian population for each of the seven leading contributors to total disease burden: diabetes (5.1 times the rate of the Australian population), cardiovascular disease (4.6 times), intentional injuries (4.1 times), unintentional injuries (2.5 times), chronic respiratory diseases (2.5 times), cancers (1.7 times) and mental disorders (1.6 times).

Non-communicable diseases account for 70 per cent of the disease burden gap between Indigenous Australians and the total Australian population. Cardiovascular disease is the leading cause (23 per cent of the gap) followed by diabetes (12 per cent), mental disorders (12 per cent) and chronic respiratory diseases (9 per cent). Data from the 2004–05 National Aboriginal Torres Strait Islander Health Survey indicates that eye or sight problems, respiratory diseases, musculoskeletal problems and diseases of the circulatory system were the most commonly reported long-term conditions. Table 24.1 shows the reported prevalence of various long-term health conditions.

DALY (pronounced 'dally') stands for disability-adjusted life year. One DALY is one year of 'healthy life' lost due to a disease or injury. This means of measurement of health provides an equal basis for the comparison of the impact of different diseases and injuries.

Critical inquiry

Discuss the health inequities experienced by Indigenous Australians.

Table 24.1 Prevalence of selected long-term health conditions by Indigenous status, 2004–05

Condition	Indigenous Australians (%)	Total Australians (%)
Eye/sight problems	30	52
Musculoskeletal diseases	22	31
Arthritis	9	15
Diseases of the respiratory system	27	29
Asthma	15	10
Circulatory problems/diseases	12	18
Endocrine, nutritional and metabolic diseases	9	12
Diabetes/high sugar levels	6	4
Diseases of the nervous system	8	8
Digestive diseases	4	7

AIHW, Australia's Health, 2008

Health and well-being

Life expectancy and mortality rates

The life expectancy for Aboriginal and Torres Strait Islander peoples is estimated at 67 years for males and 73 years for females. For other Australians, life expectancy is 79 years for males and 83 years for females. For almost every type of disease or condition, sufferers who are Indigenous Australians die younger than non-Indigenous sufferers. In addition, in each age group, death rates are higher for Aboriginal and Torres Strait Islander peoples than for other Australians.

The Indigenous all cause mortality rate is twice the rate for non-Indigenous Australians.

Although there have been improvements in the mortality rates of Indigenous Australians in recent years, the data collected indicates a widening in the gap in overall mortality rates between Indigenous and non-Indigenous Australians. Some of the reasons for this are that Aboriginal and Torres Strait Islander peoples report:

- lower incomes than other Australians
- higher rates of unemployment
- lower educational attainment
- lower rates of home ownership.

However, the gap in mortality rates between Indigenous infants and other infants is narrowing.

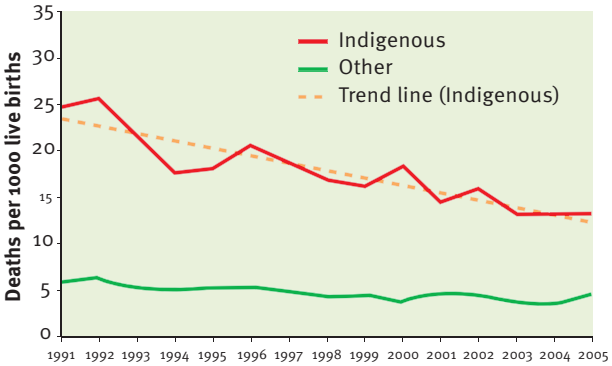
About 71 per cent of Indigenous Australians who died in the period 2001–05 were younger than 65 years. By stark contrast only 21 per cent of the non-Indigenous population died before the age of 65 years.

Death rates among Indigenous and non-Indigenous Australians are indicated in Table 24.3 (page 416). For all causes of death, rates for Indigenous males and females are at least twice as high, across all age groups, as those for non-Indigenous males and females. For 2005–07, age-specific death rates were higher for Indigenous Australians than for non-Indigenous Australians for all age groups. The greatest differences were for those people aged between 35 and 54 years, where Indigenous Australian death rates were three to eight times those for non-Indigenous Australians. Indigenous Australians have death rates in excess of the non-Indigenous population for almost all causes of death. The three leading causes for Aboriginal and Torres Strait Islander people are diseases of the circulatory system, external causes of morbidity and mortality (mainly accidents, intentional self-harm and assault) and **neoplasms** (including cancer).

Indigenous infant mortality rates are high; however, the gap compared with non-Indigenous infants is narrowing, as shown in Figure 24.1. There was a dramatic decline in overall infant mortality rates in Australia over the twentieth century, with the rate of infant deaths decreasing from 103 deaths per 1000 live births in 1900 to 4.2 deaths per 1000 live births in 2007. For the total population, the infant mortality rate has been consistently higher for males than females over the past 20 years.

Reducing avoidable deaths is a key component of improving Indigenous Australian life expectancy. Factors outside the health system also contribute to health and mortality. These factors include socio-economic factors (education, employment and income), lifestyle factors (substance use, obesity and nutrition), environmental factors and interactions with the justice system.

Dying from an avoidable cause is 3.8 times as likely for Indigenous Australian females as for non-Indigenous Australian females and 4.5 times as likely for Indigenous Australian males as for non-Indigenous Australian males (see Table 24.4, page 416).



Source: AIHW, Australia's Health, 2008

Figure 24.1 Infant mortality rates by Indigenous status, 2005–07

Health risk factors

Aboriginal and Torres Strait Islander people also experience socio-economic disadvantage compared with other Australians. This places them at greater risk of exposure and vulnerability to health risk factors. The 11 risk factors identified in the survey account for half the gap in disease burden between the Indigenous Australian population and the total Australian population. Tobacco is the leading risk factor (17 per cent of the gap) followed by obesity, (16 per cent), physical inactivity (12 per cent), high blood pressure (7 per cent) and alcohol (4 per cent).

Indigenous Australians are twice as likely as non-Indigenous Australians to be subject to health risk factors, including smoking, binge drinking, using illicit drugs and being victims of violence. Indigenous Australians are also more likely to be physically inactive and subject to more than one of these risk factors. Indigenous Australians with low levels of educational attainment are more likely than those who had completed Year 12 to smoke regularly, to consume alcohol at risky or high-risk levels and to engage in low levels of exercise and less likely to eat fruit or vegetables on a daily basis.

A number of other issues related to the living, working and social conditions of Indigenous Australians, along with a reduced sense of control over their own lives, may help to explain the generally poorer health of Aboriginal and Torres Strait Islander peoples.

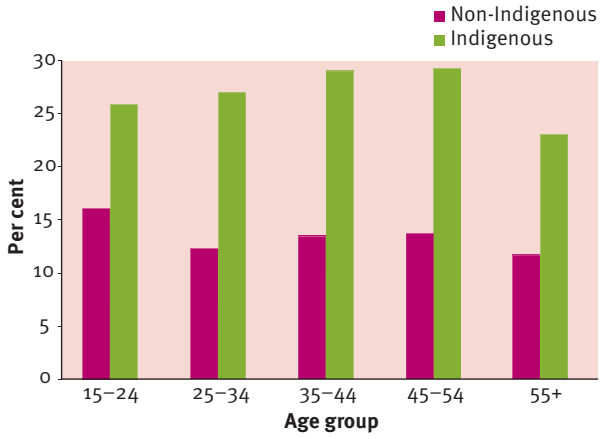
Dental health

The dental health of Aboriginal and Torres Strait Islander peoples is worse than for other Australians, both for children and adults. Trend data from the Northern Territory indicate that the dental health of Indigenous Australian children has not improved since 1991. Based on data collected in 2000–01, Indigenous Australian adults also had a greater average number of decayed and missing teeth and a lower average number of filled teeth than non-Indigenous Australian adults across most age groups.

Social and emotional well-being

Information about the social and emotional well-being of Indigenous Australians was limited until the 2004–05 National Aboriginal Torres Strait Islander Health Survey was completed. More than one in four (27 per cent) Indigenous Australian adults report high or very high levels of psychological distress, with Indigenous females significantly more likely than Indigenous males to report such levels (32 per cent and 21 per cent, respectively). A higher proportion of Indigenous adults than non-Indigenous adults report high or very high levels of psychological distress in every age group (see Figure 24.2). According to the AIHW, when comparing Indigenous Australians to other Australians, Indigenous Australians are twice as likely to report high or very high levels of psychological distress. More specifically:

- Approximately 21 per cent indicate they had been unable to work or carry out their normal activities because of their distress.
- Around 12 per cent have seen a doctor or other health professional at least once for this reason.
- One in seven (15 per cent) indicate that physical health problems were the main cause of these feelings.



Source: AIHW, Australia's Health, 2008

Figure 24.2 Psychological distress among Australians

Access to health services

Many Indigenous Australians visit a general practitioner or medical service if they have a problem with their health. Information about visits to the general practitioner can provide a clearer picture about the state of Indigenous health. Indigenous people visit a general practitioner in relation to the same health problems as non-Indigenous Australians; although diabetes and circulatory conditions are more common reasons for general practitioner visits by Indigenous Australians. Table 24.2 indicates the health problems managed by general practitioners in Indigenous and non-Indigenous Australian patients.

Table 24.2 Problems managed by general practitioners at encounters with patients by Indigenous status, 2001–02 to 2005–06

	Number per 100 encounters	
Problems managed	**Indigenous**	**Other**
Respiratory	20.3	19.8
Skin	14.7	16.9
Musculoskeletal	15.3	17.3
Endocrine and metabolic	18.6	11.3
Diabetes—non gestational	10.2	3.1
Circulatory	19.8	16.7
Psychological	12.0	11.6
Digestive	10.9	10.0
Pregnancy and family planning	4.7	4.4
Ear	4.1	4.0
Other	35.9	36.7
Total problems	**156.4**	**148.8**

AIHW, Australia's Health, 2008

Health services that are begun, managed and operated by the Indigenous Australian community have the potential to increase the level of access for Aboriginal and Torres Strait Islander peoples. This is because they focus on providing holistic and culturally appropriate care.

In 2006–07, the most common diagnosis for Indigenous Australians admitted to hospitals was 'care involving dialysis', a procedure used in treating kidney failure. Indigenous Australians were also commonly hospitalised for injury (such as resulting from assault and attempted suicide), respiratory diseases (such as influenza and pneumonia), digestive diseases (such as diseases of the liver, intestines and mouth) and mental and behavioural disorders (such as schizophrenia and those resulting from **psychoactive substance** use). Hospitalisation rates for Indigenous Australians were higher for most **diagnoses** than for other Australians and they were hospitalised for care involving dialysis at 14 times the rate of other Australians. Endocrine, nutritional and metabolic diseases, which include diabetes, were three times higher than the rate experienced by other Australians.

Table 24.3 Age specific death rates and median age at death, 2005–07

Age (years)	Males			Females		
	Indigenous	Non-Indigenous	Rate ratio*	Indigenous	Non-Indigenous	Rate ratio
			NSW/Qld			
0	11.1	5.2	2.2	7.7	4.1	1.9
1–4	51.8	23.9	2.2	29.3	19.3	1.5
5–14	20.4	11.3	1.8	11.6	8.4	1.4
15–24	94.1	59.2	1.6	48.6	23.5	2.1
25–34	191.2	85.0	2.2	111.1	33.8	3.3
35–44	462.1	128.1	3.6	269.6	68.7	3.9
45–54	862.1	278.9	3.1	506.6	167.9	3.0
55–64	1675.8	674.8	2.5	1143.3	400.0	2.9
65 +	5091.4	4217.6	1.2	4173.9	3681.2	1.1
			WA/SA/NT			
0	14.0	3.6	3.9	10.1	3.8	2.6
1–4	79.9	25.4	3.1	69.7	15.0	4.6
5–14	36.5	7.8	4.7	28.2	7.7	3.6
15–24	260.2	67.1	3.9	113.8	26.6	4.3
25–34	503.6	100.4	5.0	264.8	37.5	7.1
35–44	1080.6	139.3	7.8	578.8	73.3	7.9
45–54	1565.2	282.3	5.5	972.1	167.1	5.8
55–64	2682.7	660.9	4.1	2022.0	376.0	5.4
65 +	6729.5	4190.4	1.6	5334.1	3625.9	1.5

*Indigenous rate divided by the non-Indigenous rate

Overcoming Indigenous Disadvantage, Key Indicators 2009

Table 24.4 Avoidable mortality, by age and sex, people aged 0–74 years in Qld, WA, SA and NT

Age (years)	Males			Females		
	Deaths per 100 000			Deaths per 100 000		
	Indigenous	Non-Indigenous	Rate ratio	Indigenous	Non-Indigenous	Rate ratio
Less than 1	699.7	239.6	2.9	517.3	217.7	2.4
1–4	34.1	15.7	2.2	38.2	10.9	3.5
5–14	15.1	5.9	2.6	12.5	4.4	2.9
15–24	150.7	55.8	2.7	68.7	19.8	3.5
25–34	325.5	74.9	4.3	135.2	25.4	5.3
35–44	606.5	98.5	6.2	330.3	51.1	6.5
45–54	1066.6	196.9	5.4	616.5	116.1	5.3
55–64	1891.1	476.0	4.0	1271.3	261.8	4.9
65–74	3808.0	1313.8	2.9	2699.7	716.8	3.8
Total	**812.1**	**214.1**	**3.8**	**519.1**	**115.0**	**4.5**

*Indigenous: non-Indigenous

Overcoming Indigenous Disadvantage, Key Indicators 2009

Table 24.5 Avoidable mortality, by cause of death, people aged 0–74 years, Qld, WA, SA and NT, 2002–06

Cause of death	Indigenous per 100 000	Non-Indigenous per 100 000	Ratio
Ischaemic heart disease	149.7	32.7	4.6
Cancer	115.2	60.8	1.9
Lung cancer	47.0	21.3	2.2
Diabetes	94.5	5.3	17.7
Suicide	26.3	11.1	2.4
Road traffic injuries	26.3	8.2	3.2
Alcohol-related disease	37.1	4.1	9.0
Selected invasive bacterial and protozoal infections	27.2	3.6	7.6
Cerebrovascular disease	36.5	9.8	3.7
Chronic obstructive pulmonary disease	39.2	8.0	4.9
Nephritis and nephrosis	27.0	1.6	16.4
Violence	9.0	0.9	10.0
Birth defects	5.9	2.7	2.2
Complications of perinatal period	4.2	1.4	3.1
Rheumatic and other valvular heart disease	10.7	0.5	22.7
Other avoidable	47.6	13.6	3.5
Total avoidable	656.3	164.5	4.0

*Indigenous: non-Indigenous

Overcoming Indigenous Disadvantage, Key Indicators 2009

Obesity

In 2004–05, 38 per cent of Indigenous Australians aged 15 years and over had a healthy weight, 28 per cent were overweight and 29 per cent were obese. The rate of overweight or obesity was similar among males and females. It increased with age, from 37 per cent among those aged 15–24 years to 74 per cent among those aged 55 years and over. The rates of overweight or obesity among Indigenous Australians in non-remote areas increased from 48 per cent in 1995 to 56 per cent in 2004–05. Compared with non-Indigenous females, Indigenous females were around one and a half times as likely to be overweight or obese, whereas the rates were similar among both Indigenous and non-Indigenous males.

Physical activity and nutrition

Seventy-five per cent of Indigenous Australian respondents aged 15 years and over living in non-remote areas were sedentary or had low levels of physical activity. They were 1.5 times as likely as non-Indigenous people to report being sedentary.

In 2004–05, 5 per cent of Indigenous Australians aged 12 years and over reported no daily vegetable intake and 14 per cent reported no daily fruit intake. Daily vegetable and fruit intake varied by remoteness. Among Indigenous people living in non-remote areas, 45 per cent were eating the recommended daily intake of fruit (two or more serves daily) and only 10 per cent the **recommended daily intake** of vegetables (five or more serves daily). For Indigenous Australians living in remote areas, access to a range of food items, including fruit and vegetables, is limited. This is due to the higher costs of handling and transporting goods to remote communities, the lack of appropriate storage facilities within communities and the lack of suitable local produce to purchase.

Traditionally, Indigenous Australians had a diet rich in **fibre**, high in **protein** and low in **saturated fat**. The diet of many Aboriginal and Torres Strait Islander communities has changed to one that is high in refined **carbohydrates** and saturated fats. Such changes, along with physical inactivity, have increased the risk of obesity and chronic disease, including type-2 diabetes.

Drug and alcohol use

In 2004–05 half (50 per cent) of the Indigenous Australian population aged 18 years or over were daily cigarette smokers. A similar proportion of males (51 per cent) and females (49 per cent) were daily smokers, with the highest rates reported by those aged 25–44 years. Although there was little difference between the overall proportions of Indigenous people in remote and non-remote areas who smoked, males in remote areas were somewhat more likely to smoke than males in non-remote areas (58 per cent compared with 49 per cent). Smoking is more prevalent among Indigenous than non-Indigenous Australians (34.1 per cent compared with 19.0 per cent). Compared with non-Indigenous people aged 18 years or over, Indigenous people in the same age group were more than twice as likely to be current smokers.

Smoking is much more prevalent among Indigenous than non-Indigenous Australians.

Overall, Indigenous Australians are less likely to drink alcohol than are non-Indigenous Australians. Among those who drink, however, the proportion of those who drink at risky or high-risk levels is similar for Indigenous and non-Indigenous Australians.

In 2004–05, a higher proportion of Indigenous Australians than non-Indigenous Australians reported that they had not consumed any alcohol in the last 12 months (29 per cent compared with 15 per cent). This is after adjusting for age differences between the two populations.

For both Indigenous and non-Indigenous Australians, in 2004–05, men were more likely than women to have consumed alcohol at risky to high-risk levels (19.5 per cent compared with 13.8 per cent for Indigenous Australians and 15.4 per cent compared with 11.7 per cent for non-Indigenous Australians). Indigenous Australian adults were less likely to have consumed alcohol in the week prior to interview than were non-Indigenous Australian adults (53.4 per cent compared with 36.1 per cent). Among those who drank alcohol, the reported rate of risky to high-risk drinking for Indigenous Australians was not statistically different from that for non-Indigenous Australians.

In 2004–05, compared with Indigenous Australian females, Indigenous Australian males were more likely to report recent use of illicit drugs (32 per cent for males compared with 25 per cent for females). Recent drug use was highest among those aged 25–34 years (38 per cent). The 2007 National Drug Strategy Household Survey suggests that a higher proportion of Indigenous Australians than non-Indigenous Australians reported using illicit drugs (including marijuana/cannabis) in the 12 months prior to the survey.

Critical inquiry

Discuss whether the gap in health status between Aboriginal and Torres Strait Islander peoples and other Australians is reducing or increasing. Support your statements with statistical evidence.



Figure 24.3 For Indigenous people living in remote areas, access to a range of food items, including fruit and vegetables, is limited



Figure 24.4 Close the Gap, a campaign to improve the health of Aboriginal and Torres Strait Islander peoples

practical application

Inequities experienced by Indigenous Australians

You have been asked by the Board of Studies to write a short article about the health inequities that Aboriginal and Torres Strait Islander peoples experience. This article will be included on the Board's webpage for students to access.

Significant factors influencing the health of Aboriginal and Torres Strait Islander peoples

The health status of Aboriginal and Torres Strait Islander peoples highlights the vast inequities between the Indigenous population and other Australians. These inequities are indicative of a huge range of underlying social and cultural factors. All indicators of socio-economic disadvantage provide evidence of the extreme disadvantage experienced by Indigenous people.

Housing

Aboriginal and Torres Strait Islander people are more likely to live in crowded conditions. Housing has been identified as a major influence on the health of Aboriginal and Torres Strait Islander peoples. Overcrowded dwellings and poor-quality housing have been associated with the poor physical and mental health of the occupants. Many Indigenous people live in houses that are overcrowded and that do not satisfy the basic Australian standards for shelter, safe drinking water and adequate waste disposal. Indigenous Australians were 4.8 times as likely as non-Indigenous Australians to live in overcrowded housing in 2006. Overcrowding was highest in very remote areas (65.1 per cent). The proportion of Indigenous Australians living in overcrowded housing decreased from 30.7 per cent in 2001 to 27.2 per cent in 2006.

This can place strain on services such as water, sewage, electricity and/or gas facilities. Indigenous Australians are more likely to live in improvised dwellings. Some are living in conditions that are similar to those in developing countries. This is particularly true for those living in rural and remote locations where environmental health problems have a significant impact on health. These include inadequacies in water supply, sanitation and disposal of waste water and serious housing problems. Attempts to improve the **infrastructure** have often been imposed on these communities with little consultation about their needs. This has resulted in inappropriate technologies being introduced, which are not maintained.

Economic factors

Aboriginal and Torres Strait Islander peoples are likely to be poorer than other Australians. Due to their predominant geographic location, where employment opportunities are limited, they have a greater likelihood of their income being derived from social security benefits. Indigenous Australians are more likely to have low incomes and significantly less likely to have above-average incomes. They also have less likelihood of owning their own homes. However, this last indicator demonstrates the inadequacy of data collection. For some Aboriginal and Torres Strait Islander peoples, material possessions have little cultural relevance, and measures relating to these are inappropriate indicators of their well-being.

Employment

Employment provides people with economic security that can guarantee some quality of life. Aboriginal and Torres Strait Islander peoples are less likely to be employed and more likely to be unemployed for long periods of time. Of those who are employed, there is a higher proportion of low-skilled workers in low-status jobs, such as labouring. Such employment makes them more vulnerable to restructuring and casual employment arrangements that lack certainty.

Education

Educational level is related to employment opportunities. In general, Indigenous Australians leave school earlier than do other Australians. They are less likely to have educational qualifications at all levels and are much less likely to be enrolled in post-secondary education. Apart from the link between employment and education, there is also evidence to suggest that one of the best indicators for the future health of a child is the educational level of the child's mother.



Figure 24.5 One of the best indicators of the future health of a child is the educational level of the child's mother

Dispossession

Perhaps the most influential factor among the disadvantages experienced by Indigenous Australians is **dispossession**. Before the European invasion and subsequent **colonisation**, Aboriginal and Torres Strait Islander peoples inhabited Australia in various groups that had their own languages, cultural beliefs and geographic areas. Indigenous Australians have a strong sense of connection to their land. When they were forcibly removed, this created great distress for them because they were forced to cut their spiritual and cultural ties with the land. This has been a great source of grief for Aboriginal and Torres Strait Islander peoples. They lost a sense of control over their lives. Their land also provided them with an adequate diet through a subsistence existence of hunting, gathering and fishing. European invasion introduced to Indigenous Australians an inadequate diet and a range of diseases.

Colonisation introduced a number of practices that adversely affected Aboriginal and Torres Strait Islander peoples. They were forcibly removed from their land and taken to missions where they were raised under different spiritual and cultural systems. Previously **nomadic** peoples, they were restricted in their movements and confined to camps. This structure meant that Indigenous Australians were dependent on Europeans for their basic needs. They were often used as labour and paid poorly for their work. The prevailing opinion at the time was that the cultures of the Aboriginal and Torres Strait Islander peoples were inferior. There was the belief that if Indigenous children were to have a chance in life, they needed to be removed from their families and trained in institutions where they could be introduced to European ways and become workers for the Europeans.

The devastating effect of the **Stolen Generations** on Aboriginal and Torres Strait Islander peoples is still being felt today. The national inquiry into this found that it caused great cultural, psychological and social damage to the individuals removed as well to their families and communities. In addition, removing individuals from their families and communities from their land failed to recognise the significance of 'shame' in Aboriginal and Torres Strait Islander cultures. Shame can occur when individuals are removed from the group. It has been described as a powerful emotion that results in the 'loss of extended self' and adversely affects the health of Indigenous people.

On 13 February 2008 the Prime Minister of Australia apologised to Indigenous Australians affected by the forced removal of children from their families.

Discrimination

Discrimination against Aboriginal and Torres Strait Islander peoples has been present in Australian society since colonisation. Indigenous people were excluded from participation in mainstream Australian society and the economic benefits it brings until the 1970s. Until recently, little attempt has been made to understand and preserve the cultures of Indigenous Australians. Unfortunately, many non-Indigenous Australians blame Indigenous Australians for the current situation of the Indigenous people. These non-Indigenous Australians fail to recognise and acknowledge the long-term effect that colonisation and dispossession has had on Indigenous Australians. For instance, it has resulted in the high levels of social disadvantage that many Indigenous people experience.

Lack of funding

Despite the overwhelming evidence of health inequities, funding to improve the health status of Aboriginal and Torres Strait Islander peoples remains inadequate. Although estimates indicate that more is spent per person on the health of Indigenous Australians than is spent on other Australians, this amount does not match the higher burden of illness that Indigenous people experience. It has already been established that extra resources are needed to address health inequities. Given the gap between the health status of Indigenous Australians and other Australians, the adequacy of current funding to the Indigenous population is questionable.



Figure 24.6 There is a lack of understanding of how Aboriginal and Torres Strait Islander peoples view health

Self-determination

There appears to be a lack of understanding of how Aboriginal and Torres Strait Islander peoples view health. This has created barriers for the provision of appropriate services. Indigenous people have a much broader concept of health than do many other Australian groups. They utilise the term 'well-being' to denote health. To Indigenous Australians 'health' means **harmony** and **integrity** in relation to the interconnectedness of all aspects of life. An important element in their concept of health and well-being is having a sense of control over one's life circumstances; that is, self-determination. Linked to this is the significance of land and the right to practise their own customs.

Indigenous Australians do not view health problems in terms of statistics and 'cause and effect'. They see their health problems as a disharmony between their own understanding of well-being and what is being imposed on them by people outside their cultures. One positive development to help address this issue is the establishment of community-controlled Aboriginal Medical and Health Services employing Indigenous Australians as health workers.

practical application

Inequities experienced by Indigenous Australians

1 You are on an advisory committee to the government that is examining how to reduce the inequities experienced by Aboriginal and Torres Strait Islander peoples.

- a **Propose** a set of recommendations for actions to address the health issues influencing Indigenous people.
- b **Identify** the various groups that need to be involved in implementing these recommended actions.
- c **Discuss** the potential barriers to implementing these recommended actions.
- d **Propose** how these barriers might be overcome.

Research and Review

1 a **Investigate** the Stolen Generations and draw conclusions about the effects that the practice of removing children has had on the health of Aboriginal and Torres Strait Islander peoples.

b **Identify** the recommendations proposed by the Australian Human Rights Commission in its inquiry into the issue.

Critical inquiry

1 **Analyse** the impact of the health determinants on the health of Aboriginal and Torres Strait Islander peoples.

2 You hear a group of students talking about all the benefits that Indigenous Australians receive and how unfair it is. Challenge these generalisations about this population group in terms of the health inequities experienced by Indigenous Australians.

WEB The Australian Human Rights Commission website can be accessed via www.oup.com.au/pdhpe12

Homeless

Nearly one in every 200 Australians is homeless; that is, without safe, secure or affordable housing. Of Australia's homeless, 23 per cent are children. One in four homeless people is aged under 18 years. Homelessness can be caused by poverty, unemployment or a critical shortage of affordable housing. Domestic violence is the single largest cause of **homelessness** in Australia.

Homelessness results in social and economic costs to individuals, families, communities and the country as a whole. Homelessness forces people away from their family, friends and communities. It makes it difficult for them to attend school or maintain further study, and leaves them vulnerable to long-term employment and chronic ill-health. Homeless Australians are often excluded from participation in the social, recreational, cultural and economic life of our communities. Those who are homeless live without the most fundamental **human rights**.

Homelessness can be triggered by family breakdown, mental illness, sexual assault, addiction, financial difficulty, gambling or social isolation.



Figure 24.7 Homelessness results in social and economic costs to individuals

Homelessness is a complex issue, resulting from a variety of personal and societal factors. Major contributors to homelessness are certain structural factors, such as poverty, unemployment and an inadequate supply of affordable housing. A range of personal circumstances may increase a person's risk of becoming or remaining homeless. These include discrimination, poor physical or mental health, intellectual disability, drug and alcohol abuse, gambling, family and relationship breakdown, domestic violence, and physical and sexual abuse.

People experiencing homelessness may access a wide range of government services provided for the broader community. These include general health services, particularly drug rehabilitation programs, general community services and housing assistance. There are also programs specifically for people experiencing, or at risk of, homelessness, such as the Supported Accommodation Assistance Program (SAAP), which is the major government response to homelessness. Other government programs include the Crisis Accommodation Program (CAP) and Reconnect, which are early intervention programs for young people who are homeless or at risk of becoming homeless.

practical application

Inequities experienced by Indigenous Australians

Visit the Youth off the Streets website. Write a short article about the organisation to challenge the generalisations made about homeless young people in relation to the health inequities they experience.

WEB The Youth Off the Streets website can be accessed via www.oup.com.au/pdhpe12

Research and Review

1. **Identify** the causes of homelessness.
2. **Describe** the socio-economic determinants that have an impact on homeless people.
3. **Discuss** the major areas of health inequity experienced by homeless people.
4. **Outline** the government services provided for homeless people.

People living with HIV/AIDS

Although **HIV/AIDS** is one of the most deadly illnesses in the world today, there are many more people living with AIDS than ever before. It is possible for those with HIV/AIDS to live a relatively normal life thanks to new drugs on the market that ease the symptoms of the disease. At the end of 2007 in Australia there were 27 331 diagnoses of HIV infections, 10 303 diagnoses of AIDS and 6767 deaths following AIDS. An estimated 16 692 people were living with HIV/AIDS in Australia in 2007.

Transmission of HIV

Approximately 90 per cent of all HIV diagnoses were in men, with a growing trend of new infections in women. **Transmission** in Australia continues to be mainly through sexual contact between men. Of all new HIV transmissions in Australia during 2006, 86 per cent were estimated to have been via such contact. The number of new HIV diagnoses in Australia has increased each year from 718 in 1999 to 1051 in 2007, resulting in an increase of almost 50 per cent. There was a similar per capita rate of HIV diagnosis in the Aboriginal and Torres Strait Islander and non-Indigenous populations. However, a higher number were related to heterosexual contact and injecting drug use in the Aboriginal and Torres Strait Islander population. During 2003–07 HIV and AIDS diagnosis in Australia was at least five times higher among people born in countries in sub-Saharan Africa than among Australian-born people.

In the past five years 6 per cent of cases of HIV infection attributed to heterosexual contact were in people from high HIV prevalence countries or their sexual partners.

HIV Futures Surveys

The HIV Futures Surveys are national **non-clinical surveys** conducted every two years. They are self-completed and anonymous. The first of these surveys was conducted in 1997 with a sample of 925 people living with HIV/AIDS. The survey has six major content areas: health and treatments, sex and relationships, accommodation, employment, community involvement and finance. It aims to reflect the socio-economic, political, pharmaceutical, legislative and geographic context of those living with HIV.

The HIV Futures Surveys have provided policy-makers and service providers with reliable and detailed information in the following five domains:

- the socio-economic situation of people living with HIV/AIDS (such as housing, finances and employment)
- social and community involvement (such as ease of access to be involved and privacy related to disclosure)
- health status and maintenance (such as clinical history, treatments and health service access)
- emotional well-being (such as mental health and social support)
- understandings of the socio-cultural dimensions of HIV (such as discrimination, attitudes to treatment and prevention aspects of the illness).

While it is known that many people can live with HIV without even being aware of it, living with AIDS is more difficult. This is because by the time a person with HIV has developed AIDS, that person's circumstances are much more serious. If someone is infected with HIV but has not yet developed full-blown AIDS, he or she may not yet feel ill and may live normally. This is one of the hazards of the disease; the fact that HIV-infected people do not usually have strong symptoms means that many people are infected with HIV and don't realise it and, therefore, can spread the disease to other people. Living with AIDS is more difficult than living with HIV; however, with new medications on the market it makes symptoms less difficult to deal with.

Illnesses and infections

Living with AIDS means dealing with frequent illnesses and infections, which may be a challenge. It is necessary for those who are living with AIDS to have a strong support network of family and friends, including those who also suffer from the disease, who can be depended on for support and information. In addition, living with AIDS is less difficult if the individual has a physician that he or she can trust and talk to when necessary.

Depression is a common problem for those who are living with AIDS and the difficulties with living with the illness can make depression more likely. **Thrush** is also a common problem in AIDS sufferers. It is characterised by a thin coating and a bad taste on the tongue and inside the mouth. Diarrhoea and nausea are experienced frequently by those who are living with AIDS. People who are living with AIDS may notice rapid weight loss, and a problem with fat distribution; their arms may be bony while there may be fat deposits on the stomach and at the back of the neck.

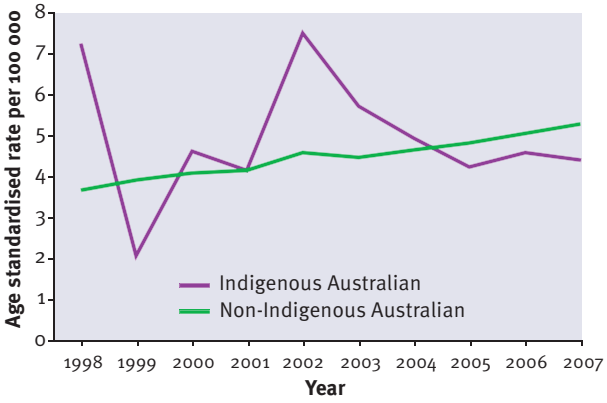
Prevention and health promotion activities

Population groups regarded as priorities for HIV/AIDS prevention and health promotion activities include gay and other homosexually active men, Aboriginal and Torres Strait Islander people, prison entrants and people who have injected drugs. These population groups were identified as priority groups because they are recognised as either experiencing ongoing HIV or having the potential for increases in transmission. Men with a history of homosexual contact continue to make up the majority of people diagnosed with HIV infection in Australia. Figure 24.8 shows the rate of HIV diagnosis in the non-Indigenous population. It illustrates that the rate increased steadily from 3.7 per 100 000 population in 1998 to 5.2 in 2007. By contrast, the rate in the Aboriginal and Torres Strait Islander population has remained relatively stable at around 4.6 during 1998–2002 and around 4.5 during 2003–07. The rate of AIDS diagnosis in the Indigenous Australian population declined from a peak of 2.7 during 2003–04 to 0.7 in 2007.

Figures 24.8 to 24.10 (page 424) illustrate the prevalence and incidence of HIV and AIDS in Indigenous and non-Indigenous Australians.

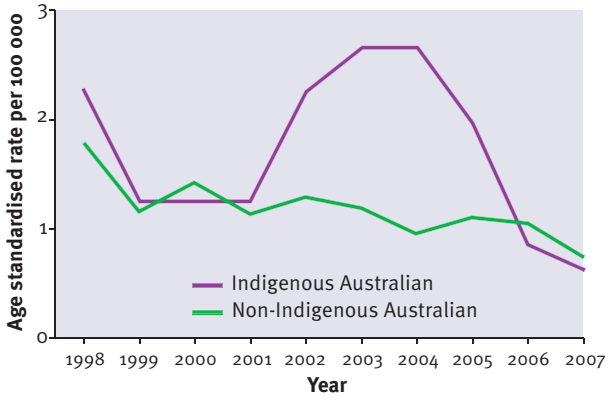
The number of new HIV diagnoses for which exposure to HIV was attributed to heterosexual contact increased from 804 during 1998–2002 to 994 during 2003–07. This accounted for 21 per cent of total HIV diagnoses in both five-year periods.

The most frequently reported route of HIV transmission in the non-Indigenous Australian population during 2003–07 was male homosexual contact (60 per cent). In the Aboriginal and Torres Strait Islander population, exposure to HIV was attributed to male homosexual contact in 41 per cent of cases. In 28 per cent of cases heterosexual contact was the reported source of exposure to HIV. Indigenous



Source: Australia Annual Surveillance Report 2008

Figure 24.8 Newly diagnosed cases of HIV infection



Source: Australia Annual Surveillance Report 2008

Figure 24.9 Newly diagnosed cases of AIDS

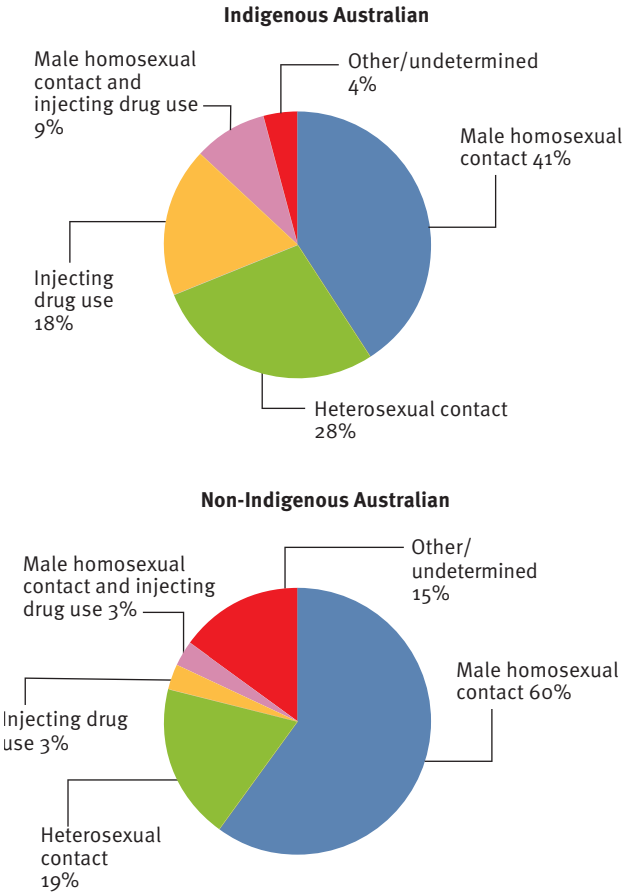


Figure 24.10 HIV diagnoses for Aboriginal and Torres Strait Islander peoples

Australian cases also differed from non-Indigenous cases in that a higher proportion of infections were attributed to injecting drug use (18 per cent among Indigenous Australian cases versus 3 per cent for non-Indigenous cases). Also, a higher proportion of infections were among women (25 per cent among Indigenous Australian cases versus 15.9 per cent for non-Indigenous cases).

HIV prevalence among people attending needle and syringe programs has remained low (around 1 per cent during 1998–2007), but in the subgroup of men who identified as homosexual it was 26.1 per cent in 2007. Of 724 men and 456 women with a history of injecting drug use, three men (0.4 per cent) and two women (0.4 per cent) were diagnosed with HIV infection.

HIV prevalence among people entering Australian prisons from 1998 to 2007 remained low, at levels of less than 0.5 per cent. Prevalence increased from 2004 to 2007 in both males and females, due primarily to increases in the number of HIV diagnoses in prison entrants in New South Wales.



Figure 24.11 People living with HIV/AIDS experience health inequities

practical application

Inequities experienced by Indigenous Australians

Design a poster to raise the awareness of health inequities experienced by people living with HIV/AIDS.

Critical inquiry

Analyse the health inequities experienced by people living with HIV/AIDS.

Research and Review

1. **Identify** the major areas of health inequity experienced by people living with HIV/AIDS.
2. **Describe** the impact of the health determinants on people living with HIV/AIDS.
3. **Examine** the media's role in influencing social attitudes towards and public policy relating to people living with HIV/AIDS.
4. **Evaluate** government interventions that have been introduced for people living with HIV/AIDS.

Incarcerated

In 2006 the Australian Bureau of Statistics (ABS) estimated that there were 25 790 adults imprisoned in Australia; about one in 610 adults nationally. The Indigenous Australian community made up nearly one-quarter (24 per cent) of the adult prisoner population in 2006. The average age of prisoners was 33 years and the majority (93 per cent) were male. Over the past 15 years the overall number of prisoners and the imprisonment rate have steadily increased.

Indigenous Australians were 13 times as likely as non-Indigenous Australians to be imprisoned in 2008. The imprisonment rate increased by 46 per cent for Indigenous Australian women and by 27 per cent for Indigenous Australian men between 2000 and 2008. In 2007 Indigenous Australian juveniles were 28 times as likely to be detained as were non-Indigenous Australian juveniles. The Indigenous Australian juvenile detention rate increased by 27 per cent between 2001 and 2007.

People in prisons experience severe disadvantage, stigmatisation, social exclusion, and poor physical and mental health. Studies of prison inmates regularly find they are more likely to engage in risky behaviours, such as drug and alcohol use, smoking and unsafe sexual practices. These social and behavioural factors provide an explanation for why the incarcerated experience higher rates of blood borne viruses (such as viral hepatitis), sexually transmitted infections, drug dependence, mental illness and other health problems.

Suicide accounted for 46 per cent of prison deaths between 1990 and 2005 and 'natural causes' for 38 per cent. Studies have consistently found high levels of traumatic brain injury among prisoner populations, ranging from 22 per cent to 100 per cent of prisoners.

Young people are made more vulnerable when they have a parent who is imprisoned, are living away from the family home, have been taken into care as a child or live with a person with a physical or mental disability. Nine out of 10 young offenders have been suspended from school at some time. Young offenders are at greater risk of being exposed to infectious diseases and engaging in high levels of risky behaviours while in juvenile detention centres. Young offenders are at more risk of being exposed to **blood borne viruses**, particularly **hepatitis B** and **hepatitis C**. This may occur as a result of risky behaviours, such as injecting drug use, sharing contaminated injecting equipment, unsafe tattooing and body piercing. An overwhelming proportion of young offenders have engaged in both licit and illicit substance use. Over 80 per cent of offenders are current tobacco smokers and the average age at which they had started smoking was 12 years.



Figure 24.12 Juvenile detention centre

Table 24.6 Characteristics of prisoners at 30 June, selected years

Characteristic	1991	1996	2001	2006
Number	15 021	18 193	22 458	25 790
Total imprisonment rate (per 100 000 adults)	117	132	153	163
Average age (years)	30.3	31.8	33.0	34.7
Aged under 25 (%)	33.0	28.6	25.3	19.7
Females (%)	4.8	5.3	6.7	7.1
Indigenous (%)	14.4	18.0	19.8	23.6
Indigenous imprisonment rate (per 100 000 adults)	1 739	1 436	1 754	2 127
Prior known adult imprisonments (%)	56.9	57.4	58.4	56.9
Remandees (%)	13.2	12.7	19.3	21.6
Median sentence length (years)	n.a.	3.0	3.3	3.0

AIHW, Australia's Health, 2008

Critical inquiry

Critically analyse why the Indigenous Australian community makes up nearly one-quarter of the adult prisoner population.

Research and Review

1. **Outline** the major areas of health inequity experienced by people in prison.
2. **Outline** the experiences of people in prison that have an impact on their health.

Aged

An ageing population contributes to the burden of disease. This burden of disease is shared unequally among the aged (those aged 65 years and over), as they experience higher levels of disability, morbidity and mortality.

There has been an increase in the number and proportion of older people in the population, and their health needs are different from those of the population generally. These factors present challenges in the areas of aged care policy and delivery. Although many older people are in good health and lead active and fulfilling lives, many others live with limited physical mobility or deteriorating mental alertness. A high proportion of older people need to take a range of medications, which requires careful monitoring. Whether the aged have access to services that support their life choices is also a social concern. These services may be provided by non-government agencies (such as Meals on Wheels), in residential aged care units or by government health and community services designed to support older people in their own homes.

In 2006, older Australians made up a little over one in eight Australians; about 13 per cent of the population. As more Australians reach an older age there is concern that the incidence of **dementia** and other disabilities and handicaps will increase. It seems logical to assume that an older population means, overall, a more unhealthy population. This might occur, but it is also possible that the older people who will live longest will also be the healthiest older people. These relatively healthy older people might not develop as many medical problems. An older population will probably mean a less healthy population overall, but it is uncertain whether this will be a slight change or a more significant change in the health status of the Australian population.



Figure 24.13 As people age their mobility may decrease

practical application

Inequities experienced by Indigenous Australians

1. Write a letter to your local member in which you:
   - a **outline** the health inequities experienced by the elderly
   - b **propose** your ideas on how to address those inequities.
2. Design a brochure that outlines the services for the aged in your local area. For each service:
   - a **identify** the contact details of the organisation that provides the service
   - b **describe** the service.

Critical inquiry

Discuss how the health needs of the elderly are different from those of other age groups.

Research and Review

Identify the services available to the elderly that support their health.

Culturally and linguistically diverse backgrounds

Australia has one of the largest proportions of immigrant populations in the world, with an estimated 24 per cent of the total population (4.96 million people) born overseas. Over half (61 per cent) of these—one in seven Australians—were born in a non-English- speaking country.

Immigrants bring to Australia their own unique health profiles. Research has found that most immigrants enjoy health that is at least as good as, if not better than, that of the Australian-born population. Immigrant populations often have lower death and hospitalisation rates, as well as lower rates of disability and lifestyle-related risk factors. This 'healthy immigrant effect' is believed to result from two main factors: a self-selection process that includes people who are willing and economically able to migrate and excludes those who are sick or disabled; and a government selection process that involves certain eligibility criteria based on health, education, language and job skills.

Almost one-quarter of the Australian population were born overseas; among the highest proportion of any country.

Despite these advantages, certain health risk factors and diseases are more common among some country-of-birth groups in Australia, reflecting diverse socio-economic, cultural and genetic influences. Tables 24.7 and 24.8 (page 428) illustrate the causes of death and selected health risk factors for people from culturally and linguistically diverse backgrounds.

Factors affecting the number and type of services required include not only the size of the population, but also its characteristics, such as location, age and sex structure, living arrangements, health and disability status and proficiency in spoken English. With almost one in five Australians speaking a language other than English at home, there is a need to provide assistance to households that have difficulties in speaking or reading English. English language skills facilitate social integration and the ability to access services. Those who have limited proficiency in English may therefore experience restrictions in the number and types of services available to them.

Those people who lack English language skills face practical problems in education, employment and access to services. Where there is a lack of a common language there is also a need for interpreter and translation services, and programs of English instruction in schools and other educational institutions. At the same time, many people from a non-English speaking background desire to see the use of their home language continue in Australia, for reasons of cultural continuity and identity.



Figure 24.14 Immigrants arriving in Australia: most recently arrived migrants enjoy health that is at least as good as, if not better than, that of the Australian-born population

Table 24.7 Mortality ratios by causes of death and countries of birth, people aged over 15 years, 2003–05

Country of birth	Colorectal cancer	Lung cancer	Diabetes	Coronary heart disease	Cerebro-vascular disease	Influenza and pneumonia	All causes of death
China	0.77	1.03	0.91	0.51	0.90	0.79	0.69
Croatia	1.23	1.23	1.71	1.14	1.04	1.22	1.09
Germany	0.95	1.00	1.14	0.99	1.03	0.81	1.00
Greece	0.74	0.74	1.38	0.78	0.73	0.74	0.77
India	0.56	0.70	1.55	1.05	0.85	0.80	0.83
Italy	1.02	0.92	1.69	0.84	0.77	0.79	0.87
Lebanon	0.73	1.03	2.05	0.99	0.81	0.65	0.89
Malaysia	0.60	0.66	1.30	0.57	0.86	0.43	0.61
Netherlands	0.79	1.36	1.06	0.93	0.85	0.97	0.99
New Zealand	1.11	0.90	0.85	0.96	0.96	0.97	0.91
Philippines	0.47	0.53	0.79	0.46	0.95	0.26	0.56
Poland	1.08	1.10	1.36	1.21	0.99	1.04	1.07
South Africa	0.63	0.92	0.70	0.65	0.81	1.14	0.81
UK and Ireland	0.89	1.31	0.88	0.98	0.93	1.14	1.01
Vietnam	0.42	0.63	1.00	0.32	0.64	0.50	0.52
All overseas	0.86	1.06	1.19	0.93	0.89	0.96	0.91
All deaths	12 728	21 635	10 512	73 534	35 764	9906	390 108

AIHW, Australia's Health, 2008

Table 24.8 Selected health risk factors by country of birth group, people aged 18 years and over, 2004–05 (per cent)

Country of birth group	Current daily smoker	Risky/high-risk alcohol	Sedentary/ low exercise level	Overweight/ obese BMI	1 or fewer serves of fruit	4 or fewer serves of vegetables
Australia	22.3	15.3	69.2	50.1	47.8	84.4
Other Oceania	26.1	12.5	66.8	58.3	44.4	89.2
United Kingdom	18.6	15.5	68.6	51.1	45.6	86.7
Other North-West Europe	18.0	11.8	67.3	50.9	42.0	87.0
Southern and Eastern Europe	18.4	6.0	81.8	59.5	29.4	88.8
North Africa and the Middle East	22.8	2.2	79.5	47.5	40.1	92.2
South-East Asia	15.6	4.4	76.7	29.4	43.5	92.6
All other countries	14.8	4.7	74.4	34.2	44.5	89.6

Critical inquiry

Explain why most immigrants enjoy health that is as good as or better than that of the Australian-born population.

Research and Review

1. **Describe** the health risk factors common among culturally and linguistically diverse backgrounds.
2. **Outline** the factors affecting the number and types of health services available to people from culturally and linguistically diverse backgrounds.

Unemployed

Some people experience great difficulties in securing a job and may remain unemployed for long periods of time. The risk of poverty is obviously greater for the long-term unemployed than for those with jobs or those who are unemployed for short periods of time. Associated concerns with unemployment include the well-being of the unemployed person's family members and the burden carried by the wider community. There is also some evidence that the probability of welfare dependence in adulthood is increased for children who grow up with parents receiving income support.

Difficulty in finding work is associated with high levels of competition for a limited number of opportunities. It has also been associated with other factors, such as the loss of confidence and motivation for finding work; the lack of recent work experience or appropriate skills; or other personal characteristics, such as poor health status.

Job seekers who have been unemployed long term are eligible to receive direct and indirect assistance. Assistance includes job search training, vocational training, work experience, literacy training and employer incentives, such as wage subsidies.

Paid work is the means through which many people obtain the economic resources needed for day-to-day living, for themselves and their dependants, and to meet their longer-term financial needs. Having paid work contributes to a person's sense of identity and self-esteem. People's involvement in paid work also contributes to economic growth and development. Many aspects of work affect people's well-being, such as hours worked, job satisfaction and security, levels of remuneration, opportunity for self development, and interaction with people outside the home.

People who are unemployed for long periods may experience greater financial hardship. They may also have more difficulties in finding employment because of the loss of relevant skills and employers' perceptions of their 'employability'.



Figure 24.15 Some people experience great difficulties in securing a job and may remain unemployed for long periods of time

Because economic and social inequalities go hand in hand, their combined impact results in limited opportunities and life chances for many who are affected by them. Those with the highest socio-economic status are those who have the most resources, opportunities and power to make choices, whereas those with the lowest status have the least of these. Thus, people with a higher income generally enjoy better health and a longer life than those with a lower income. The rich tend to be healthier than those in the middle, who are, in turn, healthier than the poor. People who experience disadvantage report more visits to doctors and hospital **outpatient** and accident and emergency services, but are less likely to use preventive health services, such as dental services.

People with a higher income generally enjoy better health and a longer life than those with a lower income.

Critical inquiry

1. **Explain** how being unemployed has an impact not only on an individual's health but also on the health of that person's family.
2. **Discuss** why people with a higher income generally enjoy better health and a longer life than those with a lower income.

Research and Review

Outline the social and economic inequalities experienced by people who are unemployed.

Geographically remote populations

Many Australians believe that life in the country is associated with good health. What many fail to realise is that some rural and remote communities have undergone drastic changes in the past 20–30 years and are no longer the thriving communities they once were. Rural and remote communities differ greatly from metropolitan zones.

Approximately 70 per cent of Australians live in metropolitan zones, and 90 per cent of these people live in capital cities. In general, the less dense the population of an area, the poorer is the health experienced by those living there.

Life expectancy differs according to geographic location. People living in capital cities have a longer life expectancy than those living in rural and remote communities. The difference is greater in remote areas, where life expectancy is four years fewer than for those living in capital cities. The difference between those living in rural areas and those living in capital cities is minimal; being less than one year.

In terms of total death rates, a similar pattern emerges. People living in capital cities have total death rates 6 per cent lower than for those living in large rural centres, and 20 per cent lower than those living in remote centres.

Injury is a major cause of mortality for people living in rural and remote communities. As remoteness increases, so does the death rate from injury. The death rate from injury for males living in 'other remote areas' is double that of those living in capital cities, and for males living in rural centres it is 50 per cent higher than for those living in capital cities. Death rates from road vehicle accidents show an even greater difference. Males and females living in 'other rural areas' die in road vehicle accidents at more than double the rate of those living in capital cities. Hospitalisation rates for injury resulting from interpersonal violence is also greater in rural and remote areas than in metropolitan areas. Hospitalisation rates also highlight injury as a major health issue for rural and remote communities. These rates are much higher in rural and remote zones than in capital cities.

Other areas of health inequity for rural and remote communities include the following:

- Hospitalisation rates for stroke increase with increasing rurality and remoteness.
- Slightly higher death and hospitalisation rates occur in both rural and remote areas for coronary heart disease; again increasing with rurality and remoteness.
- Death rates for asthma increase with remoteness, with the exception of 'small rural centres', which have lower rates than do their metropolitan counterparts.
- Death rates and hospitalisation rates for diabetes are greater in rural and remote communities than in metropolitan areas.
- For all cancers combined, death rates from cancer are greater for males than females regardless of the area in which they live. Cancer death rates are higher for people from 'remote centres'; although these rates are not significantly different.
- Females from remote areas have a higher death rate from cervical cancer and a higher incidence of cervical cancer than females from all other areas.
- The death rate from suicide is five times higher for males than females in all areas. The highest male suicide rates are for males in 'large rural centres' and 'other remote areas'.
- Babies born in 'other remote areas' have low birth weight, which is an indicator of poor infant health status and can result in poor health status later in life.
- Babies from 'other remote areas' have twice the mortality rate of other areas.



Figure 24.16 Those in rural and remote communities may experience difficulty in accessing health services

People living in capital cities have a longer life expectancy than those living in rural and remote communities.

WEB

Internet support concerning the gap in health status between people living in rural and remote communities and other Australians can be accessed via www.oup.com.au/pdhpe12

Health risk factors

Health risk factors and preventative measures help to determine whether a population is at risk of developing a certain disease. These factors include behavioural factors, such as drug use, diet, screening for disease, physical activity, sun protection and dental health.

Compared with non-rural areas, in rural and remote communities no significant differences exist for males in terms of being overweight. Slightly more females in rural and remote areas report being overweight.

Males from 'other metropolitan' and remote zones have the highest alcohol consumption. The highest level of alcohol consumption for females is reported by females from 'small rural centres' and 'other remote areas'. Those living in remote areas report the highest proportion of both male and female smokers.

Females from remote areas report the highest prevalence of high blood pressure. Remote zones have the highest proportion of males with high blood pressure.

In terms of walking for exercise, females from all areas report similar levels. Fewer males from rural and remote communities report walking for exercise in comparison with males from capital cities. One explanation for this could be the type of work in which males in rural and remote communities are engaged.

Those living in rural and remote communities have fewer visits to the dentist than do people living in capital cities.

Statistics indicate that those living in the most remote areas experience the poorest health status. It has been suggested that the health status of Aboriginal and Torres Strait Islander peoples affects these statistics. This is due to the higher proportion of Indigenous Australians who live in remote areas.

Distance

Many people living in rural and remote communities experience the 'tyranny of distance'. This results in their experiencing geographic and social isolation because of the distances they have to travel to access services and to interact with other people. This has implications for their health status.

The need to travel long distances to access health services can act as a deterrent to people accessing the services they need. It can cause them to delay seeking information, particularly for preventative services (such as screening for breast cancer). Travelling long distances also makes it difficult for people to access social support, which is an important protective factor for mental health. Living long distances from others can limit the opportunities for developing social networks and this has adverse effects on social and mental health.

Although **telecommunications** help to reduce the impact of geographic and social isolation, the cost of this **infrastructure** is significant for rural and remote communities.

Harsh environments

Exposure to relatively harsh environments is another factor influencing the health of rural and remote communities. This includes greater exposure to natural disasters, such as drought, flood and fires. Harsh environmental conditions can make access by road difficult and sometimes impossible, causing problems related to isolation. These environmental conditions can also lead to the **degradation** of roads, making them dangerous to use. This is one factor identified as being linked to the disproportionate number of injuries from road accidents in remote areas.

Fire also affects remote communities to a greater degree than other areas. Burns as a result of fire affect eight times the number of people from remote areas as those from other areas. The natural environment also takes time to regenerate after fire. Droughts can create conditions that can damage physical health, such as increased dust in the air.

The harsher environmental conditions can ruin crops and kill livestock, which are the livelihood of many farmers. This affects their economic resources, and therefore their quality of life.

Access to services

Access to services is limited in rural and remote areas for a number of reasons, including geographic isolation and exposure to harsher environmental conditions (as noted above). There has also been a shift in populations from rural and remote communities, resulting in a population decline. This has caused many services to cease in smaller rural centres and remote communities, meaning that some people are forced to travel greater distances to access those services. More time has to be taken to access services, and access depends on the availability of transport. People incur greater costs to travel to the areas where services exist.

Generally speaking, rural and remote communities have less access to general practitioners, hospitals and specialist treatment. They also have less access to preventative treatments and health promotion programs, due to the limited number of health professionals working in these areas.

Other factors that affect health in rural and remote communities

There are a number of other factors associated with life in rural and remote communities that affect health.

Reduced economic resources

Previously relatively affluent, rural Australia has undergone changes that have reduced the economic resources available in these communities. Primary industries are no longer as profitable as they once were.

Fewer employment and educational opportunities

The economic changes described above have resulted in fewer employment opportunities, leading to higher levels of unemployment. Statistics indicate that as population density declines, social disadvantage increases. Younger people leave these communities to improve their chances of gaining employment or to access educational opportunities that do not exist in many rural and remote centres.



As population density declines, social disadvantage increases.

There is also the compounding effect of the decline in primary industries on other local businesses. If farmers have fewer economic resources they are unable to spend money at the local businesses, and so these also struggle to survive. Those who are employed are more vulnerable to injury due to the nature of the work required, such as operating machinery.

The social fabric of rural communities and family life is deteriorating as family histories and traditions are abruptly changed and life on the land becomes unviable. Families lease the land or alter their work patterns: the males seeking paid employment, the females working the farm.

Suicide

One major inequity that has been related to the social factors associated with life in rural and remote communities is the disproportionately high youth suicide rate for males living in these communities. The decline in rural economies, and the accompanying high unemployment rates and lack of educational opportunities, together with the isolation that exists in rural and remote communities, can lead to depression in many young people.

A lack of services that provide support for young people in these situations, and concerns about confidentiality when services are available, mean that young people can develop a sense of hopelessness about their future. These factors, along with easier access to firearms, have been identified as causal factors contributing to high youth suicide rates in rural and remote locations.

Attitudes towards illness

Attitudes towards illness have been found to differ between urban residents and those living in rural and remote communities. People living in rural and remote communities tend to be more:

- accepting of injury and illness as a part of life
- self-reliant and independent when faced with illness
- likely to treat and medicate themselves before seeking medical attention.

There is an expectation that people will be tough and rugged and not succumb to illness. This means that, in some cases, conditions worsen before a medical professional is consulted.

Barriers to using health services

There are many factors associated with life in rural and remote communities that create barriers to using health services. Some of these are related to the lack of infrastructure in these areas, such as poor road conditions, lack of transport, distance and time to travel, and high costs for telecommunication. Although there has been an increase in the use of **'telemedicine'** there is a substantial cost involved in providing the infrastructure for this service.

Telemedicine is the use of modern technology to diagnose and treat some conditions.

There are also issues relating to confidentiality. In less densely populated areas, people are more easily identified and known in the area. This leads to concerns that other people in the community will have knowledge of one's private medical history. Others might discover that a person is accessing a particular health service, especially for more sensitive matters (such as drug dependency and mental illness). This can deter people from seeking the support necessary to address a health concern.

practical application

Geographically remote populations

1 You are on a government advisory committee that is examining how to reduce the inequities experienced by people living in rural and remote communities.

a **Propose** a set of recommendations for actions to address the health issues influencing people living in rural and remote communities.

b **Identify** the various groups that need to be involved in implementing these recommended actions.

c **Discuss** the potential barriers to implementing these recommended actions. **Propose** how they might be overcome.

Critical inquiry

Argue the statement, 'Australians who live in the country experience better health than those who live in cities.'

practical application

Inequities experienced by Indigenous Australians

You have been asked by the Health Minister to write a speech that proposes new strategies, interventions and policies to improve the health of people living in remote and rural areas. The points that you should address relate to distance, access to services and harsh environments.

Research and Review

1 **Outline** the health risk and preventative measures that determine whether a population is at risk of developing a certain disease.

2 **Describe** the factors that affect health in rural and remote communities.

Figure 24.17 In general, rural and remote communities have less access to general practitioners, hospitals and specialist treatment



People with disabilities

People with disabilities frequently lack many of the basic material and cultural resources needed to sustain a healthy existence and social participation. In the 2003 Australian Bureau of Statistics Survey of Disability, Ageing and Carers, one in five people in Australia (20.0 per cent) had a reported disability. This rate was much the same for males (19.8 per cent) and females (20.1 per cent). Disability is defined as any limitation, restriction or impairment that has lasted, or is likely to last, for at least six months and restricts everyday activities. Examples range from hearing loss that requires the use of a hearing aid, to difficulty dressing due to arthritis, to advanced dementia requiring constant help and supervision.

With an older population and increasing life expectancies there will be more people with disabilities and an associated increased demand for carers to look after them. The disability rate increased with age, reaching 92 per cent for those aged 90 years and over. In 2003, one in four people (24 per cent) aged 15–64 years with a profound or severe core-activity limitation and who were living in households had completed Year 12. People with a profound or severe core-activity limitation, such as in walking, were less likely to have completed a diploma or higher qualification (14 per cent) than those without a disability (28 per cent).

WEB

Internet support concerning the gap in health status between people with a disability and other Australians can be accessed via www.oup.com.au/pdhpe12

Physical conditions were the most common main health conditions of persons with a disability (84 per cent). The remaining 16 per cent had a mental or behavioural disorder as their main condition. Those whose main condition was a mental or behavioural disorder were more likely to have a profound or severe core-activity limitation than those with a physical condition (46 per cent compared with 29 per cent).

Over half (56 per cent) of those with psychosis or a mood affective disorder, such as dementia and depression, had a profound or severe core-activity limitation. This compared to 33 per cent for those with a circulatory condition, such as stroke or heart disease, and 33 per cent for those with a disease of the nervous system. These are the classes of physical conditions with the highest rates of profound or severe core-activity limitation.

Economic factors

It is widely recognised that people with disabilities must bear extra costs that people without disabilities do not. The costs of disability can be substantial. For many individuals, these effects can compound: reduced economic resources mean a poorer quality of life, which, in turn, has an impact on the person's illness or disability. Disability-related poverty exists in terms of employment exclusion, shortages of social services, income deprivation (from the extra costs of disability and exclusion from the labour force) and the barriers to social participation associated with many types of disabilities. Generally, as the severity of handicap increases, the main source of income changes from wages and salary to government pensions or benefits.



Figure 24.18 Provided with appropriate support, people with a disability can lead a fulfilling, productive life

Critical inquiry

Analyse the different types of disabilities experienced by different age groups.

Research and Review

1. **Define** the term 'disability'.
2. **Identify** the types of disabilities that people may experience.
3. **Outline** the economic factors that have an impact on a person with a disability.
4. Select two of the population groups studied in this chapter. For each of the selected groups:
   - a **Identify** and **analyse** the impact of the health determinants.
   - b **Examine** the media's role in influencing social attitudes and public policy.
   - c **Identify** and **evaluate** government interventions.

What inequities are experienced by population groups in australia?

chapter summary

- Health inequalities are most apparent among Indigenous Australians and the socio-economically disadvantaged.
- The life expectancy for Aboriginal and Torres Strait Islander peoples is estimated at 59 years for males and 65 for females.
- There have been improvements in the mortality rates of Indigenous Australians in recent years. The gap in mortality rates between Indigenous Australian infants and other infants is narrowing.
- The health status of Indigenous Australians highlights the vast inequities between the Indigenous population and other Australians.
- Health inequities are indicative of a huge range of underlying social and cultural factors.
- Aboriginal and Torres Strait Islander peoples are more likely to be poorer than are other Australians and leave school earlier than do other Australians.
- Dispossession and discrimination against Aboriginal and Torres Strait Islander peoples have resulted in their high levels of social disadvantage.
- Homelessness can be caused by poverty, unemployment and a critical shortage of affordable housing.
- HIV/AIDS is one of the most deadly illnesses in the world and there are many more people living with HIV/AIDS than ever before.
- People in prisons experience severe disadvantage, stigmatisation, social exclusion and poor physical and mental health.
- Although many older people are in good health and lead active and fulfilling lives, many others live with limited physical mobility or deteriorating mental alertness.
- Most migrants enjoy health that is at least as good as, if not better than, that of the Australian-born population.
- The risk of poverty is obviously greater for the long-term unemployed than for those with jobs or those who are unemployed for only short periods of time.
- People living in capital cities have a longer life expectancy than do those living in rural and remote communities. Injury is a major cause of mortality for people living in rural and remote communities.
- People with disabilities frequently lack many of the basic material and cultural resources needed to sustain a healthy existence and social participation.

revision activities

1. **Describe** the populations experiencing health inequities.
2. **Outline** the areas of health inequity.
3. **Describe** the health determinants that have an impact on health.
4. **Describe** three government interventions in the area of health inequities.

extension activities

1. **Discuss** the generalisations made about populations experiencing health inequities.
2. **Outline** the health inequities experienced by two population groups.
3. **Examine** the media's role in influencing social attitudes and public policy in relation to health inequities.
4. **Evaluate** two government interventions aimed at addressing health inequities.

exam-style questions

1. **Explain** how poor living conditions and the traditional understandings about health have contributed to the health inequities experienced by Aboriginal and Torres Strait Islander peoples. (8 marks)
2. **Explain** the trends in health inequity for Aboriginal and Torres Strait Islander peoples. (5 marks)
3. **Describe** how occupational hazards have an impact on the health of rural and remote communities. (5 marks)
4. **Discuss** how socio-economic status and access to health care influence the health status of Aboriginal and Torres Strait Islander peoples. (10 marks)
5. **Analyse** the health inequities experienced by two population groups. (12 marks)

chapter 25

how might the gap in HEALTH STATUS OF POPULATIONS be bridged?

In this chapter you will consider the role of funding in improving health and the issues that influence health funding. You will also look at actions and processes that improve health for disadvantaged groups and apply a social justice framework to develop a plan to address the causal factors of inequities. You will describe the characteristics of effective health promotion strategies and analyse the characteristics of specific health promotion strategies in order to predict their potential for success.

Funding to improve health

Funding to improve health in Australia is complicated by the fact that responsibility for it is split among various levels of government as well as the public and private sectors. Funding will not, in itself, necessarily improve health. Instead, it provides the means by which strategies for improving health can be implemented. These strategies, if effective, contribute to the health of the population. If funding allocation is underpinned by principles of social justice, consideration is given to those groups in Australia that are experiencing the greatest health inequities.





Funding for health

Governments at various levels provide funding for health. According to the AIHW, the estimated total governmental expenditure on health in Australia in 2005–06 was $86 879 million, or 9.0 per cent of gross domestic product (GDP). This was similar to the previous year, when health accounted for 9.05 per cent of GDP. A decade earlier, expenditure on health was 7.5 per cent of GDP. In 2005–06 the Australian Government provided 43 per cent of funding, and state and local governments provided 25 per cent. The rest (32 per cent) was provided by the non-government sector. Table 25.1 (page 438) illustrates total health expenditure, as a percentage of GDP and annual growth rates over a 10-year period. Figure 25.1 (page 438) and the following extract illustrate which health funding is provided by government and non-government organisations.

When analysing statistics related to health funding, a difficulty arises if no account is taken of expenditure outside the health sector that has had an effect on health. For example, money spent on improving roads can reduce injuries and fatalities associated with road accidents.

Research and Review

From the extract below, **identify** and research any unfamiliar terms to find out what they mean.

Health care: who provides the funds?

The Australian Government provides most of the funding for recurrent expenditure on:

- services provided by general practitioners and medical specialists (together known as 'medical services'), and services provided by other health practitioners that are covered or partly covered by Medicare …
- pharmaceuticals that are covered or partly covered by the **Pharmaceutical Benefits Scheme (PBS)** and **Repatriation Pharmaceuticals Benefits Scheme (RPBS)** …
- Aboriginal Community Controlled Health Organisations (100 per cent)
- health research (67 per cent).

The Australian Government also partly funds:

- public hospital services (42 per cent) and public health activities such as infectious disease control and health promotion campaigns (54 per cent), through direct funding and through Specific Purpose Payments (SPPs) to the states and territories. The main health SPPs in 2005–06 were:
  - the Australian Health Care Agreements (AHCAs) …
  - the Public Health Outcomes Funding Agreements
  - for the provision of highly specialised drugs to outpatients in public and private hospitals
- private hospitals, through subsidising private health insurance cover through incentive arrangements (amounting to 34 per cent of the gross funding that is provided through private health insurance funds).

State and territory governments (including local governments) provide funding for:

- community health services (81 per cent of recurrent funding in 2005–06)
- patient transport (62 per cent)
- public hospital services (51 per cent)
- public health activities (43 per cent).

State and territory governments also fund the regulation of various health activities.

Non-government funding comes from:

- out-of-pocket funding by individuals
- benefits paid by private health insurance
- providers of compulsory motor vehicle third-party insurance
- workers compensation insurance.

Non-government sources provide funding for:

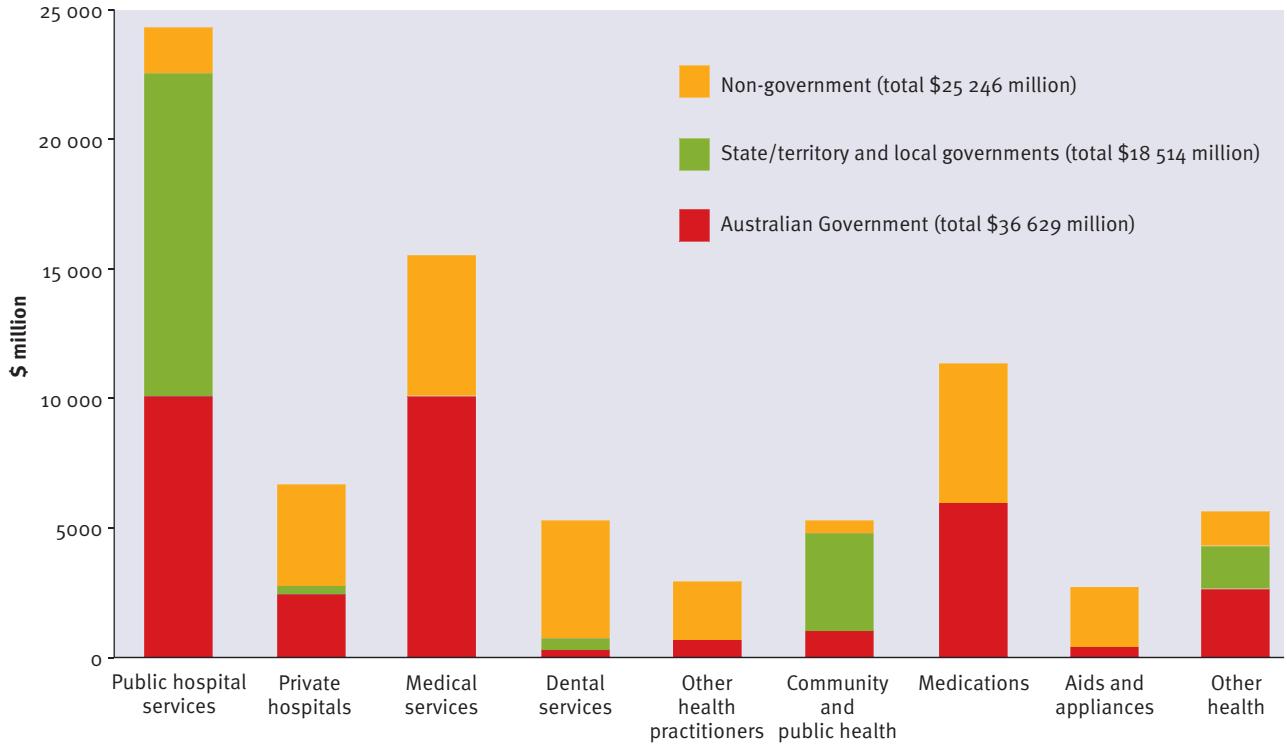
- aids and appliances (85 per cent of recurrent funding in 2005–06)
- dental services (81 per cent)
- private hospitals (59 per cent)
- medications (47 per cent).

AIHW, Australia's Health, 2008

Table 25.1 Total health expenditure and GDP, 1995–96 to 2005–06

	Total health expenditure		GDP	
Year	**Amount ($m)**	**Growth rate (%)**	**Amount ($m)**	**Growth rate (%)**
1995–96	50 948	–	647 659	–
1996–97	54 015	6.0	673 099	3.9
1997–98	56 266	4.2	703 258	4.5
1998–99	59 393	5.6	739 629	5.2
1999–00	62 786	5.7	769 045	4.0
2000–01	68 090	8.4	784 017	1.9
2001–02	70 802	4.0	813 542	3.8
2002–03	74 334	5.0	839 187	3.2
2003–04	77 036	3.6	873 197	4.1
2004–05	81 125	5.3	896 568	2.7
2005–06	83 601	3.1	922 772	2.9
Average annual growth rates				
1995–96 to 1997–98		5.1		4.2
1997–98 to 2002–03		5.7		3.6
1995–96 to 2005–06		5.1		3.6

AIHW, Australia's Health, 2008



Source: AIHW, Australia's Health, 2008

Figure 25.1 Allocation of health expenditure, 2005–06

Critical inquiry

1 Critically **analyse** the issues that influence health funding.

2 **Discuss** if or how the allocation of funding can solve inequities.

practical application

Funding for health

1 Read the extract 'Health care: who provides the funds?' (page 437). Using Excel, create graphs and charts to illustrate the distribution of health funding in Australia.

2 a **Propose** a list of government agencies (other than the Roads and Traffic Authority) where spending might contribute to improving health.

b **Explain** the link between spending in these areas and health improvement.

Does government funding resolve health inequities?

Does current government funding solve health inequities? Most of the health budget is allocated to **acute-care hospitals**. Although important, this will not, in itself, improve the health status of the population. It does not address the broader social effects on the health of the population. Although most of the social determinants of health lie outside the responsibility of the health sector, this sector can still play a strategic role in reducing health inequities. Community health work in Australia has made progress by working with disadvantaged communities and involving the people themselves in helping to address the causes of their inequities. These programs have been sensitive to the particular circumstances of these groups.

One such community development program worked with families on food and nutrition issues in an area of high unemployment and low incomes. The program took into account the economic resources of the people and developed their confidence and skills in shopping for, and cooking, nutritious foods on a limited budget. The success of this program reveals how the health sector can work with disadvantaged communities to improve health, and shows that, in certain circumstances, funding can help to reduce health inequities.

Medicare is an aspect of the Australian health care system that addresses the issue of equity, at least to some degree. Medicare is a universal system of health insurance. In theory, it ensures all Australians have access to the same basic health services. Medicare is partially funded through a levy on taxable income. This ensures that those more able to afford it pay extra. Medicare has a high level of support in the Australian community. Some health services (such as dental care) are not covered by Medicare. Those on low incomes can thus experience inequity of access to some services, based on the inability to pay. (For more detailed information relating to Medicare, see Chapter 3.)



Figure 25.2 Medicare ensures all Australians have access to the same basic health services

There are eight area and district health services in New South Wales. They have the main responsibility for health care delivery in a wide range of settings, from primary care posts in remote outback and rural areas to metropolitan tertiary health centres.

A simple solution to reducing health inequities might appear to be an increase in government spending. In New South Wales, the area and district health services are based on geographic areas. The NSW Government has developed a funding strategy that it claims will promote equity in the distribution of health funding. The government calls this funding strategy its 'Resource Distribution Formula'. It is claimed that this will ensure that funding is based on the population size of an area or district health service, and will reflect the health needs of the population. This indicates that the NSW Government recognises that there are different health needs in different geographic areas, and that these require different levels of funding. Mechanisms for identifying areas of greatest need, and recognition that some areas will need increased resources due to their relative disadvantage, will be necessary to promote equity. Although state health authorities, such as NSW Health, have developed formulae to address the issue of needs-based funding, there is still an emphasis on economic efficiency.

Critical inquiry

1. **Investigate** Medicare and debate the advantages and disadvantages of this health insurance system.
2. **Propose** recommendations about how the Medicare system could be improved while maintaining its focus on equity of access to health care.

Assessing health outcomes

A significant amount of public money is allocated to the health sector. The sector has a responsibility to be accountable for how this money is spent. Given that there are limited economic resources, there is a need to focus on the health outcomes achieved as a result of government spending. Health outcomes are the changes that occur in individuals, communities or populations as a result of a health strategy. Most of the reporting and measurement of health outcomes has been focused on risk factors, and on mortality and morbidity. There has not been as much attention given to measuring improvements in health, quality of life and equity. This makes it very difficult to measure outcomes for health promotion initiatives that aim to address issues of quality of life and equity. In addition, changes in health behaviour—and the resulting improvements in health outcomes and quality of life—occur over a number of years. This is particularly so with diseases that usually present in older age, such as cardiovascular disease and cancer.

The Australian Institute of Health and Welfare (AIHW) is providing regular reports on each of the national health priority issues to monitor progress in achieving positive health outcomes. These priority issues have been chosen on the basis of the following criteria:

- the best available data and evidence on health issues and interventions
- the degree of impact on population health status (as measured by mortality, morbidity and quality of life)
- the availability and effectiveness of **interventions**
- the cost to the community of the condition, and its treatment and prevention
- the potential to reduce health inequalities.

The priority issues are cancer, diabetes, cardiovascular disease, chronic respiratory disease, mental health problems, and illnesses and injury.

Funding for specific populations

The AIHW has identified specific priority groups within the population. These are Aboriginal and Torres Strait Islander peoples, socio-economically disadvantaged people, those living in rural and remote areas, prisoners and overseas-born people. Funding is allocated to individual targets within the priority issues and population groups. It is hoped that this will contribute to a reduction in the health inequities experienced by particular population groups.

Those chosen as priorities were considered to have the highest overall impact and the greatest potential for change. These criteria thus attempt to identify where funding should be allocated: to the areas of greatest need, and areas with greatest chances of success.

Limited resources

Because governments have limited financial resources, there is an increasing expectation that funding be tied to the achievement of positive health outcomes. Whereas there has always been support for **curative** services, governments are becoming increasingly aware of the need to provide funding for promoting health and preventing disease. Although this area of health has had an increased profile recently, funding for health promotion is still minimal compared with spending on curative services.

Health status is not improved by provision of health services alone. Improved health status relies on the participation of many groups in society. For example, in an attempt to increase levels of physical activity, a health promotion project might decide to organise a walking group. To operate this group, the health promotion officer depends on the local council for the provision of adequate and safe walkways, and on the transport authority to ensure that all people will be able to reach the meeting point with relative ease. Thus there is a need for resources from various areas of government to improve the health of the population. Many of the social factors that affect health are outside the responsibility of the health sector, and this highlights the need for increased **intersectoral collaboration**, where various agencies work cooperatively to reach a common goal.



Figure 25.3 Funding for health promotion is still minimal compared with spending on curative services.

Critical inquiry

1. Argue if improving the health of all Australians will reduce the health gap.
2. **Propose** whether funding should be allocated to areas where there is the greatest chance of success or to the areas of greatest need. Is it possible to do both?

Research and Review

1. **Describe** how the role of funding can improve health.
2. **Outline** the issues that influence health funding.
3. **Describe** the role of the Australian Institute of Health and Wellbeing.
4. **Identify** the groups in society that are involved in improving the health status of a community.

Actions that improve health

The Ottawa Charter for Health Promotion (WHO 1986) outlines five priority action areas for health promotion:

- develop healthy public policy
- create supportive environments
- strengthen community action
- develop personal skills
- reorient health services.

The charter also identifies three basic strategies for health promotion: **enabling**, **mediating** and **advocating**. These strategies for improving health are supported by the five action areas of the **Ottawa Charter**. (The Ottawa Charter for Health Promotion is covered in more detail in Chapter 4.)

Enabling

In health promotion, enabling is the process by which people gain more control over factors that influence their health; that is, **empowering** disadvantaged individuals or groups to take action to promote or protect their health. This action usually involves bringing about change. When enabling individuals or groups to take such action, it is important that they have the opportunity to express their needs and concerns. It is also necessary for them to be involved in any decision-making processes regarding action to be taken to meet their needs.

Enabling can involve a number of strategies, including:

- providing access to information
- facilitating the development of skills
- supporting action (such as lobbying governments for increased resources).

Mediating

There are many social determinants of health and, to address these effectively, many different sectors need to be involved. This is known as intersectoral collaboration. Many different disadvantaged groups within society have their own interests and perspectives on particular health issues. Inevitably, conflict will occur. Mediation involves the **reconciliation** of such conflict to ensure that the interests of all groups are considered, and that the best possible outcomes are reached.

Advocating

Advocacy involves speaking up for groups to gain political commitment, policy support, funding and other types of support. Depending on the skill level of those in the group, some groups are able to advocate on their own behalf; for example, a group of local residents who lobby local council to reduce speed limits in their local streets.

In other cases, people speak up on behalf of groups. For example, the Australian Council of Social Services (ACOSS) advocates on behalf of people on low incomes and other disadvantaged groups to influence government funding and policy to help improve the circumstances of these people.

Advocacy can come in various forms, including:

- awareness-raising in the **mass media**
- **lobbying** of politicians or senior **bureaucrats**
- development of coalitions of interested people or pressure groups to address a particular issue of concern.

Disadvantaged groups tend to have less representation in political and social decision-making. The University of Melbourne in 2004 estimated that in Australia the richest 10 per cent of households own close to 45 per cent of all wealth. This gives the wealthier in society more political influence than those with less wealth. It is important to:

- give disadvantaged groups a political voice through advocacy
- ensure the interests of all parties are considered
- ensure that any conflict is resolved through mediation
- enable people to have control over factors that influence their health.

Disadvantaged groups need to be involved in decision-making and the design of appropriate services, and need a sense of ownership of all health promotion programs. Programs that meet the needs of the group are more likely to be sustained.

Critical inquiry

Explain the nature of enabling, mediating and advocating processes when working for sustainable improvements for disadvantaged groups.

Research and Review

Identify the actions and processes that improve health for disadvantaged groups.

practical application

Actions that improve health

1 You are a member of a student committee in your school that is considering how it can meet the health needs of young people in the school.

a **Describe** how your committee would enable the students in your school to have some involvement in the identification of their needs and decision-making about the strategies to be implemented.

b **Describe** how you would mediate to gain consensus and manage conflict.

c **Describe** how you would advocate on behalf of the student body to help ensure that the strategies agreed upon are implemented.

d **Outline** the action you would take to ensure that the strategies are sustainable.

A social justice framework for addressing health inequities

Health promotion activities can help to address health inequities. A **social justice framework** for addressing health inequities can be implemented to ensure that the most disadvantaged in society are given an opportunity to improve and protect their health. This framework should underpin health promotion activity by:

- empowering individuals in disadvantaged circumstances
- empowering disadvantaged communities
- improving access to essential facilities and services
- encouraging economic and cultural change.

Empowering individuals in disadvantaged circumstances

Strengthening individuals in disadvantaged circumstances involves:

- providing culturally appropriate information
- developing personal skills
- providing support.

Using an example of improving nutrition in a community characterised by limited incomes we can apply this aspect of the social justice framework. The members of this community could be motivated to improve their nutrition by the information provided by health professionals. Community members would develop the skills and confidence to shop for, prepare and cook nutritious foods on a limited budget. As a result, individual community members would be able to sustain this practice, and contribute to the health and well-being of their families and the community as a whole.



Figure 25.4 A social justice framework for addressing health inequities can improve access to essential facilities and services

Empowering disadvantaged communities

Some health issues have an individual focus, whereas others involve the collective action of a community. Strengthening disadvantaged communities is a complex process. It relies on the skills and resources of individuals and organisations within the community, and access to professional support, such as health workers. Disadvantaged communities are strengthened if they are actively involved in identifying the issues that are important to them, and have input into decisions regarding action to be taken. The strategy of mediation might be necessary at this stage of planning.

Although strengthening communities is challenging, it can also be rewarding, and it can provide communities with the confidence to address new issues. For example, the people of Minjilang (on Croker Island, 240 kilometres north-east of Darwin) were concerned about their dietary intake and food supply. They had previously experienced success with an alcohol program, as a result of which their community has prohibited alcohol. This success motivated them to tackle the issue of nutrition. Their previous experience had provided them with the knowledge and skills required to bring about change in their community. The community identified the need to change dietary intake. It directed and managed a program that was conducted in partnership with health professionals and successfully addressed this issue.

Improving access to facilities and services

Access to essential facilities and services is necessary to reduce the current inequities experienced by disadvantaged groups. These groups themselves must be consulted to determine the facilities that they need, and how access to these can be improved.

This can involve improvements in transport, access to interpreter services and the provision of culturally appropriate health services. For example, parents with infants need health services that are:

- in locations well serviced by public transport
- situated at ground level, to avoid having to carry prams and children up stairs.

Improving access to facilities and services might also include improved access to adequate housing and employment opportunities through changes in government policies and programs.

In general, interventions are needed to ensure that people have access to the basic prerequisites for health. These are clean water, **sanitation**, food, health care, and safe and satisfying employment.



Figure 25.5 Improving access to facilities and services is necessary to reduce the current inequities experienced by disadvantaged groups

Encouraging economic and cultural change

The removal of health inequities requires economic and cultural change. This can occur at various levels. For example, an individual who has limited income might require money management skills to change spending patterns and ensure that the person has enough money to meet his or her basic needs. If the situation is to improve for this person, economic change at government level is required.

The most effective way to improve health inequities is to reduce the gap between incomes. Since the 1980s there has been a gradual increase in economic inequities. One way to address this is for governments to implement a taxation system that reduces the economic burden on people with low incomes.

Economic change might also require that governments allocate their funds differently. Funding is needed for programs that reduce the underlying causes of health inequities, such as programs that provide training and work experience. These give unemployed people an opportunity to gain employment.

Cultural change can also assist in reducing health inequities. Australian society has a focus on individual responsibility: if a person is unhealthy, many believe that that person has only himself or herself to blame. Australia has a culture of '**victim-blaming**', in which individuals are held responsible for their circumstances. This individual perspective is particularly prevalent in the area of health care, in which a medical model dominates. According to a medical perspective, for every disease there exists a medical treatment to bring the individual back to good health. This fails to acknowledge that conditions created by society hamper people in accessing health services during the early stages of an illness or making positive changes to their health.

A cultural change is required to embrace a social view of health, a view that recognises that health is influenced by many factors within society, such as education and employment opportunities. A social view of health is also important to support the principle of social justice, and to ensure that the most disadvantaged in society are adequately resourced, so that they have opportunities to improve their health status.

For example, when HIV/AIDS was first discovered and the public was informed of its existence, there was a great deal of stigma associated with being HIV-positive, and much victim-blaming took place. This resulted in discrimination against people who were HIV-positive, and gay males were blamed for the disease. Health promoting campaigns and education were able to change this culture of victim-blaming to ensure that people living with HIV/AIDS are treated with dignity and respect. **Legislation** was passed to ensure that discrimination against HIV-positive people was eliminated, and that their human rights were protected. Although there are still individuals who have negative attitudes towards the groups most at risk of HIV/AIDS, Australians in general are compassionate to people living with the disease. Australia has been recognised internationally for its success in controlling the spread of HIV and AIDS. This success can be attributed to careful planning and the involvement of government, community groups concerned with HIV/AIDS and health care services.

practical application

Social justice framework

1 Consider the following account of a visit to remote Aboriginal communities:

> In some of these communities, a 'home' for up to 20 people consisted of a tin shed without a toilet or washing facilities. The toddlers' playground consisted only of a car body strewn with broken glass. Could any of us honestly hope to sustain our motivation and self-esteem if forced to live in a community with appalling physical conditions, where alcohol abuse was rife and with unemployment running close to 100 per cent? One community visited had raw sewage on the ground and had recently been through a two-month period with no drinking water supply.

a **Identify** the causes of the inequities experienced by the people living in a remote community such as the one described above.

b **Apply** the social justice framework to develop a plan to address the causal factors of these inequities.

Research and Review

Apply a social justice framework to develop a plan to address the causal factors of health inequities.

Characteristics of effective health promotion strategies

Strategies that are implemented to reduce health inequities must be effective, and their effectiveness should be constantly evaluated. We need to establish which particular aspects of a strategy contributed to its success. We also need to identify any barriers that existed during the implementation of the strategy. This will ensure action can be taken to address these barriers.

Successful strategies have certain shared characteristics. They have involved:

- working with the target group in program design and implementation
- ensuring cultural relevance and appropriateness
- focusing on skills, education and prevention
- supporting the whole population while directing extra resources to those in high-risk groups
- ensuring intersectoral collaboration.

There are many strategies aimed at improving the circumstances of the most disadvantaged in society and reducing gaps in health status. These strategies operate at different levels. Some provide support for people to help them to meet their basic needs, such as food and housing. Other strategies are aimed at addressing the underlying causes of health inequities, such as training programs for unemployed people. Both approaches are necessary and effective in reducing health inequities.



Figure 25.6 Many strategies are aimed at improving the circumstances of the most disadvantaged in society, and reducing gaps in health status

Working with the target group in program design and implementation

To obtain a true picture of the needs of a particular group, it is important to involve the group actively in the design and implementation of the program. The target group then develops a sense of ownership of the program, and is more likely to be actively engaged in it. During this process, the group members develop their personal skills and community action is strengthened. Such strategies help to develop the group's confidence in its ability to tackle issues, and to take future action if other issues arise. All this contributes to the program being sustained for as long as it is required.

Ensuring cultural relevance and appropriateness

Any strategy that aims to reduce inequities needs to take into account the **culture** of its target group. Culture is a broader concept than ethnicity. For example, people refer to the **'youth culture'** (that is, the norms, values, beliefs and activities of youth) based on age not **ethnicity**. Culture can include creative arts and traditional practices passed down through generations.

Programs for a group that are culturally relevant will address the real needs of the group, and will engage the people it is aiming to reach. This increases the willingness of the group members to be involved.

Focusing on skills, education and prevention

Providing people with information alone will have minimal effect on improving their health. There are certain skills that people need to maximise their health, and these skills will depend on their circumstances. These could include skills such as:

- managing a budget
- preparing nutritious meals
- driving safely
- managing stress.

Education can thus be related to development of skills. Education can also involve providing information about health-related matters. This could be information about:

- the **management** of a particular condition (such as diabetes)
- the **prevention** of a condition (such as cardiovascular disease).

Education can take place in group situations (such as a lecture or a discussion group) or on a one-to-one basis (as in a doctor giving advice regarding blood pressure). It can take place in a variety of settings and does not have to be formal. In certain circumstances it is preferable that education is not too formal because some people find this intimidating and are discouraged from attending.

Effective health promotion strategies focus on prevention. They analyse the causes of the most prevalent conditions in a population, including the underlying social factors, and develop the knowledge, skills and attitudes necessary to avoid these conditions.

Effective health promotion strategies focus on prevention.

The acquisition of skills and the provision of education will be most effective when they occur within supportive environments. For example, in a program relating to nutrition, people must have access to nutritious food that they can afford. Strategies focusing on skills, education and prevention must take into account the social circumstances of their target group.



Figure 25.7 The acquisition of skills and the provision of education will be most effective when they occur within supportive environments

Supporting the whole population while directing extra resources to those in high-risk groups

Some groups within society have greater health needs than do others. This is often the result of conditions created by society that have had a negative impact on particular groups. Although it is necessary to address the health needs of the whole population, more resources might need to be provided to reduce the inequities experienced by some groups. For example, there are many conditions that disproportionately affect Aboriginal and Torres Strait Islander peoples, such as diabetes and heart disease. It is essential that extra resources be allocated to reduce this inequity, as well as addressing these issues for the rest of the population.

Intersectoral collaboration

Many of the factors that affect health are not the responsibility of the health sector. Therefore, it is important that all sectors within society work collaboratively to address health inequities.

For example, ensuring access to nutritious foods could include a number of agencies:

- Local government could change its policies relating to town planning and ensure that there are as many fresh-food outlets as there are take-away food outlets.
- Transport authorities could ensure that adequate transport is available to ensure people can access locations selling nutritious foods.
- The health department could ensure that staff is available to provide education in the preparation of nutritious foods.
- Schools could provide healthy foods in their canteens.
- Governments could offer subsidies to those living in rural and remote locations to make fresh food more affordable.
- Local shopkeepers and food outlets could have frequent 'healthy specials'.

If such agencies work cooperatively to improve the nutritional status of a particular group they will implement a more effective strategy than one agency alone could deliver. It is important that all sectors involved in a strategy have a common goal and are clear about their roles and responsibilities in helping to achieve this goal. This helps to ensure that the strategy runs efficiently and that conflict is avoided.

practical application

Effective health promotion strategies

1 Imagine you have limited resources to develop a health promotion strategy to reduce the level of hazardous or harmful alcohol consumption.

- a **Identify** the target group you would choose. Why?
- b **Describe** how you would involve this group in design and implementation of the strategy.
- c **Describe** how you would ensure that this program is culturally relevant and appropriate.

2 A strategy is being developed to encourage safe driving practices in young males. To maximise the effectiveness of this, the RTA has asked you to involve a number of sectors to plan and implement a health promotion strategy.

- a **Identify** the government and non-government organisations that could be involved in this project.
- b **Discuss** their various roles in this project.

Critical inquiry

1 You are planning a health promotion strategy targeted at people who are socio-economically disadvantaged. **Explain** how you would determine the settings of relevance to this group.

2 **Describe** how you would gather the evidence necessary to determine the high-risk groups for particular conditions.

3 **Distinguish** those characteristics that contribute to the sustainability of health strategies.

4 **Analyse** the characteristics of a specific health promotion strategy in order to predict its potential for success.

Research and Review

1 **Describe** the characteristics of effective health promotion strategies.

2 **Analyse** the characteristics of specific health promotion strategies in order to predict their potential for success.

how might the gap in health status of populations be bridged?

chapter summary

- Funding will not necessarily improve health. Funding provides the means by which strategies for improving health can be implemented.
- Governments at various levels provide funding for health.
- Medicare addresses the issue of equity to some degree.
- Health outcomes are the changes that occur in individuals, communities or populations as a result of a health strategy.
- Most health outcomes have been focused on risk factors, and on mortality and morbidity. Less attention has been given to measuring improvements in health, quality of life and equity.
- There is an increasing expectation that funding be tied to the achievement of positive health outcomes.
- Health status is not improved by provision of health services alone. Improved health status relies on the participation of many groups in society.
- Resources from various areas of government are needed to improve the health of the population.
- Many of the social factors that affect health are outside the responsibility of the health sector, and so there is a need for increased intersectoral collaboration.
- The Ottawa Charter for Health Promotion outlines five priority action areas for health promotion.
- Three basic strategies for health promotion are advocating, enabling and mediating.
- Health promotion activities can help to address health inequities.
- A social justice framework for addressing health inequities can be implemented to ensure that the most disadvantaged in society are given an opportunity to improve and protect their health.
- Strategies that are implemented to reduce health inequities must be effective and their effectiveness should be constantly evaluated.
- It is important that all sectors within society work collaboratively to address health inequities.

revision activities

1. **Describe** how funding improves health.
2. **Outline** the actions that improve health.
3. **Describe** a social justice framework for addressing health inequities.
4. **Outline** the characteristics of effective health promotion.

extension activities

1. **Critically analyse** the issues that influence health funding.
2. **Explain** the nature of enabling, mediating and advocating processes when working for sustainable improvements for disadvantaged groups.
3. **Apply** the social justice framework to the development of a plan to address the causal factors of an inequity.
4. **Critically analyse** the characteristics of a specific health promotion strategy in order to predict its potential for success.

exam-style questions

1. **Critically analyse** how a social justice framework can address the factors influencing the health of a disadvantaged population. (12 marks)
2. **Assess** how funding to improve health attempts to overcome health inequities experienced by Aboriginal and Torres Strait Islander peoples. (15 marks)
3. **Describe** how mediating and advocating processes improve health for disadvantaged groups. (5 marks)
4. **Investigate** the characteristics that contribute to the effectiveness of health strategies in Australia. (15 marks)
5. **Evaluate** the characteristics of effective health promotion strategies for improving the health of people living in rural and remote locations. (12 marks)

Syllabus checkpoints

PDHPE Stage 6 HSC Course Content

Core 1: Health priorities in Australia

How are priority issues for Australia's health identified?	
Students learn about:	Students learn to:
• measuring health status – role of epidemiology – measures of epidemiology (mortality, infant mortality, morbidity, life expectancy)	• critique the use of epidemiology to describe health status by considering questions such as: – what can epidemiology tell us? – who uses these measures? – do they measure everything about health status? • use tables and graphs from health reports to analyse current trends in life expectancy and major causes of morbidity and mortality for the general population and comparing males and females
• identifying priority health issues – social justice principles – priority population groups – prevalence of condition – potential for prevention and early intervention – costs to the individual and community	• argue the case for why decisions are made about health priorities by considering questions such as: – how do we identify priority issues for Australia's health? – what role do the principles of social justice play? – why is it important to prioritise?

What are the priority issues for improving Australia's health?	
Students learn about:	Students learn to:
• groups experiencing health inequities – Aboriginal and Torres Strait Islander peoples – socio-economically disadvantaged people – people in rural and remote areas – overseas-born people – the elderly – people with disabilities	• research and analyse Aboriginal and Torres Strait Islander peoples and ONE other group experiencing health inequities by investigating: – the nature and extent of the health inequities – the socio-cultural, socio-economic and environmental determinants – the roles of individuals, communities and governments in addressing the health inequities
• high levels of preventable chronic disease, injury and mental health problems – cardiovascular disease (CVD) – cancer (skin, breast, lung) – diabetes – respiratory disease – injury – mental health problems and illnesses	• research and analyse CVD, cancer and ONE other condition listed by investigating: – the nature of the problem – extent of the problem (trends) – risk factors and protective factors – the socio-cultural, socio-economic and environmental determinants – groups at risk
• a growing and ageing population – healthy ageing – increased population living with chronic disease and disability – demand for health services and workforce shortages – availability of carers and volunteers	• assess the impact of a growing and ageing population on: – the health system and services – health service workforce – carers of the elderly – volunteer organisations

What role do health care facilities and services play in achieving better health for all Australians?	
Students learn about:	Students learn to:
• health care in Australia – range and types of health facilities and services – responsibility for health facilities and services – equity of access to health facilities and services – health care expenditure versus expenditure on early intervention and prevention – impact of emerging new treatments and technologies on health care, e.g. cost and access, benefits of early detection – health insurance: Medicare and private	• evaluate health care in Australia by investigating issues of access and adequacy in relation to social justice principles. Questions to explore include: – how equitable is the access and support for all sections of the community? – how much responsibility should the community assume for individual health problems? • describe the advantages and disadvantages of Medicare and private health insurance, e.g. costs, choice, ancillary benefits
• complementary and alternative health care approaches – reasons for growth of complementary and alternative health products and services – range of products and services available – how to make informed consumer choices	• critically analyse complementary and alternative health care approaches by exploring questions such as: – how do you know who to believe? – what do you need to help you make informed decisions?

What actions are needed to address Australia's health priorities?	
Students learn about:	Students learn to:
• health promotion based on the five action areas of the Ottawa Charter – levels of responsibility for health promotion – the benefits of partnerships in health promotion, e.g. government sector, non-government agencies and the local community – how health promotion based on the Ottawa Charter promotes social justice – the Ottawa Charter in action	• argue the benefits of health promotion based on: – individuals, communities and governments working in partnership – the five action areas of the Ottawa Charter • investigate the principles of social justice and the responsibilities of individuals, communities and governments under the action areas of the Ottawa Charter • critically analyse the importance of the five action areas of the Ottawa Charter through a study of TWO health promotion initiatives related to Australia's health priorities

Core 2: Factors affecting performance

How does training affect performance?	
Students learn about:	Students learn to:
• energy systems – alactacid system (ATP/PC) – lactic acid system – aerobic system	• analyse each energy system by exploring: – source of fuel – efficiency of ATP production – duration that the system can operate – cause of fatigue – by-products of energy production – process and rate of recovery
• types of training and training methods – aerobic, e.g. continuous, Fartlek, aerobic interval, circuit – anaerobic, e.g. anaerobic interval – flexibility, e.g. static, ballistic, PNF, dynamic – strength training, e.g. free/fixed weights, elastic, hydraulic	• assess the relevance of the types of training and training methods for a variety of sports by asking questions such as: – which types of training are best suited to different sports? – which training method(s) would be most appropriate? Why? – how would this training affect performance?

• principles of training – progressive overload – specificity – reversibility – variety – training thresholds – warm up and cool down	• analyse how the principles of training can be applied to both aerobic and resistance training
• physiological adaptations in response to training – resting heart rate – stroke volume and cardiac output – oxygen uptake and lung capacity – haemoglobin level – muscle hypertrophy – effect on fast/slow twitch muscle fibres	• examine the relationship between the principles of training, physiological adaptations and improved performance

How can psychology affect performance?

Students learn about:	Students learn to:
• motivation – positive and negative – intrinsic and extrinsic	• evaluate performance scenarios to determine the appropriate forms of motivation, e.g. golf versus boxing
• anxiety and arousal – trait and state anxiety – sources of stress – optimum arousal	• explain the difference between anxiety and arousal in terms of the effects on performance
• psychological strategies to enhance motivation and manage anxiety – concentration/attention skills (focusing) – mental rehearsal/visualisation/imagery – relaxation techniques – goal-setting	• research case studies of athletes from different sports and ascertain the nature of their motivation and the psychological strategies they employ

How can nutrition and recovery strategies affect performance?

Students learn about:	Students learn to:
• nutritional considerations – pre-performance, including carbohydrate loading – during performance – post-performance	• compare the dietary requirements of athletes in different sports considering pre-, during and post-performance needs
• supplementation – vitamins/minerals – protein – caffeine – creatine products	• critically analyse the evidence for and against supplementation for improved performance
• recovery strategies – physiological strategies, e.g. cool down, hydration – neural strategies, e.g. hydrotherapy, massage – tissue damage strategies, e.g. cryotherapy – psychological strategies, e.g. relaxation	• research recovery strategies to discern their main features and proposed benefits to performance

How does the acquisition of skill affect performance?

Students learn about:	Students learn to:
• stages of skill acquisition – cognitive – associative – autonomous	• examine the stages of skill acquisition by participating in the learning of a new skill, e.g. juggling, throwing with the non-dominant arm

• characteristics of the learner, e.g. personality, heredity, confidence, prior experience, ability	• describe how the characteristics of the learner can influence skill acquisition and the performance of skills
• the learning environment – nature of the skill (open, closed, gross, fine, discrete, serial, continuous, self-paced, externally paced) – the performance elements (decision-making, strategic and tactical development) – practice method (massed, distributed, whole, part) – feedback (internal, external, concurrent, delayed, knowledge of results, knowledge of performance)	• design a suitable plan for teaching beginners to acquire a skill through to mastery. The plan should reflect: – appropriate practice methods for the learners – the integration of relevant performance elements – an awareness of how instruction may vary according to characteristics of the learner – how feedback will be used as learners progress through the stages of skill acquisition
• assessment of skill and performance – characteristics of skilled performers, e.g. kinaesthetic sense, anticipation, consistency, technique – objective and subjective performance measures – validity and reliability of tests – personal versus prescribed judging criteria	• develop and evaluate objective and subjective performance measures to appraise performance

Option 1: The health of young people

What is good health for young people?	
Students learn about:	Students learn to:
• the nature of young people's lives – how the developmental stage can vary in motivations, values, socio-cultural background – the influence of family/peers – the influence of prevailing youth cultures – the influence of global events and trends – the influence of technology	• distinguish those aspects of young people's lives that make them similar and different to the young people of previous generations
• epidemiology of the health of young people – patterns of morbidity and mortality – comparisons of health status with that of other age groups	• analyse health data for young people and compare with that of other age groups in order to identify the generally positive picture of the health of young people • identify current areas of ill health that are of greatest prevalence among young people
• the effects of the determinants of health on young people – individual factors – socio-cultural factors – socio-economic factors – environmental factors	• examine how a range of factors may adversely affect the health of young people and propose strategies to overcome these factors
• developmental aspects that affect the health of young people – revising roles within relationships – clarifying self-identity and self-worth – developing self-sufficiency and autonomy – establishing education, training and employment pathways – establishing personal support structures – determining behavioural boundaries	• identify the relationship between successfully managing these developmental aspects and health • think critically about how young people's priorities and values relate to their health by considering questions such as: – is health a priority for young people? – what would young people view as the indicators of good health?

To what extent do Australia's young people enjoy good health?

Students learn about:	Students learn to:
• the major health issues that impact on young people – mental health problems and illnesses – alcohol consumption – violence – road safety – sexual health – body image – other relevant/emerging health issues, e.g. gambling, cyber-bullying, party crashes, drink spiking	• analyse TWO of the major health issues listed by examining: – the nature and extent of the major health issue – the risk factors and protective factors – the socio-cultural, socio-economic and environmental determinants – young people most at risk

What skills and actions enable young people to attain better health?

Students learn about:	Students learn to:
• skills in attaining better health – building self concept – developing connectedness and support networks – developing resilience and coping skills – developing health literacy skills – developing communication skills – accessing health services – becoming involved in community service – creating a sense of future	• analyse through meaningful and realistic situations how the skills can assist young people to enjoy good health • critically reflect on their own personal health and health behaviours including both positive and negative influences and indicate future courses of action for better health
• actions targeting health issues relevant to young people – social action – legislation and public policy – health promotion initiatives	• evaluate a range of strategies that have been implemented by government and non-government agencies that target TWO major health issues impacting on young people

Option 2: Sport and physical activity in Australian society

How have meanings about sport and physical activity changed over time?

Students learn about:	Students learn to:
• the beginnings of modern sport in nineteenth-century England and colonial Australia – links with manliness, patriotism and character – the meaning of amateur and professional sport – women's historical participation in sport	• compare the nature of sport in the nineteenth century with sport in today's society. Consider questions such as: – how have the meanings of amateur and professional sport changed? – how did the meanings of sport differ for different social groups? – how did women's and men's sports participation differ and why?
• sport as a commodity – the development of professional sport – sport as big business – sponsorship, advertising and sport – the economics of hosting major sporting events – consequences for spectators and participants	• analyse the consequences for various sports as they have adopted a business focus

What is the relationship between sport and national and cultural identity?

Students learn about:	Students learn to:
• Australian sporting identity – national and regional identity through sporting achievements – government funding, e.g. the Australian Institute of Sport – politics and sports	• critically examine how sport has been used to promote an Australian national and regional identity, e.g. Olympic coverage, State of Origin • identify instances when Australia has used sport for political purposes and evaluate the impact of this on the athletes and the Australian public, e.g. Moscow Olympics, apartheid boycotts
• the meaning of physical activity and sport to Indigenous Australians – traditional activities and sports – links between community and identity	• investigate how physical activity and sport have influenced the lives and identity of Indigenous Australians
• physical activity, sport and cultural identity – the role of competition – links to cultural identity – relationships to health – ways of thinking about the body	• research physical activities or sports to determine their cultural significance for particular groups

How does the mass media contribute to people's understanding, values and beliefs about sport?

Students learn about:	Students learn to:
• the relationship between sport and the mass media – the representation of sport in the media – economic considerations of media coverage and sport	• think critically about the impact of the mass media on sport by investigating questions such as: – who benefits and in what ways? – how does the media influence our understanding of sporting events? – how have sports been changed to suit the needs of the media, e.g. uniforms, rule modifications, structure to accommodate advertising breaks
• deconstructing media messages, images and amount of coverage – differences in coverage for different sports across various print and electronic media – the emergence of extreme sports as entertainment, e.g. big wave surfing.	• analyse the media's role in giving meanings to sport by considering questions such as: – how does the coverage given to particular sports reflect which sports are valued and which ones are not? – what metaphors are common in sport, e.g. football as 'war'? – has the media pushed extreme sports to take excessive risks?

What are the relationships between sport and physical activity and gender?

Students learn about:	Students learn to:
• sport as a traditionally male domain – sport and the construction of masculinity and femininity – implications for participation – sponsorship, policy and resourcing – the role of the media in constructing meanings around femininity and masculinity in sport	• apply an understanding about the social construction of gender to explore the ways in which sport reinforces or challenges traditional narrow understandings of gender • critically analyse the participation rates of males and females in a range of sports and offer explanations for differences. Consider how some forms of activity have come to be traditionally associated with each gender
• challenges to the male domain, e.g. women in traditional male sports	• examine the debate that surrounds the entry of women into traditional male sports, e.g. boxing, rugby. Compare this with the entry of men into traditional female sports, e.g. netball

Option 3: Sports medicine

How are sports injuries classified and managed?

Students learn about:	Students learn to:
• ways to classify sports injuries – direct and indirect – soft and hard tissue – overuse	• identify specific examples of injuries that reflect each of the classifications
• soft tissue injuries – tears, sprains, contusions – skin abrasions, lacerations, blisters – inflammatory response	• manage soft tissue injuries: – RICER (rest, ice, compression, elevation, referral) – immediate treatment of skin injuries
• hard tissue injuries – fractures – dislocation	• manage hard tissue injuries – assessment for medical attention – immobilisation
• assessment of injuries – TOTAPS (talk, observe, touch, active and passive movement, skills test)	• perform assessment procedures to determine the nature and extent of injury in simulated scenarios

How does sports medicine address the demands of specific athletes?

Students learn about:	Students learn to:
• children and young athletes – medical conditions (asthma, diabetes, epilepsy) – overuse injuries (stress fractures) – thermoregulation – appropriateness of resistance training	• analyse the implications of each of these considerations for the ways young people engage in sport and how each is managed
• adult and aged athletes – heart conditions – fractures/bone density – flexibility/joint mobility	• explain the sports participation options available for aged people with medical conditions
• female athletes – eating disorders – iron deficiency – bone density – pregnancy	• assess the degree to which iron deficiency and bone density affect participation in sport

What role do preventative actions play in enhancing the wellbeing of the athlete?

Students learn about:	Students learn to:
• physical preparation – pre-screening – skill and technique – physical fitness – warm up, stretching and cool down	• analyse different sports in order to determine priority preventative strategies and how adequate preparation may prevent injuries
• sports policy and the sports environment – rules of sports and activities – modified rules for children – matching of opponents, e.g. growth and development, skill level – use of protective equipment – safe grounds, equipment and facilities	• critically analyse sports policies, rules and equipment to determine the degree to which they promote safe participation, e.g. heat rules, rugby union scrum rules

• environmental considerations – temperature regulation (convection, radiation, conduction, evaporation) – climatic conditions (temperature, humidity, wind, rain, altitude, pollution) – guidelines for fluid intake – acclimatisation	• evaluate strategies an athlete could employ to support the body's temperature regulation mechanisms • analyse the impact of climatic conditions on safe sports participation
• taping and bandaging – preventative taping – taping for isolation of injury – bandaging for immediate treatment of injury	• demonstrate taping and bandaging techniques, including taping the ankle, wrist and thumb • evaluate the role taping plays in both the prevention and treatment of injury

How is injury rehabilitation managed?

Students learn about:	Students learn to:
• rehabilitation procedures – progressive mobilisation – graduated exercise (stretching, conditioning, total body fitness) – training – use of heat and cold	• examine and justify rehabilitation procedures used for a range of specific injuries, e.g. hamstring tear, shoulder dislocation
• return to play – indicators of readiness for return to play (pain free, degree of mobility) – monitoring progress (pre-test and post-test) – psychological readiness – specific warm-up procedures – return to play policies and procedures – ethical considerations, e.g. pressure to participate, use of painkillers	• research and evaluate skill and other physical tests that could be used to indicate readiness to return to play • critically examine policies and procedures that regulate the timing of return to play, considering questions such as: – why aren't such policies applied to all sports? – who should have ultimate responsibility for deciding if an athlete returns to competition? – should athletes be allowed to use painkillers in order to compete when injured?

Option 4: Improving performance

How do athletes train for improved performance?

Students learn about:	Students learn to:
• strength training – resistance training, e.g. elastic, hydraulic – weight training, e.g. plates, dumbbells – isometric training • aerobic training – continuous/uniform – Fartlek – long interval • anaerobic training (power and speed) – developing power through resistance/weight training – plyometrics – short interval • flexibility training – static – dynamic – ballistic • skill training – drills practice – modified and small-sided games – games for specific outcomes, e.g. decision-making, tactical awareness	• analyse TWO of the training types by drawing on current and reliable sources of information to: – examine the types of training methods and how they best suit specific performance requirements – design a training program – describe how training adaptations can be measured and monitored – identify safe and potentially harmful training procedures

What are the planning considerations for improving performance?

Students learn about:	Students learn to:
• initial planning considerations – performance and fitness needs (individual, team) – schedule of events/competitions – climate and season	• describe the specific considerations of planning for performance in events/competitions. How would this planning differ for elite athletes and recreational/amateur participants?
• planning a training year (periodisation) – phases of competition (pre-season, in-season and off-season phases) – subphases (macro and microcycles) – peaking – tapering – sport-specific subphases (fitness components, skill requirements)	• develop and justify a periodisation chart of the fitness and skill-specific requirements of a particular sport
• elements to be considered when designing a training session – health and safety considerations – providing an overview of the session to athletes (goal-specific) – warm-up and cool-down – skill instruction and practice – conditioning – evaluation	• examine different methods of structuring training sessions • design and implement a training session for a specific event. Evaluate the session by considering questions such as: – did the activities match the abilities of the group? – what was the reaction of the group? – how could the session be modified?
• planning to avoid overtraining – amount and intensity of training – physiological considerations, e.g. lethargy, injury – psychological considerations, e.g. loss of motivation	• analyse overtraining by considering questions such as: – how much training is too much? – how do you identify an overtrained athlete? – what do you do if you identify an overtrained athlete? – how can overtraining be avoided?

What ethical issues are related to improving performance?

Students learn about:	Students learn to:
• use of drugs – the dangers of performance enhancing drug use, e.g. physical effects, loss of reputation, sponsorship and income – for strength (human growth hormone, anabolic steroids) – for aerobic performance (EPO) – to mask other drugs (diuretics, alcohol) – benefits and limitations of drug testing	• justify the reasons drugs are considered to be unethical and carry a range of risks for the athlete • argue issues related to drug testing such as: – at what level of competition should drug testing be introduced? – which drugs should be tested for? – what are the pros and cons of drug testing? – what should be the consequences of drug use?
• use of technology – training innovation, e.g. lactate threshold testing, biomechanical analysis – equipment advances, e.g. swimsuits, golf ball	• describe how technology has been used to improve performance • argue ethical issues related to technology use in sport such as: – has technology gone too far? – has access to technology created unfair competition?

Option 5: Equity and health

Why do inequities exist in the health of Australians?

Students learn about:	Students learn to:
• factors that create health inequities – daily living conditions – quality of early years of life – access to services and transport – socioeconomic factors – social attributes, e.g. social exclusion, discrimination – government policies and priorities, e.g. health, economic, social	• identify how these factors contribute to the inequities experienced by different population groups in Australia • recognise the potential for populations to be exposed to multiple risk factors contributing to health inequities and the implications for managing the inequities

What inequities are experienced by population groups in Australia?

Students learn about:	Students learn to:
• populations experiencing health inequities – Aboriginal and Torres Strait Islander peoples – homeless – people living with HIV/AIDS – incarcerated – aged – culturally and linguistically diverse backgrounds – unemployed – geographically remote populations – people with disabilities	• challenge generalisations about populations experiencing health inequities • analyse the health inequities experienced by TWO of the population groups by: – examining health data to determine areas of inequity and the degree to which the gap is reducing or increasing – analysing the impact of the health determinants – examining the media's role in influencing social attitudes and public policy – evaluating government interventions

How may the gap in health status of populations be bridged?

Students learn about:	Students learn to:
• funding to improve health – funding for health – funding for specific populations – limited resources	• think critically about the issues that influence health funding by considering questions such as: – does funding solve inequities? – will improving the health of all Australians reduce the gap? – should funding go where there is the greatest chance of success or to the area of greatest need? Is it possible to do both?
• actions that improve health – enabling (using knowledge and skills for change) – mediating (working for consensus) – advocating (speaking up for specific groups, their needs and concerns)	• explain the nature of enabling, mediating and advocating processes when working for sustainable improvements for disadvantaged groups
• a social justice framework for addressing health inequities – empowering individuals in disadvantaged circumstances – empowering disadvantaged communities – improving access to facilities and services – encouraging economic and cultural change	• apply the social justice framework to the development of a plan to address the causal factors of an inequity
• characteristics of effective health promotion strategies – working with the target group in program design and implementation – ensuring cultural relevance and appropriateness – focusing on skills, education and prevention – supporting the whole population while directing extra resources to those in high risk groups – intersectoral collaboration	• distinguish those characteristics that contribute to the sustainability of health strategies • analyse the characteristics of a specific health promotion strategy in order to predict its potential for success

Appendix

Suggested training materials

Suggested 50 g carbohydrate snacks and fluids

Foods

- Jam or honey sandwich (2 slices of bread and 1 tablespoon of jam/honey)
- Banana sandwich or salad sandwich with 1 piece of fruit
- 2 large pancakes with 1 tablespoon of syrup
- 1 cup of rice with a low-fat topping (that is, a tomato-based sauce)
- 1½ cups of pasta with a low-fat topping (that is, a tomato-based sauce)
- ¾ cup of baked beans or tinned spaghetti with 2 slices of toast
- 2 cereal bars
- 3 muesli bars (note: chocolate, yoghurt-coated or nut-based choices are high fat)
- 1 'sports bar', on average (such as Power Bar)
- 1 cup of breakfast cereal, 1 small banana and 200 mL of low-fat milk
- 1 tub of low-fat fruit yoghurt and 1 piece of fruit
- 3 average pieces of fruit or 2 medium bananas
- 50 g of jelly beans
- 65 g of jelly lollies
- 2 carbohydrate gels (such as PowerBar Gel and Carbo-shot)
- 3 medium-sized ice blocks

Fluids

- Banana smoothie—200 mL of low-fat milk, 1 banana, 2 teaspoons of honey and 1 scoop of low-fat ice cream
- 1 Sustagen Sport popper (250 mL) and 1 banana
- 250–300 mL of a liquid meal supplement (such as Sustagen Sport)
- 750 mL of a sports drink (such as Isosport, Gatorade or Powerade)
- 500 mL of cordial
- 500 mL of soft drink, flavoured mineral water or fruit juice

Suggested pre-event meals

- Breakfast cereal with skim milk/reduced-fat milk and fresh or canned fruit
- Toast with baked beans or tinned spaghetti
- Pancakes with syrup and 1 piece of fruit
- Liquid meal supplement (such as Sustagen Sport) or a low-fat fruit smoothie
- Low-fat yoghurt, custard or creamed rice with fruit salad
- Banana sandwiches or rolls
- Mini pizzas (made on pocket breads) or pasta with tomato-based sauce for lunch or afternoon meals in preparation for afternoon or night competitions

Program designed for a 100 kg male rugby union player

Energy: 18 000 kJ

Carbohydrate: 7.5 g/kg body weight

Protein: 2 g/kg body weight

Fats: 14%

Breakfast

- Bowl of cereal topped with fresh fruit and low-fat milk
- Juice
- Wholegrain toast with baked beans

Morning snack

- Milk drink
- 2 large fruit buns
- 1 piece of fruit

Lunch

- 1 chicken salad roll
- 1 ham salad roll
- 1 cup of fruit salad
- 1 tub of yoghurt
- Water

Afternoon snack (pre-training)

- Gatorade and a light snack (such as a jam sandwich)

Afternoon snack (post-training)

- Banana sandwich
- Milk-based drink

Dinner

- Lean beef and vegetable stir fry
- 2 cups of boiled rice
- Bread if desired
- Yoghurt
- Fruit juice and water

Supper

- Low-fat smoothie

Glossary

A

abuse to hurt or injure by maltreatment

acclimatisation the process whereby the body becomes accustomed to conditions, such as to altitude or temperature

accuracy how close a movement is to achieving its purpose

acute inflammatory phase the initial stage of repair of body tissue in the first 24–72 hours post injury

acute-care hospital a public or private hospital that provides services mainly to admitted patients with acute or temporary ailments; the average length of stay is relatively short

adaptation a positive change that occurs to the body as a result of training

adenosine diphosphate (ADP) the compound formed when ATP is broken down during movement

adenosine triphosphate (ATP) an energy-rich chemical compound found within the cells of the body

advocate to speak, plead or argue in favour of a person, group or issue

aerobic with oxygen

aerobic interval training performing short bouts of continuous activity with a rest period between them

aerobic training threshold the intensity of exercise where the body will begin to show signs of adaptation to aerobic training

affective associated with social learning

alactacid system an energy system using phosphocreatine as the source of energy

alienation emotional isolation or dissociation

altitude height or elevation above sea level

Alzheimer's disease a degenerative disorder that affects the brain and causes dementia, especially late in life

amateur in a nineteenth-century context, a person who engaged in sport for leisure; a term reserved for the upper-class gentleman

amenorrhoea the absence of a menstrual period

amino acids the basic compounds found in protein

amphetamine a drug used as a stimulant

anaerobic without oxygen

anaerobic intervals short bouts of high-intensity activity followed by a period of rest

anaerobic threshold the intensity of exercise where lactic acid begins to accumulate in the body

anomaly an occurrence that is strange or unique

anorexia nervosa an eating disorder accompanied by an intense fear of weight gain and a progressive loss of appetite and weight reduction beyond acceptable health levels

anticipation the ability to predict future movements

anxiety an emotional response to stress

apartheid a practice and/or policy that believes in the segregation of people based on race, such as once existed in South Africa

appraisal the evaluation of a performance

arousal the level of preparedness required to produce a movement

aspiration the ambition to succeed

assault a violent physical or verbal attack

associative stage in relation to learning a skill, the stage when the skill can be practised for improvement to occur

asylum seeker a person who has fled his or her own country and applies to the government of another country for protection as a refugee

atrophy the decreasing size of a muscle

attention the ability to focus on the things around you

attention deficit hyperactivity disorder (ADHD) a childhood mental disorder with onset before 7 years of age and involving impaired or diminished attention, impulsivity and hyperactivity

auto-immune disease a disease that results from an overactive immune response of the body against substances and tissues normally present in the body where the body attacks its own cells

autonomous being free to determine one's own actions or behaviour

autonomous stage in relation to learning a skill, the stage when the focus is on the environment and not on the performance of the skill

B

ballistic stretching bouncing or forcing stretches past a normal range of motion

basal metabolic rate the amount of energy used by the body while at rest

binge drinking drinking excessive amounts of alcohol regularly

binge eating consuming large amounts of food in a short period of time, especially as a symptom of bulimia

bisexual sexually attracted to both men and women

blood borne virus a virus that is carried in the blood and may cause severe disease in certain people and few or no symptoms in others and may spread from the carrier to another person, whether or not the carrier of the virus is ill

bulimia nervosa an eating disorder where large quantities of food are ingested at one time and then purged by self-induced vomiting

bulk-billing a payment option under the health system of universal health insurance in Australia

bureaucrat an official who is rigidly devoted to the details of administrative procedure

C

caffeine a central nervous system stimulant found in tea, coffee, cola drinks and chocolate

callisthenics light exercises of gymnastic style that are designed to enhance muscle tone

capillaries small blood vessels that are the site of exchange of oxygen and carbon dioxide in the blood

carbohydrate a nutrient that provides energy for the body

carbohydrate loading a process that is used in an attempt to increase the level of stored muscle glycogen

carcinogenic capable of causing cancer

cardiac output the total amount of blood leaving the heart each minute

cardiorespiratory system the parts of the body directly related to the delivery of oxygen to working muscles; that is, heart, lungs, blood vessels and blood

cardiovascular disease damage or disease of the heart, arteries, veins and smaller blood vessels

catalyse a chemical that will cause a release of energy

cervical cancer a malignant cancer of the cervical area

chlamydia a sexually transmitted infection caused by a microorganism

circuit training a series of exercises where the exercises are undertaken one after another

cirrhosis a chronic progressive disease of the liver, often caused by drinking too much alcohol

classification method of sorting or categorising

closed skill a skill that is undertaken in a stable and predictable environment

cognitive mental processing of information, thinking and understanding

cognitive stage in relation to learning a skill, developing a mental picture of the skill

colonisation the act of populating (causing to live in a place)

commodity something that can be bought and sold

communicable disease a disease that has the ability to transmit infection from one person to another; also known as 'contagious disease'

community a group of people with a common background or with shared health interests or issues within society

compartmentalise divide up or segment

competition a contest between individuals, groups or teams

concurrent feedback feedback received during a movement

confidence an individual's belief in his or her own ability

conflict resolution the process of attempting to resolve a dispute or a conflict

congenital anomaly birth defect

connectedness the quality and number of connections we have with other people in our social circle of family, friends and acquaintances

consistency the ability to repeat a movement

continuous motor skill a skill that repeats a set movement within them

continuous training performing a non-stop physical activity

contraception medication or prophylactic used for birth control

conventional medicine the practice of medicine using various sciences

cool-down the process of aiding recovery through slow movement and stretching

coordination the linking together of bodily movements in a flowing way

coping skill a behavioural tool that may be used by individuals to overcome adversity

coronary revascularisation surgery surgery to restore blood flow to the heart

creatine a naturally occurring substance that is found in meat and eggs and assists with short-term energy production

cryotherapy the use of very cold water or ice baths to assist in the recovery of muscles

cues signals that indicate the type and timing of the movements required

culture the elements or beliefs that define or characterise a group

curative relating to the cure of disease

curative service a service that helps to identify and treat physical symptoms or conditions

cyber-bullying bullying that is carried out through an Internet service, such as email, a chat room, a discussion room or instant messaging

D

degradation a decline to a lower condition, quality or level

delayed feedback in relation to physical activity, feedback received following a movement

delusion a false belief strongly held in spite of invalidating evidence, especially as a symptom of mental illness, as in schizophrenia

dementia deterioration of intellectual abilities (such as memory, concentration and judgment) resulting from a disease or a disorder of the brain

detoxification a medically supervised treatment program for alcohol or drug addiction designed to purge the body of intoxicating or addictive substances; such a program is used as a first step in overcoming physiological or psychological addiction

diabetes a condition affecting the body's ability to take glucose from the blood stream to use it for energy; also known as diabetes mellitus

diagnosis the identification of a condition, disease or injury made by evaluating the symptoms and signs presented by a patient

diagnostic serving to identify a particular disease

diplomatic tactful

direct sporting injury an injury caused through collision with an object or another person

disability-adjusted life year (DALY) one DALY is one year of 'healthy life' lost due to a disease or injury

discrete motor skill a skill that has a set beginning and ending point

discrimination the unfair treatment of a person or group based on the sex, race, cultural origins, age, disability, etc. of the person or group

dislocation an injury to a joint whereby one bone is displaced from another

dispossession to take away possession or occupancy of something, especially property

distributed practice the practice of a skill across a number of sessions and not in a focused way

diversity recognition of the health needs of all community groups

domestic violence violence towards or physical abuse of one's spouse or domestic partner

drink-spiking the practice of adding alcohol or another substance to a person's drink (alcoholic or non-alcoholic) without that person's knowledge

duration the length of time the activity is undertaken for

dynamic stretching gentle repetition of movements

dysfunctional abnormal or impaired functioning, especially of a bodily system or social group

E

early prevention in relation to health conditions, targeting people displaying the early signs and symptoms of a condition

elastic resistance band a flat piece of elastic material used to develop strength

empathy the ability to sense and understand someone else's feelings as if they were one's own

emphysema a chronic pulmonary or lung disease often caused by exposure to toxic chemicals, including tobacco smoke

empower to give power to an individual or group

enable to provide someone with the means or opportunity to do something

endorse promote a product or service

endurance the ability to repeat an activity without fatigue

energy the capacity or ability to perform work

environmental hazard any situation or state of events that poses a threat to the surrounding environment; the hazard may be chemical, physical, mechanical, biological or psychosocial

enzyme a chemical that assists the release of energy

equity to ensure resources and funding are distributed fairly and without discrimination

ergogenic something that assists work to occur

established criterion a list of requirements that need to be completed in order to achieve a positive evaluation

ethical acceptable standards based on beliefs and/or values

ethnicity a social group or category of the population that, in a larger society, is set apart and bound together by common ties of language, nationality or culture

exercise planned, structured physical activity completed to maintain or improve fitness

exploit to victimise or treat someone unfairly

externally-paced skill a skill that is performed at a time determined by the situation

F

Fartlek training continuous training with periods of increased intensity

fast-twitch muscle fibre a muscle fibre that contracts quickly but fatigues easily

feedback any information received about a performance

femininity characteristics commonly associated with the female gender

fibre a fibrous substance that helps the body digest food

fine motor skill a skill that uses small muscle groups to create a movement

flexibility the range of motion around a joint

flexion a decrease in the angle between two bones

foetal of or relating to a foetus (unborn young from the end of the eighth week after conception to the moment of birth)

fracture a break in a bone

G

gestation the period of development in the uterus from conception until birth; pregnancy

goal-setting the setting of targets that an individual aims to achieve

gonorrhoea a sexually transmitted infection that if left untreated can lead to sterility

gross motor skill a skill that uses large muscle groups to create movement

growth deformity an abnormal growth pattern

H

haemoglobin the oxygen-carrying component of red blood cells

hallucination the experience of seeming to see something that is not really there

harass to irritate or torment persistently

hard tissue bones of the human body

harmony a state of peaceful agreement and cooperation

heart murmur an abnormal or extra heart sound

heart rate the number of times a heart beats per minute

hepatitis B a liver infection that is caused by a DNA virus and is transmitted by contaminated blood or blood products in transfusions, by sexual contact with an infected person or by the use of contaminated needles and instruments

hepatitis C a liver infection that is caused by an RNA virus and is transmitted primarily by contaminated blood and blood products (as in blood transfusions or intravenous drug use) and sometimes through sexual contact

HIV/AIDS human immunodeficiency virus/acquired immune deficiency syndrome; a disease of the human immune system

holistic relating to an analysis of the whole rather than individual parts

homelessness the state or condition of having no home (especially the state of living on the streets)

homeostasis the regular or normal functioning of the body

homogenous all the same or of a similar kind or nature

homophobia irrational fear of and hostility towards homosexual people

homophobic someone who does not accept same-sex relationships

hospital separation the formal process by which a hospital records the completion of treatment and/or care for an admitted patient; includes completion due to discharge, death, transfer to another hospital or change in the type of care

human immunodeficiency virus (HIV) any of various strains of a retrovirus that causes AIDS by infecting the body's immune system

human rights the basic rights and freedoms to which all humans are entitled

hybrid a mixture of two different things

hydrated a high level of fluid being held by the body

hydraulic resistance training training where resistance is a function of speed; performed in water or utilising special equipment

hydrotherapy the use of water to aid in the recovery process

hyperglycaemia a condition most commonly caused by diabetes mellitus; also known as high blood sugar

hypertension abnormally high blood pressure

hypertrophy the increasing size of a muscle

hypoglycaemia the medical term for a state produced by a lower than normal level of blood glucose

I

identity characteristics that make something unique or distinctive

immunise the process by which an individual's immune system is fortified against an agent, commonly via vaccination

incarceration the state of being imprisoned

indicator a mark or symptom that is specific to a condition or disease

indices an indication or sign

indirect sporting injury an injury caused through internal forces

influenza an infectious disease transmitted through the air by coughs or sneezes; commonly referred to as the 'flu'

infrastructure facilities

inhalant something that is inhaled

inherited factor a trait that is passed genetically from parents to children

integrity honesty

intensity how hard a physical activity is conducted

International Olympic Committee (IOC) the governing body of the Olympic Games

internationalise bring to a global audience, such as in sport

intersectoral action working with more than one sector of society to take action on a particular issue or concern of health

intersectoral collaboration the promotion and coordination of the activities of different sectors

interstitial lung disease a group of lung diseases that inflame the tissue between the air sacs of the lungs called the interstitium

intervention the act of intervening, especially to influence or alter a situation in some way (especially medical procedures or applications that are intended to relieve illness or injury)

intravenous administered into a vein as an injection

inverted U theory a theory that links over-arousal and under-arousal to poor performance

isokinetic a contraction where the muscle length changes throughout the contraction while under a uniform tension

isometric a contraction of a muscle that does not change length

isotonic a contraction of a muscle that changes length

K

kilojoule the unit of measurement for energy

kinaesthetic awareness the ability to interpret sensory information regarding body position

knowledge of performance (KP) feedback about a movement pattern

knowledge of results (KR) feedback received following an activity

L

lactate threshold the point at which lactic acid accumulates quickly in the blood

lactic acid a chemical formed when glucose is burnt without the presence of oxygen

legislation a proposed or enacted law or group of laws

lifestyle disease a disease or infirmity caused by the way the person chooses to live his or her life; for example, choosing to smoke can lead to lung cancer

lobby attempt to influence legislators on behalf of a particular interest

lung capacity the amount of air that can move in and out of the lungs in a breath

lymphatic system the body system that consists of organs, ducts and nodes; transports lymph around the body and contains and produces lymphocytes, which protect the body against viruses and bacteria

M

macronutrients nutrients that provide the body with energy, including fats, carbohydrates and protein

malalignment incorrect positioning

management in relation to a health condition, the specific treatment of a disease or disorder

marginalise to take or keep somebody away from the centre of attention, influence or power

marketable product an item or person that is popular and therefore in demand

masculinity characteristics commonly associated with the male gender

mass media the means of communication that reach large numbers of people, such as television, newspapers and radio

massage firm pressure applied to muscles during recovery

massed practice the continuous focus of practice on a particular skill

max VO2 the maximum amount of oxygen that can be used by the body per minute

measurement the process of applying a value to a movement

mediate to intervene between two or more people or groups in dispute in order to bring about an agreement, a settlement or a compromise

Medicare Australia's system of health care that provides services that are accessible to all Australians

meditation concentration on a word or phrase to aid relaxation

melanoma a dark-pigmented, usually malignant tumour arising from a melanocyte (pigment cell) and occurring most commonly in the skin

meningococcal infection an infectious disease transmitted through the exchange of saliva; also known as meningitis

mental rehearsal practise of a whole skill in the mind

metabolic rate the rate at which heat is produced by an individual in a resting state

metabolism chemical reactions that break down the food we consume into the energy we need to function

metaphor a word or phrase that is a symbolic representation of characteristics or attributes

metropolitan area urban area or city

micronutrients nutrients that are only needed in very small amounts in the body, such as iron, iodine and vitamin A

minerals those elements found in food that are important in cellular function

mobilisation restoration of movement

motivation the cause of a person to behave in a certain way

motor skills the acts that occur when a physical activity is undertaken

muscle glycogen a high-energy storage of glucose

muscular bulk the total size of a muscle

muscular Christianity the concept of developing Christian values and a healthy body through active participation in physical activity

N

naturopathy a system of therapy that relies on natural remedies, such as sunlight supplemented with diet and massage, to treat illness

neonatal relating to the first few weeks of a baby's life

neoplasm any abnormal formation or growth of tissue, such as a tumour

neural anything associated with nerves within the body

neuromuscular relating to both nerves and muscles

neuroticism over-anxiousness, over-sensitivity or obsession about everyday things

nomad a person with no fixed residence who roams about; a wanderer

non-clinical survey a survey that does not provide data on any type of medical treatment or testing

nutrients components of food responsible for energy, growth and the control of bodily processes

nutrition the food eaten by an individual

nutritional supplement a substance that contains concentrated levels of nutrients

O

objective appraisal evaluation that is independent of the observer's judgment

obstetrics the branch of medicine that deals with the care of women during pregnancy, childbirth and the recuperative period following delivery

occupational hazard a health or safety hazard in the workplace environment

occupational health and safety an area concerned with protecting the safety, health and welfare of people engaged in work or employment

oestrogen female hormone

oncology the branch of medicine that deals with tumours, including study of their development, diagnosis, treatment and prevention

open skill a skill that is undertaken in a changing and unpredictable environment

oppositional defiant disorder (ODD) a recurring pattern of negative, hostile, disobedient and defiant behaviour in a child or adolescent, lasting for at least six months without serious violation of the basic rights of others

optometry the practice or profession of testing eyes for defects in vision and the prescribing of corrective glasses

orthopaedics the branch of medicine that deals with the prevention or correction of injuries or disorders of the skeletal system and associated muscles, joints and ligaments

osteopathy a system of healing that is based on the manipulation of bones or muscle

otitis media a painful inflammation of the middle ear that can cause dizziness and temporary hearing loss

Ottawa Charter for Health Promotion a World Health Organization document that represents a global approach to health promotion, outlines the prerequisites for health and aims to enable people to increase control over and improve their health

outpatient a patient who visits a hospital for treatment but does not stay there overnight

overuse in the case of a sporting injury, an injury caused by repetitive force on body structures

P

Parkinson's disease an incurable nervous disorder marked by the symptoms of trembling hands, lifeless face, monotone voice and a slow, shuffling walk

passive smoking the inhalation of smoke from tobacco products used by others

pathology the scientific study of the nature of disease and its causes, processes, development and consequences

perinatal the period of time from about three months before birth to about one month after birth

personal judging criterion evaluation criteria that are influenced by an individual's feelings, emotions and expectations

personality disorder any of a group of psychiatric disorders in which a person's abnormal self-perception or ability to relate to others results in undesirable behaviours and interferes with normal social and emotional functioning

Pharmaceutical Benefits Scheme (PBS) an Australian Government program that subsidises to consumers the cost of certain prescription drugs

pharmacotherapy the use of drugs to treat conditions, especially psychiatric disorders

pharmacy preparing and dispensing drugs; a place where drugs are sold; a chemist

phosphocreatine (PC) a high-energy chemical used to resynthesise ATP

physical activity movement opportunity

positive self-talk giving oneself positive reinforcement, motivation and recognition

power the ability to exert a force in a short period of time

practice the rehearsal of a particular skill

precision the degree of accuracy of a movement

predisposition the state of being susceptible; easily affected

prejudice dislike of certain people because they belong to a specific race, religion or group

prenatal before birth; during pregnancy

prevention in relation to a health condition, the management of those factors that could lead to disease so as to prevent the occurrence of the disease

professional in a nineteenth-century context, a person who engaged in sport for profit or other gain; a term associated with the working class

progressive overload increasing the load or effort during training

proprioception the messages sent to the brain about the location of body parts

proprioceptive neuromuscular facilitation (PNF) a stretching technique involving a static stretch, followed by an isometric contraction, followed by another static stretch

protective factor a variable associated with the increased prevention of a disease or infection

protein a nutrient used by the body for the growth and repair of muscles

psychiatric condition a mental disorder or mental illness

psychoactive substance a drug that can produce mood changes and distorted perceptions**psychological distress** the end result of factors that prevent a person from self-actualisation and connecting with 'significant others'

psychology the scientific study of mental processes and behaviour

psychosomatic illnesses that are caused or greatly influenced by psychological factors, such as stress

R

radiology the branch of medicine that deals with the use of radioactive substances in the diagnosis and treatment of disease

recommended daily intake (RDI) the level of intake of essential nutrients considered adequate to meet the needs of a healthy person

reconciliation the reestablishment of friendly relations; a political term emphasising the need to acknowledge the wrongs of the past

recovery the process of restoring the body to its resting state

refugee a person who has fled from some danger, such as war or political persecution

rehabilitation the process whereby an athlete becomes physically and psychologically ready to return to play post injury

rehydrate to restore fluid levels following physical activity

reinforcement something that will encourage a behaviour to be repeated

relaxation use of techniques to calm oneself

reliability the ability of a test to be repeated accurately

repatriation hospital a hospital that meets the needs of war veterans and their dependants

Repatriation Pharmaceutical Benefits Scheme (RPBS) an Australian Government program that provides certain pharmaceuticals and dressings at concession rates for the treatment of eligible veterans and war widows/widowers and their dependants

repetition maximum (RM) the maximum number of repetitions that can be completed with a given resistance before fatigue becomes apparent

repetitions (reps) the number of times an exercise is repeated without rest

resilience the ability to respond positively to challenges and changes

resistance something that works against a muscle contracting, such as weights

rest the time necessary for the muscle to recover after a period of overload

resting heart rate the number of time a heart beats while at rest

resynthesis the process of recycling ADP into ATP

reversibility the effects of detraining (losing benefits when training is interrupted)

risk factor a variable associated with an increased risk of disease or infection

S

sanitation the use of sanitary measures to maintain public health

saturated fat a type of fat found in animal products (such as meat, milk and cheese) and in many processed foods (such as chocolate)

scar tissue tissue that has become thick, fibrous and lacking in flexibility

scoliosis curvature of the spine

self-concept the mental image or perception that one has of oneself

self-efficacy the belief that one can influence one's own thoughts and behaviour

self-harm a person's behaviour that harms him or herself, including attempted suicide, self-mutilation, substance abuse or general risk-taking

self-identity awareness of and identification with oneself as a separate individual

self-paced skill a skill that is performed at a time determined by the individual

self-sufficiency the state of not requiring any outside aid, support or interaction for survival

self-worth the total of a person's knowledge and understanding of his or her self

serial motor skill a skill that requires a movement to follow the previous one

sets the number of groups of repetitions of a particular exercise

sexploitation marketing of an individual's sexuality

sex-role socialisation attitudes and beliefs deemed appropriate for each gender

slow-twitch muscle fibre a muscle fibre that contracts slowly but has high endurance.

social disadvantage adverse socio-economic characteristics that are distributed unequally by age, sex and ethnicity

social justice making sure that everyone has choices about how they live and the means to make those choices

social justice framework an approach based on the acknowledgment of broad, systematic societal inequities and oppression

soft tissue structures of the human body other than bone, such as skin, ligaments, tendons and muscles

specificity training that closely resembles the requirements of an activity

speed the rate at which a movement is performed

sponsorship an individual or organisation providing money or other goods/services to support an endeavour, generally in return for promotion or advertising

sport structured, competitive physical activity

state anxiety the anxiety felt as a result of a particular situation

static stretching a muscle being held in a stretch for 10–30 seconds

stigma an attempt to label a particular group of people as less worthy of respect than others

stigmatisation the act of disapproving or condemning

Stolen Generations the policy of forcibly removing Aboriginal and Torres Strait Islander children from their families and those affected by this policy

strength the ability of a muscle to exert a force

stress the response of a body when a demand is placed upon it

stretch reflex when nerve endings cause a contraction of muscles to prevent them being overstretched

stroke volume the amount of blood leaving the heart with each beat

sub-maximal a level of exercise that can be maintained for an extended period of time

subjective appraisal an evaluation that is influenced by the observer's judgment

syphilis a sexually transmitted disease that can be treated with antibiotics, but if left untreated can damage organs or bones or, in some cases, be fatal

T

task complexity how many parts are contained within a movement

task organisation the degree of relationship between the parts of a movement

telecommunications communications using electronic equipment, such as telephones, radio and television

telemedicine the use of modern technology to diagnose and treat some conditions

thrush a contagious disease caused by a fungus

training threshold the point at which a training benefit can be measured

trait anxiety the level of anxiety generally felt by an individual

transmission the passing of something, such as a disease, from one person to another

triglyceride a type of fat compound used for energy

tuberculosis an infectious disease caused by mycobacteria that attack the lungs but can also affect other parts of the body

V

validity the degree to which a test measures what it is designed to measure

variety changing training to maintain interest

vascular disease blockage of the arteries

victim-blaming holding the victim of a crime to be in whole or in part responsible for the crime committed against him or her

victimise to single somebody out unfairly for punishment or ill-treatment

vilification a rude expression intended to offend or hurt

visualisation creating positive pictures of aspects of a performance in the mind

vitamins organic compounds needed for growth, development and metabolism

W

warm-up the preparation of the body for physical activity

Worksafe Australia a national occupational health and safety advisory and information provider to Australian companies

X

xenophobia hatred or fear of foreigners or strangers

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Brown, p. 154 (bottom) /Simon Bruty, p. 342 /Paul Burns, p. 53 /David Cannon, p. 152 /Jean-Pierre Clatot, p. 148 /Paul Crock, p. 384 /Mark Dadswell, pp. 142, 284, 286 /Tariq Dajani, p. 126 /George Doyle, p. 205 /Paul Ellis, p. 106 /Stu Forster, pp. 102, 164 /Gallo Images, p. 314 (top) /Gaye Gerard, p. 228 /Laurence Griffiths, p. 115 /Jamie Grill, p. 231 /Craig Golding, p. 276 /Jeff Gross, p. 161 (top left) /Tim Hales, p. 280 (right) /Alexander Hassenstein, p. 352 /Tim Heitman, p. 117 /Martin Hunter, p. 359 /Imagemore, p. 82 /Jed Jacobsohn, p. 145 (bottom) /Gerard Julien, p. 400 /Bradley Kanaris, pp. 96, 247 /Paul Kane, p. 314 (bottom) /John Kelly Photography, p. 94 /Matt King, p, 265 /Kai-Uwe Knoth, pp. 123, 338 (bottom) /Jeremy Kost, p. 279 (left) /Nick Laham, pp. 158 (bottom), 396 /Jimin Lai, p. 288 (top left) /Mathew Lewis, p. 277 /Loungepark, p. 301 / Deborah Lovely, p. 154 (top) /Jamie McDonald, p. 392 (top) /Chris McGrath, p. 260 /Ryan McVay, pp. 170, 196 /Peter Macdiarmid, p. 176 /Steve Mason, p. 294 /Ebby May, p. 194 /Ty Milford, p. 107 (top) /David Paul Morris, p. 262 /Kazuhiro Nogi, p. 97 /Mark Nolan, pp. 92, 261, 340, 377 /Thomas Northcut, p. 310 /Ryan Pierse, p. 375 /Mike Powell, pp. 266, 398 /Adam Pretty, p. 80 / Robert Prezioso, p. 372 /Quinn Rooney, p. 127 /Clive Rose, p. 155 /Edward Rosenberger, p. 300 /Anderson Ross, p. 141 /Joel Saget, pp. 136, 328 (bottom) /Pete Saloutos, p. 114 /Steve Satushek, p. 172 /Robert Schmidt, pp. 268, 274 /Kirstin Scholtz, p. 251 (bottom) /Lothar Schulz, p. 122 /Simon Smith, p. 131 /Cameron Spencer, pp. 121, 135, 256, 370 /Justin Sullivan, p. 56 (top) /Bob Thomas, pp. 161 (top right), 168, 295 (top) /Brendon Thorne, p. 312 /Al Tielemans, p. 112 /Matt Turner, p. 324 /Kristof Verschueren, p. 334 /Friedemann Vogel, p. 393 /Rachel Weill, p. 309 /Rocky Widner, p. 158 (top right) /Michelle Wie, p. 128 /Paul Windsor, p. 302 /Agence Zoom, p. 163; Headspace, p. 232 (middle); Istockphoto/Joselito Briones, p. 198 /Valentin Casarsa, p. 68 /Mike Cherim, p. 192 /Sergey Kashkin, p. 158 (top left) /Krzysztof Kwiatkowski, p. 30 /Morgan Lane, p. 132 /Pavel Losevsky, p. 406 /Mark McDonald, p. 216 /Birgitte Magnus, p. 381 /Claus Mikosch, p. 75 /Susan H. Smith, p. 426 /Doug Webb, p. 357 /A. 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Index

A

Aboriginal and Torres Strait Islander peoples
  access to health services 415
  age–specific death rates 416
  avoidable mortality by age and sex 416
  avoidable mortality by cause of death 417
  cardio–vascular disease in 31
  causes of inequities 22
  dental health of 415
  diabetes in 22
  drug and alcohol abuse by 418
  factors influencing the health of 419–421
  health inequities experienced by 20–23, 412–421
  health risk factors for 414
  HIV infection and AIDS diagnosis among 423–424
  imprisonment rates among 425
  infant mortality rates among 414
  leading causes of death in 21
  life expectancy and mortality rates of 414
  major health issues 22
  obesity rates among 417
  physical activity and nutrition among 417
  prevalence of long–term health conditions among 413
  primary health–care services for 55
  problems managed by GPs 415
  social determinants of health 23
  social and emotional well–being of 415
  see also indigenous Australians
Aboriginality, and mental health 206–207
abrasions 290–291
access to facilities and services, improvement strategy 444
acclimatisation, effect on sporting performance 328–330
active movement test, in injury assessment 297
acupuncture 69
adenosine triphosphate (ATP) 83
  creation in the body 85–89
  metabolism via aerobic pathways 88
Adidas, sponsorship by 250
adult and aged athletes
  effect of physical changes in 304–305
  exercise program goals 305
  suitable activities for 306
advertising
  athletes' share of responsibility for 251
  use of female body for 280
advocating, as health promotion strategy 442
aerobic energy system 85, 87–88
aerobic glycolysis 87
aerobic interval training, prescription writing for 97
aerobic training
  circuit 95
  continuous/uniform 357
  continuous and interval 94
  Fartlek 95, 358
  long–interval 358
  threshold 104
AFL clubs, injury prevalence in 289
age, and mental health 206
aged care, crisis in 49
ageing, effect of physical changes during 304–305
ageing population
  availability of carers and volunteers 50
  demand for health services by 50
  health of 47–50
  see also adult and aged athletes; older people
agoraphobia 199
AIDS, effect of illnesses and infections on people with 423
alactacid energy system (ATP–PC) 85, 86
alcohol
  consumption by indigenous Australians 418
  for masking other drug use 396
alcohol consumption by young people
  amount and social factors 209–210
  binge drinking 210–211
  drink spiking 224
  harm done due to 210
alternative health services 56, 68–70
altitude, effect on sporting performance 327
amateur status in sport 244–245
ambient temperature, effect on sporting performance 326
ambulance services 56
anabolic steroids, for increasing muscle size 395
anaerobic glycolysis 85
anaerobic threshold 104
anaerobic training 96–97
  plyometrics 361–364
  resistance/weight for power 359
  short–interval 364–365
  for speed 360
ankle, taping of 331
annual training plan 380
anorexia nervosa 202
anxiety and arousal 117
  optimum arousal theories 119–120
  sources of stress 118–119
  trait and state anxiety 118
anxiety management
  concentration/attention skills 121–122
  goal–setting 127–128
  mental rehearsal 123
  relaxation techniques 124–126
  visualisation and imagery 124
apartheid, and sporting bans 261, 262
aromatherapy 70
aspiration, effect on performance 116
assessment of skill and performance
  traits of skilled performers 162–163
  objective and subjective performance measures 164
  personal versus prescribed judging criteria 167–168
  skill–related tests 165–166
  validity and reliability of tests 167
associative stage of learning 150
asthma
  in children 302
  in young people 180
asylum seekers, mental health of 208
athletics, as suitable for women 246
ATP *see* adenosine triphosphate
ATP–PC energy system *see* alactacid energy system
attention, characteristics of four types of 122
attention deficit hyperactivity disorder (ADHD) 201
Australian Council of Social Services (ACOSS), as advocates for disadvantaged people 442
Australian football
  and indigenous Australians 264–265
  management of concussion in 343
Australian Institute of Health and Welfare (AIHW), and reports on national health priority issues 440
autogenic training 126
autonomous stage of learning 151
avoidable mortality among indigenous Australians
  by age and sex 416
  by cause of death 417

B

ballistic flexibility training 368
ballistic stretching 98
banned drugs and practices 394
basal metabolic rate 107
basketball rating scale 165
bathing, as suitable for women 246
big business, and sport 248–249
binge eating disorder 202
biofeedback 126
biomechanical analysis, for performance evaluation 399
bipolar mood disorder 200
blisters 290–291
blitzing 355
blood lactate 103
blood lactate accumulation (OBLA), onset of 104
body image in young people 221–222
bone density
  effects of ageing on 306
  in female athletes 309
bounds and hurdles (plyometrics) 364
breast cancer 33, 34
bulimia nervosa 202

C

caffeine, as diet supplement 141–142
callisthenics, for girls 246
cancer
  determinants of 34
  effect of tobacco smoking on 35
  extent of and trends in 32–33
  groups at risk of 36
  nature of 32
  risk factors and protective factors 33–34

cancer screening services 54
car accidents 42
carbohydrates 83
cardiac output 109
cardio–vascular disease
  determinants of 30
  extent of and trends in 28
  groups at risk of 30
  in indigenous Australians 31
  nature of 28
  risk factors and protective factors 29–30
catastrophe theory of arousal 120
Chambers, Dwain, drug use by 392
character, sport linked with 243
cheating 355
child accidents 43
children
  benefits of physical activity 300–301
  with medical conditions 302–303
  overuse injuries in 303
  resistance training for 304
  safety guidelines for 301
  thermoregulation in 303–304
chiropractic treatment 69
chronic disease and disability, in older people 48
chronic obstructive pulmonary disease (COPD) 39
cigarette smoking *see* tobacco smoking
circuit training, fixed and individual resistance 95
Clarke, Ron, defence of drug use in sport by 393
climate, effect on training planning 376
climatic conditions, effect on sporting performance 326–330
cognitive stage of learning 150
cold, use in rehabilitation 338–339
commodification of sport, effect on athletes and spectators 254
communicable diseases
  in indigenous Australians 22
  in young people 181
communities, unification through sport 257
community health services 55
competition, role in sport 264
competition phases and subphases 377–383
competition preparation
  initial planning for 374–376
  planning a training year 377–383
competition schedules, effect on planning 376
complementary health services 56, 68–69
compound training 355
compression garments 146
concentration/attention skills, in anxiety management 121–122
concentric contractions 100
concussion, management in Australian football 343
conditioning, during rehabilitation 336
condom use by young people 218–219
conduct disorder (CD) 201
conduction, in thermoregulation 325
continuous training 94
continuous/uniform training 357–358
contusions 290
convection in thermoregulation 325
cool–down techniques 105
  as recovery strategy 144
cooling–down, after exercise 317
COPD *see* chronic obstructive pulmonary disease
creatine, as diet supplement 142–143
cricket
  Indian Premier League payments 249
  international matches considered as tests between nations 243
critical enquiry 124
cryotherapy 145
  in rehabilitation 338–339
cultural change, to remove health inequities 445
cyber–bullying among young people 222–223

D

daily living conditions, effect on health inequities 405
death *see* mortality
decision making
  learning of skills 156
  training for 371
delusions 203
dental health, of indigenous Australians 415
dental services 56
depression, with psychotic features 200
depth jumps (plyometrics) 364
developmental aspects of young people's health
  behavioural boundaries 194
  education, training and employment 193
  personal support structures 194
  role in relationships 192
  self–identity and self–worth 192
  self–sufficiency and autonomy 193
diabetes
  in children 302
  determinants of 38
  extent of and trends in 37
  groups at risk of 38
  in indigenous Australians 22
  nature of 36
  risk factors and protective factors 37–38
diagnosis groups, principal, for sport–related injury cases 318
dicrimination, effect on health of indigenous Australians 420
diet supplementation 138–139
  caffeine 141–142
  creatine 142–143
  proteins 140–141
  risk of doping with 139
  vitamins and minerals 139–140
direct injury 287
disabilities, people with
  extra costs borne by 434
  health inequities of 434
  young people 179
disadvantaged circumstances, empowering people in 443
disadvantaged communities, empowering 444
discrimination, effect on health inequities 409
disease patterns in young people 179–181
dislocations 294
dispossession, effect on health of indigenous Australians 430
distance, effect on access to health services 431
distributed practice 157
disturbance, in psychosis 203
diuretics, for masking other drug use 396
doping risk, with diet supplements 139
double– or single–leg zig–zag hops (plyometrics) 364
drills practice 370
drink spiking among young people 224
drive theory of arousal 119
drug and alcohol use, among indigenous Australians 418
drug testing in sport, benefits and limitations of 396–397
drug usage in sport 391
  for aerobic performance 395–396
  effect on reputation 393
  effect on sponsorship and income 393–394
  harms done by 391–394
  physical effects of 393
  for strength 394–395
  to mask other drugs 396
drugs banned in sports 394
dynamic flexibility training 368
dynamic stretching 98

E

early years of life, quality and health inequities 406
eating disorders
  causes 202
  in female athletes 308
eccentric contractions 100
economic change, to remove health inequities 445
economic factors, effect on health of indigenous Australians 419
economics of hosting major sporting events 254
education
  effect on health of indigenous Australians 419
  effect on health inequities 407
elastic resistance training 350–351
electron transport system 87
employment, effect on health of indigenous Australians 419
enabling, as health promotion strategy 442
endogenous (major) depression 200
energy
  in the body 82–83
  from foods 83–84
energy systems in the body
  ATP from all sources 89
  and fatigue 92
  relative contributions of anaerobic and aerobic in running events 89
  sports types and predominant systems 89
  types 85–88
environmental factors affecting health of young people 190–191
epidemiology 4–5
  gender differences in health status 10–11
  life expectancy trends 6–7
  main causes of mortality 7–9
  measures used in 6
  trends in morbidity 8, 10
epilepsy, in children 303

equipment, safe design of 323
equipment advances in sport
  golf balls 400
  swimsuits 400
ergogenic aids to performance 390–391
  drugs 391–397
  technological 398–400
erythropoietin (EPO), for red blood cell production 395–396
ethical considerations in returning to play
  pressure to participate 342–343
  use of pain–killers 343
ethnicity, and mental health 207
evaporation, in thermoregulation 325
event schedules, effect on planning 376
excess post–exercise oxygen consumption (EPOC) 93
exercise, maximal and sub–maximal 107
external feedback
  knowledge of performance (KP) 160
  knowledge of results (KR) 160
extreme sports, as entertainment 272

F

facilities, safe design of 324
family structure, and mental health 206
Fartlek training 95, 358
fatigue
  after exertion 92
  recovery process 92–93
fats 84
Federer, Roger, and motivation 152
feedback in skills learning, sources, timing and usefulness of 160–162
female athletes, particular problems for 308–310
female body, use in advertising 280
femininity and masculinity in sport 274–282
fitness levels, and injury avoidance 315
fitness needs, individual and team 375
flexibility
  in older people 307
  screening test for 369
flexibility training 97
  ballistic 368
  dynamic 368
  static 365
  stretches for 366–367
  types of stretching in 98
flow theory of arousal 120
fluid intake, guidelines for 328
footwear, and injury prevention 323
forced repetitions 355
400 metre sprint test of lactic acid system 90
fractures 294
  in older people 306
funding of sport, by government 259

G

gambling by young people 222
games
  modified and small–sided 371
  for specific outcomes 371
Garrett, Nikki, and glamour 280
gender
  and mental health 206
  and participation in sport 274–277
gender differences, in health status 10–11
general practitioners (GPs)
  consultations with 55
  management of indigenous Australians' health problems by 415
generalised anxiety disorder 199
geographic location, and mental health 207
geographically remote populations *see* remote populations
Gilmore, Stephanie, sponsorship and endorsement deals by 252
glamour in sport 279–281
goal–setting in anxiety management
  long– and short–term 127–128
  success in 128
golf, as suitable for women 246
golf balls, improvements in 400
government funding
  effect on health inequities 439–440
  of sport 259
government policies and priorities contributing to health inequities 409–410
graduated exercise, during rehabilitation 336–337
grounds, safe design of 324
gymnastics, scoring sheets for 168

H

haemoglobin level 111
hallucinations 203
handstand jumps (plyometrics) 361
hard–tissue injuries 289
  management of 295
  types 294
harsh environments, effect on access to health services 431
health
  indigenous Australians' concept of 421
  effect of physical activity on 265–266
  total expenditure on (1995–96 to 2005–06) 438
health behaviours by young individuals
  drug use 184
  eating habits 185
  physical activity 185
  sexual 186
  sun protection 184
  weight and obesity 185
health care
  access to and health inequities 406
  funding for 436–438
health care in Australia 52–53
  complementary and alternative care 68–69
  effect of new treatments and technology in 64–65
  equity of access to 60–61
  expenditure on versus early intervention and prevention expenditure 62–63
  facilities and services 53–59, 60
  health insurance 65–68
  making choices about 70
  products and services available 69–70
  responsibility for 59–60
  specialised services 58–59
health expenditure, allocation of (2005–06) 438
health funding
  effect of limited resources on 441
  indigenous Australians lack of 420
  for specific populations 441
health of indigenous Australians
  factors affecting 419–420
  their concept of 421
health inequities
  effect of government funding on 439–440
  factors causing 405–410
health inequities, groups experiencing
  Aboriginal and Torres Strait Islander Australians 20–23
  older people 26
  overseas–born people 26
  people with disabilities 27
  people in rural and remote areas 25
  socio–economically disavantaged people 24–25
health inequity reduction, methods of 443–445
health of young people
  comparison with other populations 179–182
  developmental aspects of 192–194
  environmental factors affecting 190–191
  health promotion initiatives 238
  individual factors affecting 183–186
  legislation and public policy 236–237
  morbidity and mortality 178
  social 236
  socio–cultural factors affecting 186–188
  socio–economic factors affecting 189–190
  and socio–economic status 182
health outcomes, assessment of 440
health promotion and priorities
  benefits of partnership in 74–75
  levels of responsibility for 73–74
  Ottawa Charter and social justice in 75–77
health promotion strategies
  characteristics of effective 446–448
  cultural relevance and appropriateness of 447
  focussing on skills, education and prevention 447
  intersectoral collaboration 448
  in Ottawa Charter 442
  supporting whole population while directing extra resources to high–risk groups 448
  working with target groups in program design and implementation 446
health risk factors
  by country of birth 428
  in remote communities 431
health services
  access to by indigenous Australians 415
  barriers to use by remote communities 433
health status, measurement of 4–11
heart conditions, effect on exercising 306
heart rate 103
  resting 107–108
heat, use in rehabilitation 338
heat chamber *see* temperature and humidity chamber
heat policy, at Australian Open tennis tournament 319–320
helmets 322
hepatitis A, B and C notification rates, in young people 180
herbal medicine 70
HIV
  Futures Surveys of 422–423

transmission of 422
HIV/AIDS, priorities for prevention and health promotion activities 423–424
holistic approach to bodily health 266
homelessness, effect on health inequities 421
homoeopathy 70
homophobia 208
hospital system, fixing problems of 61
hospitals, types and care provided 57
housing, effect on health of indigenous Australians 419
human growth hormone (HGH), for increasing muscle size 395
human rights–based approach to health of indigenous Australians 23
humidity, effect on sporting performance 326
hybrid exercises 355
hydration, guidelines for 328
hydration recovery technique 144
hydraulic resistance training 352
hydrotherapy 144
hypnosis 126

I

immigrants from non–English speaking countries, health inequities among 427–428
immobilisation, for hard–tissue injuries 295
immunisation services 54
imprisonment, effect on health 425
in–season training 378
Indian Premier League, payments to players 249
indigenous Australians
and Australian football 264–265
health of young people 182
links between community and identity 263–264
traditional activities and games of 263
see also Aboriginal and Torres Strait Islander peoples
indirect injury 288
infant mortality rate 6–7
infant mortality rates, among indigenous Australians 414
inflammatory response to injury 291
injuries
assessment of 296–298
determinants of 41–43
extent of and trends in 40–41
groups at risk of 43
nature of 40
risk factors and protective factors for 41
patterns in young people 181
taping for isolation and treatment of 332
injury classification
by cause 287–288
by tissue type 289–290
insulin–dependent diabetes (type 1) 37
internal feedback 160
interval training prescription writing 97
inverted U theory of arousal 119
iron deficiency, in female athletes 308–309
isokinetic contractions 101
isometric contractions 100
isometric training 357
isotonic contractions 100–101
Ivanovic, Ana, and glamour in sport 280

J

Jankovic, Jelena, and glamour in sport 279
joint harnesses and braces 323
joint mobility in older people 307
judging criteria, personal versus prescribed 167–168

K

Knights rugby league club 258
Krebs cycle 87

L

lacerations 290–291
lactate concentration, effect of exercise and training on 104
lactate threshold (LT) 104
lactate threshold testing, to predict endurance performance 398–399
lactic acid energy system 85, 87
short–interval training session to improve 365
learners, characteristics of 152–153
learning and skills acquisition stages
associative 150
autonomous 151
cognitive 150
life expectancy
among indigenous Australians 414
current trends in 6–7
of young people 178
lifestyle diseases, effect of sport and physical activity on 265–266
living conditions, causing health inequities 405
long–interval training 358
lung cancer 34
lung capacity 110

M

macrocycles
in annual training program 380
in competition phase 383
magazines, and sport 268–269
major sporting events, economics of hosting 254
males, participation in traditionally female sports 282
manliness, sport linked with 243
marathon training program 379
masculinity and feminity in sport 274–282
mass media
effect on gender perception in sport 279–281
representation of sport in 268–270
mass media coverage
of different sports 271
and economic considerations in sport 270
massage 145
massed practice 157
maximal and sub–maximal exercise 107
maximum oxygen consumption (max VO_2) 103
mediating, as health promotion strategy 442
medical treatment of hard–tissue injuries 295
Medicare 65–66
and health care access 439
medicine ball, use in plyometrics 363
meditation 126
mental health problems and illnesses
determinants of 47
extent of and trends in 44
groups at risk of 47
nature of 43–44
risk factors and protective factors 45–46
mental health of young people
anxiety disorders 198–199
conduct disorder 201
depression 200
eating disorders 201–202, 221–222
environmental determinants 208
extent of problems and illnesses 204
oppositional defiant disorder 201
prevalence of disorders 198
psychosis 202–203
risk factors and protective factors 204–205
socio–cultural determinants 206–208
socio–economic determinants 208
mental rehearsal in anxiety management 123
metaphors, use in sporting commentary 271
microcycles, in annual training program 380
modern sport, beginnings of 242–247
mood disturbance 203
morbidity rate 6
mortality, of young people 178
mortality (death)
due to injury 41
main causes of 7–9
mortality (death) rate 6
among indigenous Australians 414, 416
in people with mental and behavioural disorders 44
mortality ratios, by causes of death and countries of birth 428
motivation
intrinsic and extrinsic 116
positive and negative 115–116
motor skills, discrete, continuous and serial 155
motor vehicle accidents 42
mouthguards 323
movements, self–paced and externally paced 154
multivisuals 174
muscle fibres
fast–twitch and slow–twitch 112
fatigue in 92
muscle groups, exercises for 354
muscle hypertrophy 111–112
muscles, control by central and peripheral nervous systems 92

N

National Drug Strategy Household Survey: tobacco smoking 35
nations, unification through sport 257
naturopathy 69–70
negative repetitions 355
neural recovery strategies
hydrotherapy 144
massage 145
Newcastle Jets rugby league club 258
newspapers, and sport 268–269
Newton, Kristie, and glamour in sport 280
non–insulin dependent diabetes (type 2) 38

non–psychotic illnesses 43–44
anxiety 46
non–psychotic depression 46
NSW Health website 238
NSW Youth Action Plan and website 237, 238
nutrition for athletes
during performance 136–137
post–performance 137–138
pre–performance 131–136
supplementation 138–143

O

obesity
in indigenous Australians 417
in young people 181
objective performance measures 164
observe stage, in injury assessment 296
obsessive–compulsive disorder 199
occupation, effect on health inequities 407
older people
with chronic disease and disability 48
health inequities among 26
see also adult and aged athletes; ageing population
Olympic athletes and sponsorship 254
Olympic Games and politics 260–261
Olympic gold medallists, sponsorship and endorsement deals by 253
1.6 kilometre run test of aerobic system 90
oppositional defiant disorder (ODD) 201
osteopathy 69
Ottawa Charter for Health Promotion (WHO 1986)
in action 73, 78
motor vehicle accidents action area 238
priority action areas 442
social justice in 75–77
over–training
amount and intensity of training 386
mental fatigue and loss of motivation 387–388
physiological signs and symptoms 387
planning to avoid 386–388
overload techniques, in weight training 355
overuse injuries 287, 288
in children 303
oxygen debt (recovery oxygen or EPOC) 93
oxygen (or oxidative) energy system 85
oxygen uptake 109

P

pain–killers, use on returning to play 343
panic attack 119
panic disorder 199
participation levels in sport, by gender 276–277
participation pressure, when returning to play 342–343
passive movement test, in injury assessment 297
passive recovery 144
patriotism, sport linked with 243
'pay for play' concept 248
peaking for performance 381
performance, nutrition during 136–137
performance decrement test of ATP–PC system 90
performance elements in learning
decision–making skills 156
strategic and tactical development 156–157
performance measures, objective and subjective 164
performance needs, individual and team 375
periodisation, in a training year 377–383
personal judging criteria 167
personality, effect on performance 116
Pharmaceutical Benefits Scheme (PBS) 67
phobia 199
phosphagen energy system 85
phosphocreatine (PC) 86
physical activity as pathway to health 265–266
physical activity and nutrition, among indigenous Australians 417
physical changes through ageing, effect on exercise 304–305
physical fitness, and injury avoidance 315
physiological adaptations in response to training 107–112
fast–twitch and slow–twitch muscle fibres 112
haemoglobin level 111
muscle hypertrophy 111–112
oxygen uptake and lung capacity 109–110
resting heart rate 107–108
stroke volume and cardiac output 108–109
physiological recovery strategies, cool–down, hydration and passive 144
physiological responses of energy systems tests of 90–91
planning
for competition, initial 374–376
of training sessions 384–388
training year 377–383
plates and dumb–bells, in weight training 353–354
plyometric demand rating scale 361
plyometric exercises 361–364
bounds and hurdles 364
depth jumps 363, 364
double– or single–leg zig–zag hops 364
lower body 363–364
push–ups 362
sit–ups 363
split squat jumps 364
upper–body 361–363
plyometric stabilisation tests 361
plyometric training, advantages and disadvantages of 362
PNF stretching 317
policies on returning to play 341
policy, and injury prevention 319
politics, and sport 259–261
pollution, effect on sporting performance 327
populations experiencing health inequities
homeless people 421–422
immigrants from non–English speaking countries 427
indigenous Australians 412–421
older people 426
those with disabilities 434
those in geographically remote locations'430–433
those with HIV/AIDS 422–424
those in prison 425
unemployed people 429
post–performance nutrition 137–138
post–season (off–season) training 378
post–traumatic stress disorder 199
power, through resistance/weight training 359
practice method in skills learning
keys to successful practice 159
massed and distributed 157
speed and accuracy 157
whole and part 158
pre–exhaustion exercising 355
pre–performance nutrition 134–136
pre–screening, prior to exercise 313–314
pre–season training 378
pregnancy, and exercise 309–310
pregnancy and contraception use among young people 219
preparation for physical activity 312–318
prescribed judging criteria 167
preventative taping 330
primary health–care services, for Aboriginal and Torres Strait Islander Australians 55
principal diagnosis groups, for sport–related injury cases 318
print media, representation of sport in 268–269
priority health areas
costs of ill–health to community 17–18
costs of ill–health to individuals 16–17
identification 12
potential for prevention and early prevention 15
prevalence of condition 14–15
priority population groups 14
social justice principles in 12–13
private health insurance 67–68
types of cover 68
private sector responsibility for health services 60
product endorsement by athletes 247, 250–251
professional football, training session models 375
professional sport, development of 247–248
professional status in sport 244–245
progressive mobilisation, during rehabilitation 335
progressive overload 102
progressive relaxation 126
progressive resistance exercise (PRE) 353
proprioceptive neuromuscular facilitation (PNF) 365
stretching 98
protective equipment 322–323
proteins 84
as diet supplement 140–141
psychological readiness to return to play 341
psychological recovery strategies
relaxation 146
sleep 146
psychology of performance
anxiety and arousal 117–120
aspiration 117

motivation 115–116
personality 117
strategies to enhance motivation and manage anxiety 121–128
psychotic illnesses 43
bipolar disorder 45
psychotic depression 46
schizophrenia 45
public health services 54
public sector responsibility for health services 59–60
push–up claps (plyometrics) 361
pyramid training 355

Q

Queens College Step Test 111

R

racism, effect on health inequities of 408
radiation, in thermoregulation 325
rain, effect on sporting performance 326
range of motion (ROM) stretching 368
rating scales
for basketball 166
for tennis and volleyball 165
reactive depression 200
recovery from exertion 92, 93
recovery oxygen (or EPOC) 93
recovery strategies 143
neural 144–145
physiological 144
psychological 146
tissue damage 145–146
recovery times for physiological functions 92
rehabilitation
after concussion 343
procedures 334–339
returning to play after 340–343
relaxation, for recovery 146
relaxation techniques for anxiety management 124–125
autogenic training 126
biofeedback 126
hypnosis 126
meditation 126
progressive 126
resilience, for social and emotional wellbeing 205
resistance training
for children 304
elastic 350–351
hydraulic 352
respiratory disease
determinants of 39–40
extent and trends in 39
groups at risk of 40
nature of 39
risk factors and protective factors in 39
rest pauses 355
resting heart rate 107–108
resynthesis of ATP 85
returning to play after rehabilitation
ethical considerations 342–343
indicators of readiness 340
monitoring progress 340
policies and procedures 341
psychological readiness 341
warm–up procedures 341
reversal theory of arousal 1120
reversibility 103
Rice, Stephanie, sponsorship and endorsement deals by 252
RICER procedure 291–293
road safety and young people 215–216
accidents and death rates 215
Royal Flying Doctor Service (RFDS) 56
rules of sports and activities, and injury prevention 319
running events, relative contributions of anaerobic and aerobic energy systems 89
rural and remote populations
attitudes towards illness among 432
barriers to use of health services among 433
effect of fewer educational and employment opportunities on 432
effect of harsh environments on health of 431
effect of reduced economic resources on 432
effects of distance from health services on 431
health risk factors among 431
high youth suicide rates in 432
limited access to services by 432

S

safety of grounds, equipment and facilities 324
safety guidelines for children and young people 301
schedules of events/competitions, effect on planning 376
scoring sheets, for gymnastics 168
seasons, effect on training planning 376
secondary injury 290
self–determination, effect on health of indigenous Australians 421
self–efficacy 205
sexual health of young people
abortion 219
attraction 218
behaviour 218
comparison (1992–2002) 220
contraceptive use 218–219
experience 217–218
exploration 217
HIV/AIDS and blood–borne viruses 221
orientation 217
sexually transmitted infections 221
sexual orientation, and mental health 207–208
shin and shoulder pads 323
size matching of opponents, and injury prevention 321–322
skill acquisition for performance
assessment 162–168
characteristics of learner 152–153
learning environment 153–161
learning skills 148–149
stages of acquisition 149–151
skill training 368, 370–372
decision making 371
drills practice 370
games for 371
tactical awareness 371
skilled performers, characteristics of 162–163
skills
closed and open 154
discrete, continuous and serial 155
fine and gross 155
and injury avoidance 314–315
skills needed for better health of young people
accessing health services 234
building self–concept 226–227
community service and involvement 235
developing communication skills 233–234
developing connectedness and support networks 227–229
developing health literacy skills 231–232
developing resiliency and coping strategies 229–231
skills test, in injury assessment 297
skin cancer 33, 34
skin injuries 290–291
immediate treatment of 293
sleep, for recovery 146
smoking *see* tobacco smoking
soccer, government funding for 249
soccer players, short–interval training session for 365
social attributes contributing to health inequities
discrimination 409
racism 408
social exclusion 408
social and emotional well–being, of indigenous Australians 415
social exclusion, effect on health inequities 408
social justice framework, for addressing health inequities 443–445
social justice principles, and health promotion 75–77
socio–cultural factors affecting health of young people
Aboriginality 187
ethnicity 186
gender 187
geographical location 188
peer influence 188
sexual orientation 187
socio–economic factors, effect on health inequities 407
socio–economic factors affecting health of young people
education 189
employment 189–190
income 190
status 189
soft–tissue injuries 289–293
management of 291–293
specialised health services 58–59
specificity 102
speed development, through training 360
Speedo, sponsorship by 250
split squat jumps (plyometrics) 364
sponsorship
effect on sport 247–248
effects on athletes 250–253
sport
in 19th Century England 242–247
as big business 248–249

in colonial Australia 242–247
as competitive physical activity 264
economic effect of media coverage on 270
effect of television on 269–270
as entertainment package 254
government funding of 259
identity through 256–257
links to culture 264–265
as national and community unifier 257
as pathway to health 264–266
and politics 259–261
women's participation historically 245–247
sport as commodity, consequences for spectators and participants 254
sports
considered suitable for women 245–246
differences in media coverage of 271
sports injuries, classification of 286–290
sports policy, and injury prevention 319
sprains 290
state anxiety 118
static strength training (plyometrics) 357
static stretching 98, 317
STOP on–field injury assessment method 298
strategic and tactical development skills learning 156–157
strength training
goals of and reasons for 348–349
isometric 357
resistance 99–100, 350–352
types of contractions in 100–101
types of 349–350
weight 353–356
stress, in performance 118
stretch reflex 97
stretches, for flexibility training 366–367
stretching
during rehabilitation 336
static and PNF 317
in warming–up 316–317
stroke volume 108
subjective performance measures 164
suicide 41
among young people in rural and remote communities 432
swimsuits, improvements in 400

T

tactical awareness, training for 371
talk, in injury assessment 296
tapering 382
taping
of ankle 331
for immediate treatment of injury 332
for isolation of injury 332
of wrist and thumb 331
taping and bandaging 330–332
task complexity and organisation 158
tears (soft–tissue injuries) 290
technique, in injury avoidance 314–315
technological training innovations 398
television, representation of sport in 269–270
temperature, effect on sporting performance 326–327
temperature and humidity chamber, for training 329
temperature regulation mechanisms, and physical activity 325
tennis, as suitable for women 245
tennis rating scale 165
tests
skill–related 165–166
validity and reliability of 167
thermoregulation, in children 303–304
thresholds 103–104
tissue damage recovery strategies
compression garments 146
cryotherapy 145
tobacco smoking, National Drug Strategy Household Survey of 35
total body fitness, as goal of rehabilitation 337
TOTAPS method of injury assessment 296–298
touch, in injury assessment 297
training
after rehabilitation 337
nutrition during 131–134
physiological adaptation in response to 107–112
strength 348–357
training principles
application of 106
progressive overload 102
reversibility 103
specificity 102
thresholds 103–104
variety 103
warm–up and cool–down techniques 105
training sessions
healthy and safety during 384
planning of 384–385
professional football models 375
sections of 384–385
structure 376
training types and methods
aerobic 94–95, 357–358
anaerobic 96–97
flexibility 97–98
strength 99–101
trait anxiety 118
transport, health inequities due to lack of access to 406
triglycerides 84
triple drop exercising 355
types 1 and 2 diabetes 37–38

U

unemployed people, health inequities among 429
up and down the rack 355
upper–body plyometric exercises 361
urine sampling, difficulties of 396–397

V

variety in training 103
ventilation 103
violence and young people
bullying 212
domestic abuse 214
homophobic vilification 214
sexual assault 213
sexual harassment 213
visualisation and imagery, for anxiety management 124–125
vitamins and minerals, as diet supplements 139–140
volleyball rating scale 165

W

warm–up procedures, when returning to play 341
warm–up techniques 105
warming–up before exercise 315–317
weight training
guidelines for different goals 356
overload techniques 355
plates and dumb–bells 353–354
wet–bulb globe temperature (WBGT) 327
Wie, Michelle, and glamour in sport 281
Williams, Serena, and glamour in sport 279
wind, effect on sporting performance 326
women
barriers to participation in sport 246
challenges to male domain in sport 282
sports considered suitable for 245–247
subordinate place in sport 274–275
women athletes, and sponsorship deals 251–252
women in sport, *see also* female athletes
women's gymnastics, scoring sheets for 168
women's sports, and media, sponsorship and resources success 277
wrist and thumb, taping of 331

Y

yoga 70
young athletes
benefits of physical activity for 300–301
safety guidelines for 301
young offenders, levels of hepatitis' B and C infection in 425
young people
actions for better health of 236–238
alcohol consumption by 209–211
body image of 221–222
condom use by 218–219
and cyber–bullying 22–23
developmental aspects of health 192–194
diversity of 173–174
and drink spiking 224
gambling by 222
health behaviours in 183–190
health of 178–186
mental health of 196–208
pregnancy and contraception use 219
and road safety 215–216
sexual health of 217–221
skills for better health 226–235
and violence 212–214
youth cultures
influence of globalisation on 175–176
influence of technology on 176

Z

zig–zag hops (plyometrics) 364
zone of optimal functioning theory of arousal 120

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