



DYNAMIC

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HSC

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1st Edition
Aaron Boyd
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Kylie Lowe
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ABOUT THIS BOOK

This book has been completely rewritten and we have taken the opportunity to include new research in the relevant areas.



HSC CORE 1: HEALTH PRIORITIES IN AUSTRALIA

CRITICAL QUESTIONS

How are priority issues for Australia's health identified?	2
What are the priority issues for improving Australia's health?	13
What role do health care facilities and services play in achieving better health for all Australians?	51
What actions are needed to address Australia's health priorities?	64

© NSW at n Str d Auth r y f d e d Development Health and Physical Education Stage 6 Syllabus
behalf of the Crown in right of the State of New South Wales 2012

<p>OUTCOMES</p> <p>When you have read this section you should be able to:</p> <ul style="list-style-type: none"> 1 identify Australia's health priorities 	<p>KEY TERMS</p> <table border="0" style="width: 100%;"> <tr> <td style="padding: 2px;">alternative health services burden</td> <td style="padding: 2px;">epidemiology infant mortality institutionalised</td> </tr> </table>	alternative health services burden	epidemiology infant mortality institutionalised
alternative health services burden	epidemiology infant mortality institutionalised		

In each chapter

CLOSING THE GAP PROGRESS 2018 EXECUTIVE SUMMARY

The latest data indicates that three of the seven Closing the Gap targets are on track to be met. The last year in which at least three targets were on track was in 2011.

The target to halve the gap in child mortality by 2018 is on track. Over the long term (1998 to 2016) the Indigenous child mortality rate has declined by 35 per cent and there has been a narrowing of the gap (by 22 per cent). Improvements in key domains of child and maternal health over the past few years suggest there are further gains to be made.

The target to have 95 per cent of all Indigenous four year olds enrolled in early childhood education by 2025 is on track. In 2016, around 14 100 Indigenous children (91 per cent) were enrolled in early childhood programs.

The target to close the gap in school attendance by 2018 is not on track. In 2017 the overall attendance rate for Indigenous

students not on track by 73.2 per cent compared to 63.0 per cent for non-Indigenous students.

The target to halve the gap in reading and numeracy by 2018 is not on track. In 2017 the proportion of Indigenous students achieving national minimum standards in NAPLAN is on track in only one (Year 9 numeracy) of the eight areas (reading and numeracy for Years 3, 5, 7 and 9).

However, the gap between Indigenous and non-Indigenous students has narrowed since 2005 across all NAPLAN areas apart from reading in Years 3 and 5 and numeracy in Years 5 and 9.

The target to halve the gap in Year 12 attainment by 2020 is on track. Not only the proportion of Indigenous 20 24 year olds who had achieved Year 12 or equivalent in 2016 was 74.4 per cent (2.4 percentage points below the 76.8 per cent target).

Case studies and articles throughout the text relate theory to real-life.

GLOSSARY

aerobic Involves phosphates. Compounds used for energy in muscle contractile units.

aerobic Any reaction occurring in the presence of oxygen.

anaerobic A metabolic pathway that does not require oxygen.

anaerobic system An anaerobic energy system using phosphates created as a fuel to synthesise ATP.

anaerobic system A system that increases muscle strength by encouraging new muscle growth, enable an athlete to train harder and longer in any given period.

anaerobic Any reaction occurring without oxygen being present.

anaerobic threshold The breakdown of a substance in the absence of oxygen.

anaerobic threshold Point at which the body starts to produce lactic acid quickly, approximately 80 per cent of maximum heart rate.

anxiety A state that manifests itself in response to a given stimulus or situation.

anaemia A condition that can result in muscle weakness.

anaerobic (carbohydrate) stores protein or endurance competitor.

anaerobic A muscle fibre that has the potential to cause cancer.

cardiac output The amount of blood pumped out of the heart per minute.

cardiac output Focuses on energy on one spot.

characteristic The way a person feels, thinks and acts, but promotes mental strength.

firmness A physical strength term, loss or condition.

ergogenic aids Relating to the brain and the ability to learn.

concerned by Any article of trade that is bought or sold.

creatine phosphate Fuel used to synthesise ATP molecules in the ATP-PC system.

cryotherapy A form of cooling as a means of treating injury, especially acute and chronic injuries.

diagnostic A way of identifying the nature or cause of an illness, disorder or

erythropoietin (EPO) Stimulates the production of red blood cells, which increase the delivery of oxygen to the tissues.

ethnic Relating to a group of people of the same descent and heritage who share a common and distinctive culture passed on through generations.

ethnic groups can exhibit such distinguishing features as language or accent, physical features, family names and customs.

free fatty acids Fat used by the body to produce energy from ATP molecules.

glycogen A simple sugar which is a form of carbohydrate.

glycaemic index (GI) A scale used by diabetics to get a better understanding of the types of carbohydrates, measured by an athlete and how quickly they are digested.

glycogen Glucose that is broken down and stored in the liver and muscle.

glycogen The body's preferred source of energy before the carbohydrates are depleted.

Rollover definitions work with the NelsonNetBook. Otherwise, go to the Glossary pages at the end of the printed book (page 378).

LEARNING TIP

Use this acronym to remember the five principles of the Ottawa Charter: **DRSBC**

- D**evelop
- R**eorient
- S**trengthen
- B**uild
- C**reate

Learning tips are sprinkled throughout the book to help you prepare for the exam.



Investigate

Use the AIATSIS map of Aboriginal Australia (access via the ABC website or follow the link) to identify the Indigenous cultures in your area.

Watch

Follow the weblink to watch 'How to use visualisation to reach your goals', from 10 November 2017, by Olympian luger Ruben Gonzalez. He explains how this has contributed to his success as an athlete.

FYI

The difference between *visualisation* and *mental rehearsal* is that visualisation can be done without the athlete having experienced the movement, whereas mental rehearsal requires the athlete to have practised the motor skill for it to be effective.

There are many types of activities, questions and tips within the chapters.

Explain

Explain how ATP is generated for activities lasting less than two minutes at high intensity.



There are no URLs printed in the book because they change often. Instead, there is a link (<http://nelsonpdhpe-hsc.nelsonnet.com.au>) to a free-access website where you will find a list of all the weblinks in the book. You will not need to use your login code to access the weblinks. A weblink icon also alerts you to web-based activities and videos.

Potential for prevention and early detection

Education programs and supportive environments can lead to prevention of some conditions; an example being the QUIT line, along with doctors working closely with patients who are trying to give up smoking to reduce the incidence of lung cancer. Emerging technologies can detect others; for example, mammograms for breast cancer and the HPV vaccine as a preventative measure against cervical and other HPV-related cancers for young people.

Costs to the individual and community

Ill health costs the government money – approximately \$170 billion in 2015–16. The cost to both the individual and the community can be divided into two categories: direct costs (hospital costs, medical treatment, the PBS and employment of medical staff). Indirect costs are those carried by families and communities. They include the emotional burden on a relationship when a loved one is diagnosed with ill health; time, energy and effort involved in caring for sick loved ones; and the cost of retraining employees if ill health requires this.

Activity

Using CVD as one of the National Health Priority Areas, research and complete the table, applying the criteria for identifying priority issues.

	Social justice principles	Priority population groups	Prevalence of condition	Cost to individuals	Cost to community	Potential for change
CVD						

A scaffold icon is used occasionally, to notify you that you can fill in a prepared (blank) table online. These are also on your student website. Each chapter has a dot point summary of the relevant key knowledge at the end. Chapter review activities follow and exam-style questions are on your student website.

On the NelsonNet website

The NelsonNet student website has:

- exam-style questions, with answer modelling
- a few templates (scaffolds) of tables so you can fill them out online if you wish.

You will need to log in to your student website (<http://nelsonnet.com.au>) for these, using the code in the back of the book.

We hope you find this book and the online resources useful!

ABOUT THE AUTHORS

Aaron Boyd is currently the CEO of Unity Grammar, Sydney. Aaron has worked extensively in government and independent educational institutions as a PDHPE teacher, Head of Department, Curriculum Consultant, Director of Administration, Dean of Studies, Head of Programs and Operations, and Chief Operating Officer for over 27 years. He holds an MBA, MEd and BEd. Aaron has been an HSC marker for more than 21 years and is a published author of a range of textbooks and teaching resources. Aaron was a recipient of the NSW Premier and ACE Award for Quality Teaching.

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Dr Matthew Winslade is a Sub Dean with the Faculty of Arts and Education at Charles Sturt University. He is a senior lecturer in Health and Physical Education and his research interests include health-promoting schools, cultural competency, culturally responsive pedagogy and teacher education. Prior to entering academia, Matthew was a Head Teacher PDHPE and a Director of Sport. Matt regularly leads sports outreach and health education programs for pre-service HPE teachers and exercise science students to Samoa, working with a range of schools and sporting organisations.



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HSC CORE 1: HEALTH PRIORITIES IN AUSTRALIA

CRITICAL QUESTIONS

How are priority issues for Australia's health identified?	2
What are the priority issues for improving Australia's health?	13
What role do health care facilities and services play in achieving better health for all Australians?	51
What actions are needed to address Australia's health priorities?	64

Source: Personal Development, Health and Physical Education Stage 6 Syllabus
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OUTCOMES

When you have read this section you should be able to:

- 1 identify Australia's health priorities and explain how the government prioritises health issues in order to achieve better health care for all Australians
- 2 evaluate the range and types of health services and analyse how they impact on national health priority areas
- 3 critically analyse how the Ottawa Charter addresses TWO National Health Priority Areas.

KEY TERMS

- | | |
|--|-----------------------------------|
| alternative health services | epidemiology |
| burden | infant mortality |
| cancer | institutionalised health care |
| cardiovascular disease (CVD) | life expectancy |
| Council of Australian Governments (COAG) | Medicare |
| comorbidity | morbidity |
| complementary health services | mortality |
| coronary heart disease (CHD) | non-institutionalised health care |
| diabetes | social construct |
| | social justice principles |
| | supportive environments |

CHAPTER 1

Priority issues for Australia's health

IN THIS CHAPTER

Measuring health status

3

Identifying priority health issues

10

LEARNING TIP

To be successful in the PDHPE HSC exam it is essential that you respond to questions using the relevant syllabus information. The most effective method of achieving this is to 'code' your syllabus to assist recall. Main critical questions can be identified as CQ1, CQ2 ... and then the dash points related to that critical question can be labelled CQ1A, CQ1B, etc.

CQ1 How are priority issues for Australia's health identified?

Students learn about:

- **CQ1A** measuring health status
 - role of epidemiology
 - measures of epidemiology (mortality, infant mortality, morbidity, life expectancy)
- **CQ1B** 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

Students learn to:

- 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
- 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?

Teacher Note: Students do not need to know the latest statistics on the rates of illness and death. It is only important that they understand trends such as whether the prevalence of leading causes is on the increase, decrease or stable.

CQ2 What are the priority issues for improving Australia's health?

Students learn about:

- **CQ2A** groups experiencing health inequities
 - Aboriginal and Torres Strait Islander peoples
 - socioeconomically disadvantaged people
 - people in rural and remote areas
 - overseas-born people
 - the elderly
 - people with disabilities

Students learn to:

- 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 sociocultural, socioeconomic and environmental determinants
 - the roles of individuals, communities and governments in addressing the health inequities

Source: Personal Development, Health and Physical Education Stage 6 Syllabus © NSW Educational Standards Authority for and on behalf of the Crown in right of the State of New South Wales, 2012

Figure 1.1 Coding the syllabus for better understanding

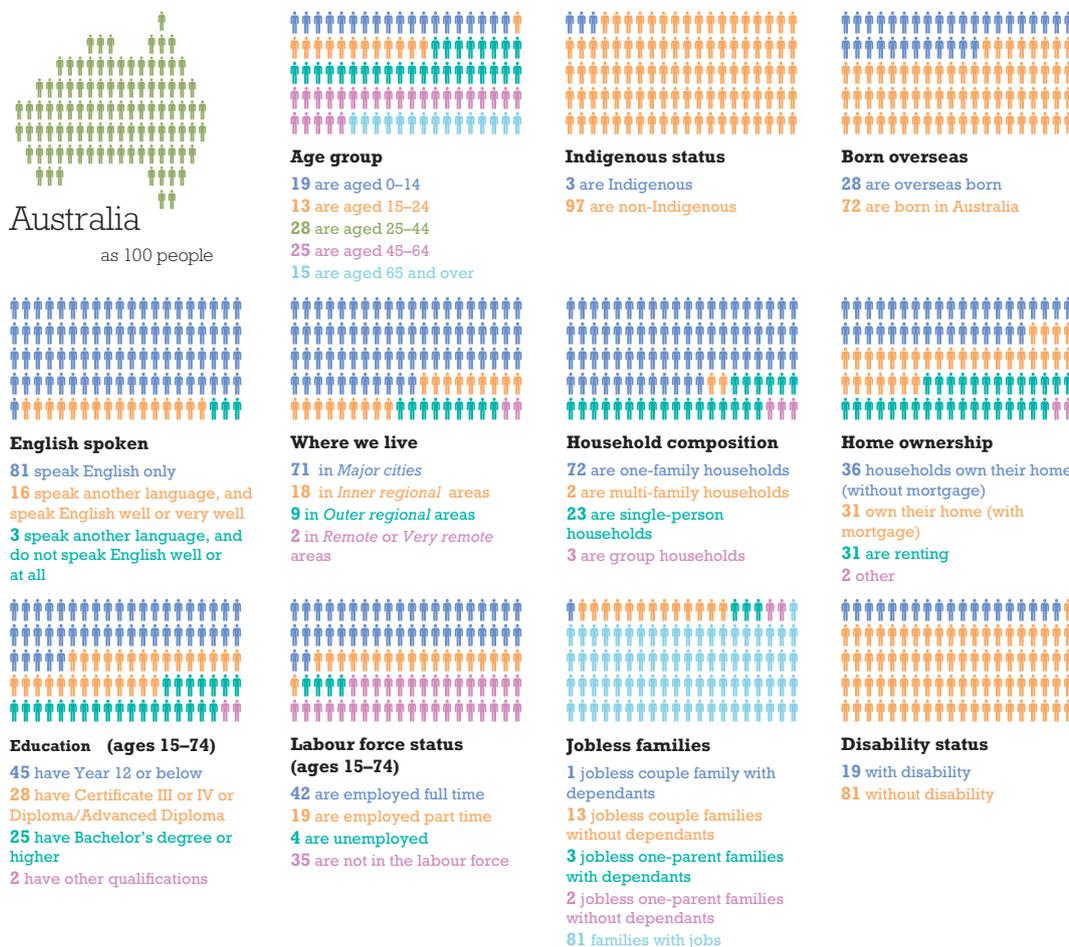
Australia's health care system is a model respected by world leaders. It is a fair and equitable system that provides universal basic health care to Australian citizens. However, it comes with a high financial cost. According to the Australian Institute of Health and Welfare (AIHW), health expenditure in 2015–16 was \$170 billion (*Health Expenditure Australia 2015–16*, AIHW, 2017, p. vii). As our **life expectancy** continues to rise, this expenditure will also rise. People born in 2014 have an average life expectancy of 82 years. The Australian federal government, along with the states and territories, has the responsibility of administering, maintaining and continually improving health systems to ensure we continue to have a high, healthy standard of living. Agencies that have this responsibility, and which are referenced regularly in this unit, are the AIHW, the Australian Bureau of Statistics (ABS), the New South Wales Department of Health and non-government organisations such as Cancer Council Australia, the National Heart Foundation and Diabetes Australia.

MEASURING HEALTH STATUS

When you have read this section you should be able to analyse current trends in life expectancy and major causes of morbidity and mortality from graphs and tables.

Role of epidemiology

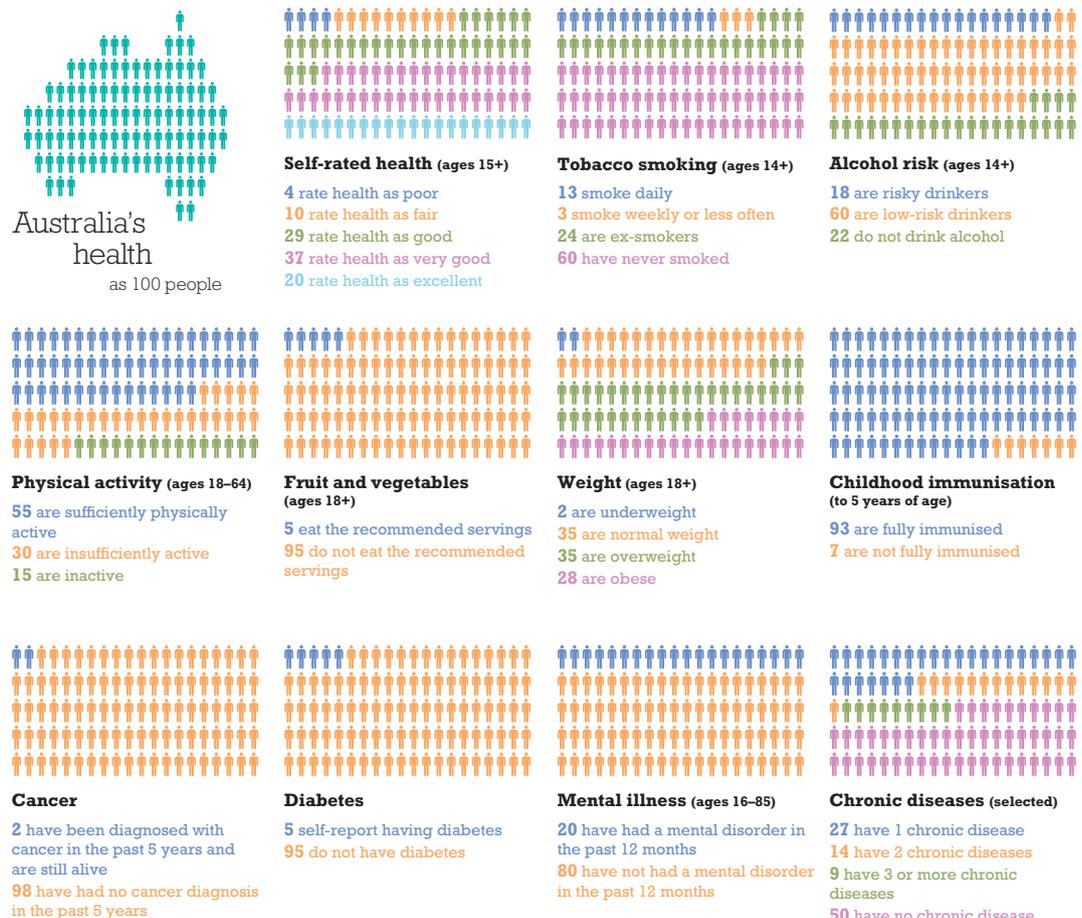
Studying the past and present health issues of individuals, groups and societies can be a powerful way to increase the prevention of injury, disease, illness and death. It also assists government



Source: *Australia's health 2016: in brief*, AIHW, p. 2. © AIHW 2016 (CC-BY 3.0) license (<https://creativecommons.org/licenses/by/3.0/au/>)

Figure 1.2 Australia represented as 100 people

and non-government organisations in identifying risk factors and implementing protective behaviours to reduce the incidence of disease, death and injury in future generations. It was through the study of epidemiology that medical researchers identified skin cancer as a national health priority in Australia, leading to the introduction of health promotion to reduce the number of Australians dying from melanoma.

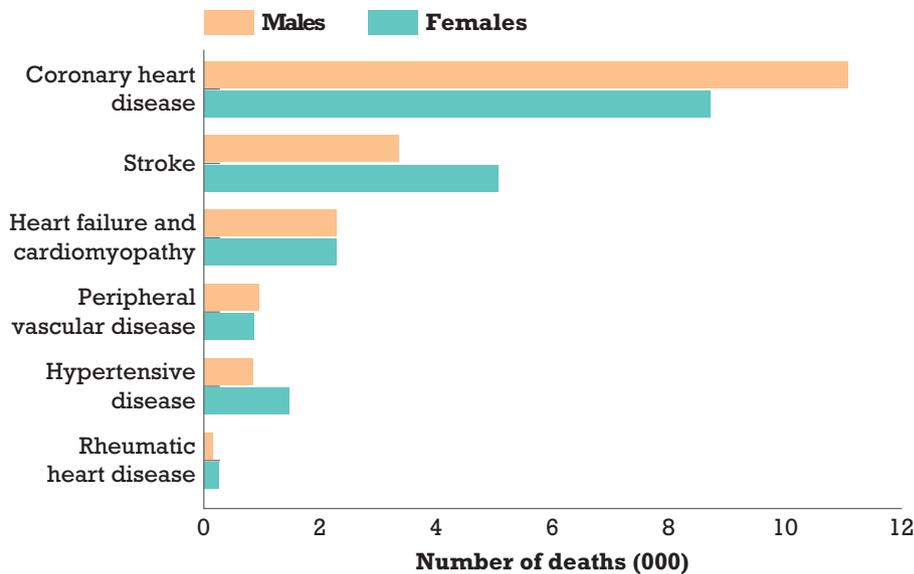


Source: *Australia's health 2016: in brief*, AIHW, p. 3. © AIHW 2016 (CC-BY 3.0) license (<https://creativecommons.org/licenses/by/3.0/au/>)

Figure 1.3 Australia's health represented as 100 people

Epidemiology is a mathematical study of death and disease within a population. Epidemiologists collect numerical data on illnesses, diseases, injury and death within populations so that they can:

- identify the number of deaths from a particular cause
- calculate the rate of diseases within a population group
- identify specific sub-groups within the population who experience higher rates of a disease or health inequities (e.g. Indigenous populations experience higher rates of infant mortality than non-Indigenous)
- compare and identify inequalities in health as experienced among members of the population
- provide tangible evidence that health promotion initiatives are being effective (e.g. rates of cancer survival are increasing, according to AIHW's *Australia's health 2016: in brief*)
- provide information that allows governments to allocate resources on a 'needs basis' and target certain health areas.

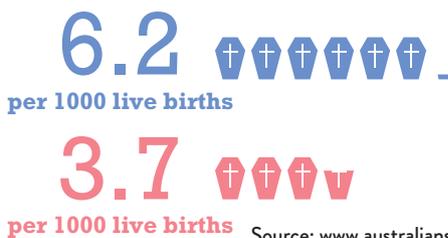


Source: National Mortality Database © AIHW 2016, (CC-BY 3.0) license. (<https://creativecommons.org/licenses/by/3.0/au/>)

Figure 1.4 Major causes of death from cardiovascular disease (CVD), 2015

Infant mortality rates

In 2008–12 the infant mortality rates for Aboriginal and Torres Strait Islander children was almost double that for non-Indigenous children.



Source: www.australianstogether.org.au

Figure 1.5 Infant mortality rates, Indigenous versus non-Indigenous

Measures used in epidemiology

Measuring **health status** is technical and conceptual. Epidemiologists use a range of quantitative statistical measures that include mortality, morbidity, infant mortality and life expectancy.

Mortality

Mortality is measured by the cause and number of deaths in a specific population over a specific time period. Data is typically standardised to enable comparisons. For example, ‘deaths per 100 000 of 20–30-year-olds’ is known as age-standardised.

Morbidity

There are two types of morbidity data. *Prevalence* is data recording the number of cases of a disease, illness or injury within a population. *Incidence* is data collected on the number of cases of a disease, illness and injury, within a population, for a given time period.

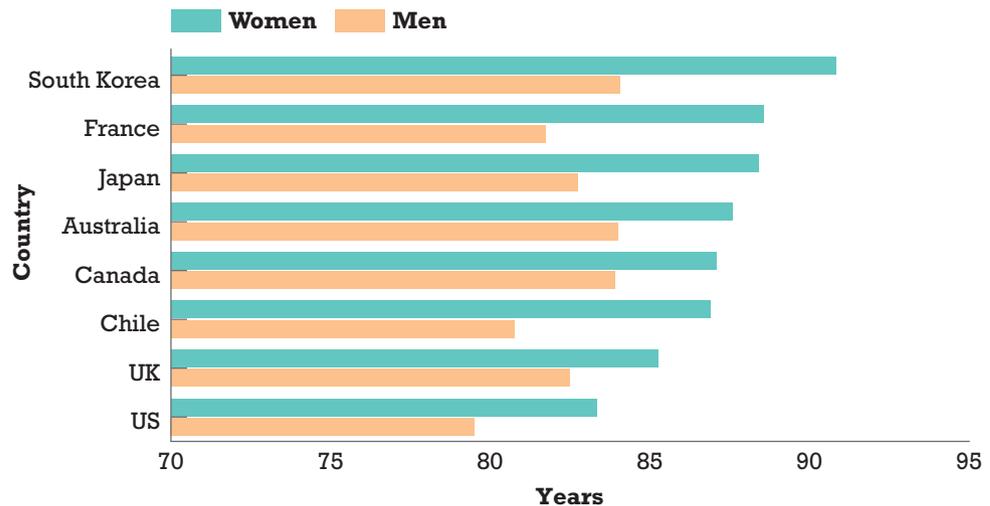
Infant mortality

Infant mortality is data collected on the number of deaths in infants within their first year of life per 1000 live births. Infant mortality can be a good predictor for life expectancy.

Life expectancy

Life expectancy is the estimated number of years that members of a group within society is predicted to live. For example, if you were born in 2015 you have a life expectancy of 84.5 years (females) and 80.4 years (males). This can be compared to people born in 1970, who have a life expectancy of 74.4 years (females) and 67.7 years (males).

One way in which the health status of a country is ranked is on its citizens' life expectancy, which can vary considerably from one to country to another. This will be explored later in the chapter; however, from your preliminary studies you should be aware that health is greatly influenced by **sociocultural**, socioeconomic and environmental determinants.



www.thelancet.com, Vol 389, 1 April 2017

Figure 1.6 Predicted average life expectancy at birth by 2030

Who uses these measures?

Data can be collected by various means; for example, when citizens use their Medicare card, through hospital admissions, immunisation records and pharmaceutical sales. All this data is collected, stored and analysed by various government and non-government organisations (NGOs). It provides powerful evidence for identifying needs, prioritising health funding and health promotion, as well as implementing health programs.

General practitioners use epidemiology data to identify outbreaks of diseases, monitor groups within society who are at greater risk and implement practices to increase the health outcomes of patients – such as screening processes for cardiovascular disease (CVD) and diabetes.

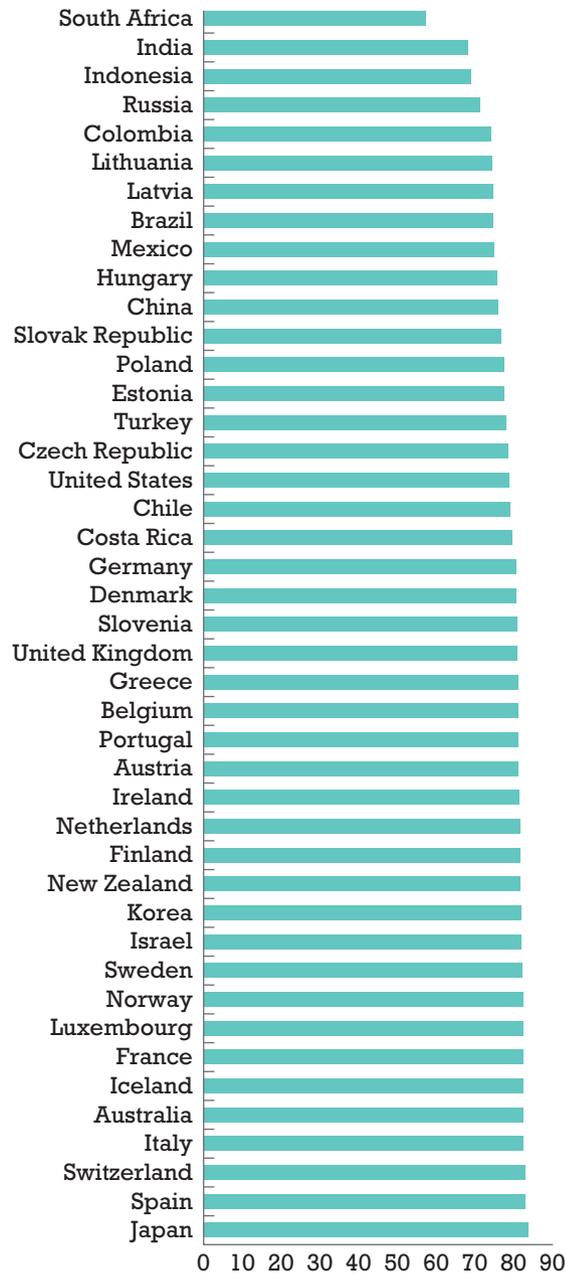
The New South Wales Department of Education uses data regarding injuries (including sporting ones) in schools as well as incidences of anaphylaxis and asthma to develop policy and procedures to minimise these risks (for example, excursion policies and training staff in EpiPen use.)

Can epidemiology measure everything about health status?

Epidemiology is a mathematical science focusing on the use of quantitative data (statistics). Therefore, it provides limited understanding about complex health issues and a person's quality of life. Its drawbacks include the following:

- Sociocultural influences on an individual are not considered (e.g. the person's wellbeing despite the injury or disease, their contribution to society, their **quality of life** prior to death).

- An epidemiological study does not identify the reasons behind protective or risk behaviour choices made by an individual.
- Diseases that are not identified as national health priority areas often receive little analysis or attention.
- An epidemiological study does not recognise factors that may contribute to mortality, an example being a death certificate that identifies CVD but not the mental health issues contributing to the hypertension.



Source: <https://data.oecd.org/healthstat/life-expectancy-at-birth.htm>

Figure 1.7 OECD life expectancy at birth rankings, 2015



Weblink

Analyse

Use tables and graphs to analyse current trends in life expectancy, and major causes of morbidity and mortality. Compare males with females in each.

LEARNING TIP

You do not need to know the latest statistics on the rates of illness and death. However, it is important that you understand trends such as whether the prevalence of leading causes is on the increase, decrease or remains stable.

Australia's health 2016: in brief

- 1 Download AIHW's *Australia's health 2016: in brief* (PDF version) and use it to complete the following tasks.
- 2 Using the information on page 4, create a visual representation (pie or mind map) of the 'profile of Australians'. Describe the population of Australia in terms of demographics and identify how this may affect the health status of the nation.
- 3 From page 40, identify what percentage of Australian children (up to 5 years of age) are fully immunised. Research the percentage that the World Health Organization (WHO) states is a protective percentage for the population. Explain what 'herd immunity' means for the health status of Australia.
- 4 Using the data on page 10, create a visual representation of how Australians 'self rate' their health. Predict whether this would correlate with what the epidemiology data would represent.
- 5 For the following age groups, identify which diseases cause the greatest 'burden' on health, for both males and females. Predict reasons for the difference (page 12).
15–24 year olds; 45–64 year olds; 75–84 year olds

According to the Organization for Economic Cooperation and Development (OECD), life expectancy has increased worldwide. As figure 1.7 indicates, Australia ranks highly among the OECD countries in life expectancy.

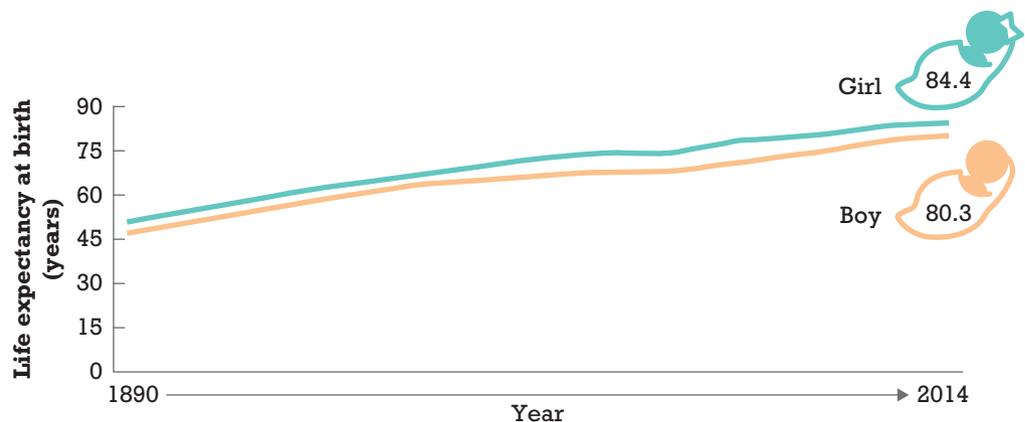
Current trends

Life expectancy

Australians have a high life expectancy compared with people in other countries across the world and it is steadily increasing, on par with the OECD predictions.

Sex differences

The trend differs between males and females across Australia where females enjoy a longer life expectancy than males, although this is narrowing. A male child born between 2012 and 2014 can expect to live to 80.3 years and a female born in the same time period can expect to live to 84.4 years.

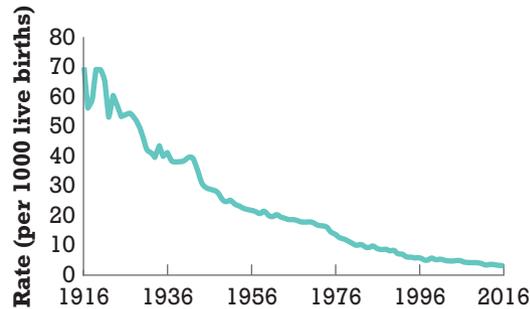


Source: Australian Bureau of Statistics, © Commonwealth of Australia: 32014b, 2015c. CC-BY 2.5 Australia license.

Figure 1.8 Life expectancy at birth by sex, Australia 1890–2014

Infant mortality

High levels of life expectancy can be attributed to low rates of infant mortality. In Australia, infant mortality rates are low and continue to decrease. According to the ABS, the infant death rate in Australia in 2016 was three for every 1000 live births. However, as will be discussed later, infant **mortality rates** among Indigenous populations and the socioeconomically **disadvantaged** are much higher.

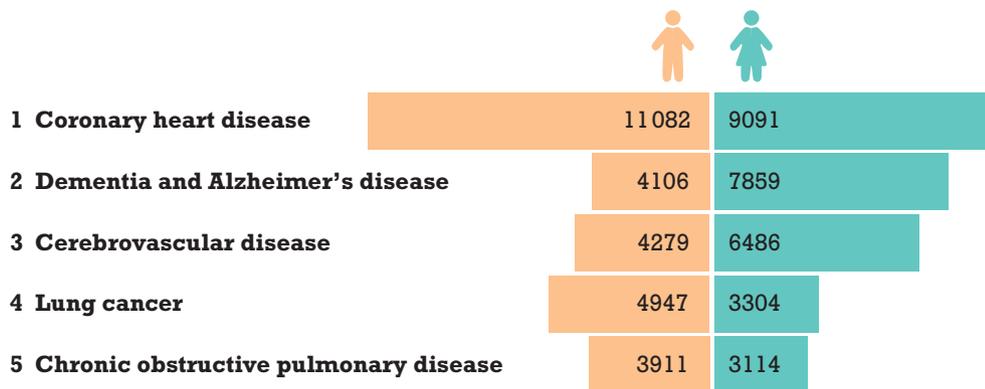


Source: Australian Bureau of Statistics, © Commonwealth of Australia: 3302.0 – Deaths, Australia, 2016
CC-BY 2.5 Australia license.

Figure 1.9 Declining infant mortality rate, Australia 1916–2016

Mortality

Cancer (all types combined) has surpassed CVD as the cause of the highest total number of deaths in Australia (44 100 and 43 600 respectively). However, coronary heart disease (CHD) – comprising myocardial infarctions (heart attacks) and angina – continues to be the leading specific cause of mortality in Australia.



Source: National Mortality Database © AIHW 2016, (CC-BY 3.0) license. (<https://creativecommons.org/licenses/by/3.0/au/>)

Figure 1.10 Leading causes of death, by sex, Australia 2014

Mortality

- Construct a table of the leading causes of mortality for males and females in Australia.
 - Construct a response to the following HSC-style question:
Compare the causes of mortality between males and females in Australia.
- Life expectancy of Australians continues to steadily rise. Predict reasons for the continued growth.

Morbidity

Morbidity is the level of ill-health in a population. While Australians have a high life expectancy, low infant mortality and decreasing rates of mortality, the rates of morbidity continue to rise due to earlier detection, advances in medical technology and improved understanding of how to manage **chronic** diseases. Half of all Australians suffer from a chronic disease. The rate is highest among people aged over 65 years; 87 per cent of people in this group reported a chronic disease, while the rate was 35 per cent for people aged under 44. Chronic disease is higher among females (52 per cent) than males (48 per cent) and those residing in the lowest socioeconomic areas have a slightly higher rate (55 per cent) than those in the highest socioeconomic areas (47 per cent). Similarly, people residing in regional and remote areas have higher rates of chronic disease (54 per cent) compared to their city counterparts (48 per cent). More than 23 per cent of all Australians have **comorbidity** factors (that is, they have more than one chronic illness).

LEARNING TIP

You do not need to know the actual statistics on morbidity and mortality, but you must look at the latest statistics and be able to discuss the trends over time.

IDENTIFYING PRIORITY HEALTH ISSUES

When you have read this section you should be able to explain why particular decisions are made about different health priorities.

The government uses a set of criteria to identify the following nine National Health Priority Areas (NHPAs): dementia, obesity, arthritis and other musculoskeletal conditions, asthma, diabetes mellitus, mental health, injury prevention and control, cardiovascular health, and cancer control. The National Health and Medical Research Council (NHMRC) uses a systematic and procedural method to ensure that the issues it identifies are the most applicable.

Social justice principles

The principles of equity, diversity and supportive environments are important considerations when prioritising a NHPA. Societal barriers and discrimination need to be addressed in order to reduce the burden of ill health on the population as well as the impact of past and current disadvantages.

Equity

Equity is the fair and balanced distribution of health resources to improve the health outcomes for all. An example of equity is Medicare. It is a basic universal health care system for all Australian citizens regardless of their socioeconomic status, geographic location and education.

Diversity

Health resources need to be diversified to meet the needs of specific cultural subgroups within the Australian society. An example of diversity is the provision of health promotion in a variety of languages, as used on the Cancer Institute of New South Wales' iCanQuit webpage.

Supportive environments

Health outcomes are improved if individuals and groups within a society feel supported and encouraged to improve their health. Governments and NGOs play a vital role in bringing about change in people's health. An example is the QUIT helpline, which supports smokers who want to give up smoking. Through the Pharmaceutical Benefits Scheme (PBS) the government reduces the cost of prescription medications to support socioeconomically disadvantaged groups. Workplace health and safety legislation (such as the *Work Health and Safety Act 2011*) provides guidelines on how employees can be safe in their workplace and engage in positive behaviours that improve health.

Priority population groups

Using epidemiological data, the government identifies groups within our society that experience higher rates of mortality and morbidity than the general population. It then targets these subgroups to effect change and reverse the negative data. Groups with high priority in Australia are Aboriginal and Torres Strait Islander people, socioeconomically disadvantaged people, the elderly, the disabled, rural and remote populations and people born overseas.

Prevalence of condition

It is vital that the government targets conditions with high prevalence within our populations. This is to ensure that the vast amount of financial and structural resources deployed have the greatest possibility of effecting change and reducing future incidences of the condition; for example, CVD is attributed as being an underlying condition in more than 35 per cent of deaths. This is a high prevalence so the financial investment made in it is justified.

Potential for prevention and early detection

Education programs and supportive environments can lead to prevention of some conditions; an example being the QUIT line, along with doctors working closely with patients who are trying to give up smoking to reduce the incidence of lung cancer. Emerging technologies can detect others; for example, mammograms for breast cancer and the HPV vaccine as a preventative measure against cervical and other HPV-related cancers for young people.

Costs to the individual and community

Ill health costs the government money – approximately \$170 billion in 2015–16. The cost to both the individual and the community can be divided into two categories. Direct costs include hospital costs, medical treatment, the PBS and employment of medical staff. Indirect costs are those carried by families and communities. They include the emotional burden on a relationship when a loved one is diagnosed with ill health; time, energy and effort involved in caring for sick loved ones; and the cost of retraining employees if ill health requires this.

Activity

Using CVD as one of the National Health Priority Areas, research and complete the table, applying the criteria for identifying priority issues.

	Social justice principles	Priority population groups	Prevalence of condition	Cost to individuals	Cost to community	Potential for change
CVD						



Scaffold

CHAPTER SUMMARY

- Epidemiology is the mathematical science used to provide data and information about the rates of disease, injury, illness and death within the Australian population.
- Epidemiology measures include life expectancy, mortality, morbidity (prevalence and incidence) and infant mortality.
- Epidemiology provides valuable information to government and non-government organisations so they can identify, prioritise and target national health priority areas through health promotion programs and initiatives.
- Epidemiology has limitations. It cannot measure quality of life, sociocultural influences, reasons for protective or risk behaviour choices, and it does not recognise comorbidity factors in complex health issues.
- Australia rates high among OECD countries in life expectancy although there are differences between males and females.
- Low rates of infant mortality occur in Australia, contributing to rising life expectancy. Approximately three babies in every 1000 live births will die and these rates are higher among the Indigenous population.
- Coronary heart disease is the leading specific cause of mortality in Australia for both sexes.
- Equity, diversity and supportive environments are the three ideologies of the social justice principles. *Equity* means the fair distribution of health resources, ensuring that those resources are *diversified* to meet the needs of specific subgroups within society with populations, groups and individuals feeling *supported* in their *environments* (live, work, play) to achieve good health.
- Specific subgroups within the Australian population are identified as experiencing a higher level of health inequality. These include people who are Indigenous, socioeconomically disadvantaged, elderly, disabled, living in rural and remote populations, and people born overseas.
- Criteria used by governments and NGOs to assess the priority of a disease include identifying: the priority population groups affected, the prevalence of the condition, the potential for prevention and/or early detection, the cost to both the individual and the community (direct and indirect) and the application of the social justice principles.
- Australia spends in excess of \$170 billion a year on health. It is imperative that the diseases receiving funding and resources as a National Health Priority Area (NHPA) have the potential to be prevented through education or early detection, such as screening programs like mammograms for breast cancer.

CHAPTER REVIEW ACTIVITIES

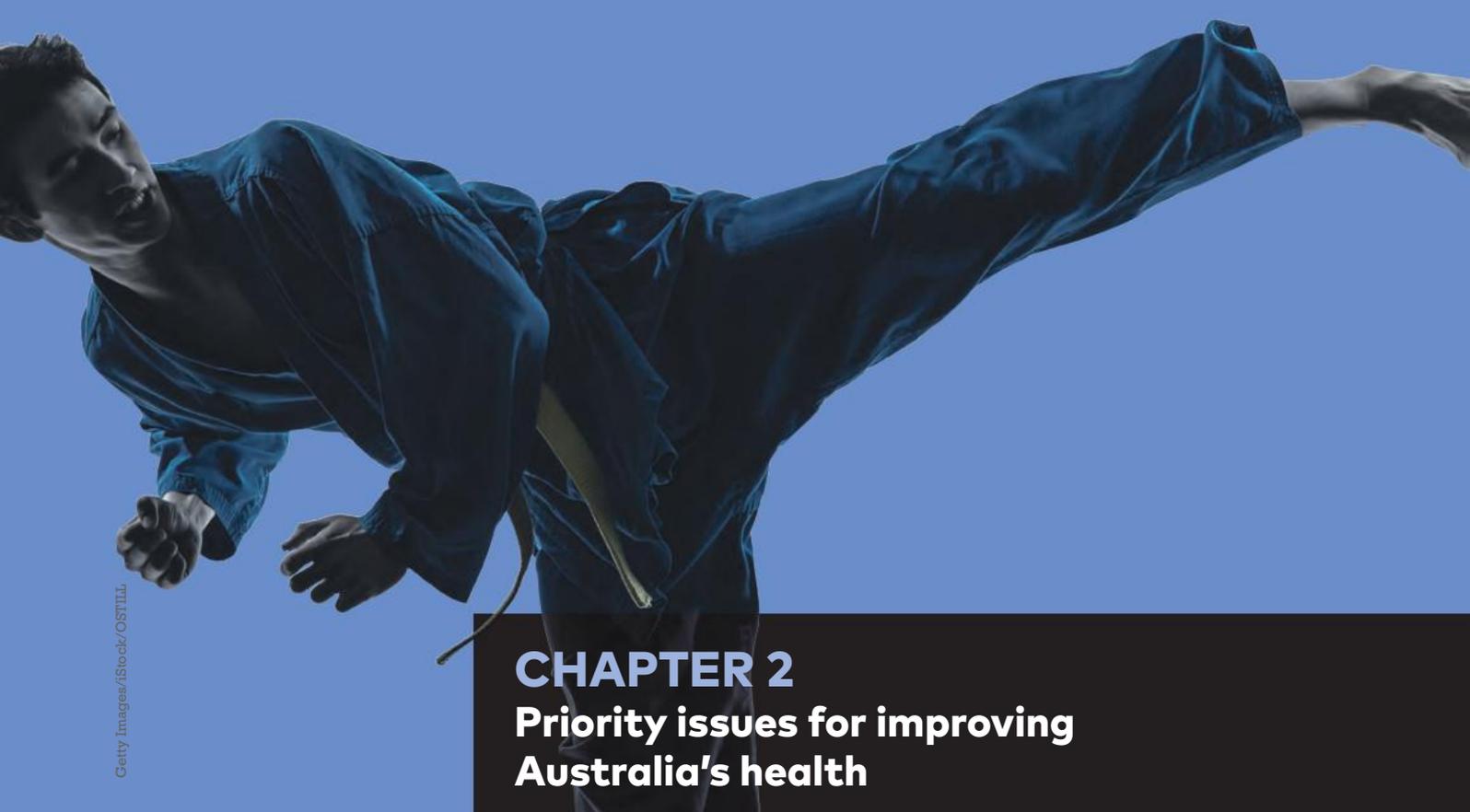


Extra exam-style questions

Before composing your responses to the following activities, take the time to identify the **key verb** and determine the terms required to demonstrate the application of the verb in a written response. For example, a **define** or **outline** response should consist of terms such as 'the main role is ...' or 'characterised by ...'. A **compare** response should include 'similarly ...', 'whereas ...' or 'different ...' and an **assess** response should include 'effective ...', 'important ...' and 'vital ...'.

In the following questions, syllabus terms have been *italicised* to demonstrate the significance in the construction of a response. Always identify what dash or dot point of the syllabus a question is asking for. For example, in question 3, health status is a dot point in the first critical question; so to accurately and thoroughly address this, the response should include both dash points (role of epidemiology and measures of epidemiology). It is always beneficial to consult the syllabus when constructing responses.

- 1 **Define** the following terms: *mortality*, *morbidity*, *infant mortality* and *epidemiology*.
- 2 **Outline** what *epidemiology* can and cannot indicate about the health of a population.
- 3 **Describe** how *health status* is measured.
- 4 **Discuss** the criteria used to *prioritise health issues* in Australia.
- 5 **Compare** the *health status* of males and females in Australia.
- 6 **Assess** the importance of *prioritising health issues* in Australia.



Getty Images/iStock/OSTILL

CHAPTER 2

Priority issues for improving Australia's health

IN THIS CHAPTER

Groups experiencing health inequities	13
High levels of preventable chronic disease, injury and mental health problems	25
A growing and ageing population	45

GROUPS EXPERIENCING HEALTH INEQUITIES

In this section you are required to investigate the health inequities experienced by Aboriginal and Torres Strait Islander Australians and ONE other group.

Epidemiology is dynamic. The statistical data and trends change with every birth, death or diagnosis, so it is important to use this text in conjunction with the various health websites that update this information. They include the Australian Institute of Health and Welfare (AIHW) and the Australian Bureau of Statistics (ABS).

Despite Australia having an excellent health care system and experiencing high levels of life expectancy, there are numerous groups within our society who experience significantly lower levels of health due to socioeconomic, environmental or sociocultural reasons. The Australian government has a responsibility to recognise this and to provide additional resources and means that will benefit those groups that are most in need. These include:

- Aboriginal and Torres Strait Islanders
- socioeconomically disadvantaged people
- people living in rural and remote areas
- people born overseas
- elderly citizens
- people with disabilities.

Aboriginal and Torres Strait Islander peoples

Aboriginal and Torres Strait Islanders live right across Australia, in major cities, inner regional, outer regional, remote and very remote regions. There are hundreds of groups or 'mobs' within their culture, each with its own distinct cultural practices, language and history. Their health issues are complex, as are the determinants and roles played by governments and communities in reducing the health inequities between Indigenous and non-Indigenous people.



Weblink

Investigate

Use the AIATSIS map of Aboriginal Australia (access via the ABC website or follow the link) to identify the Indigenous cultures in your area.

Nature and extent of health inequities

Indigenous Australians account for approximately 3 per cent of the population, with almost two-thirds living in Queensland, although most live in non-remote areas (79 per cent) and 15 per cent in very remote areas. By comparison, 98 per cent of non-Indigenous Australians reside in non-remote locations (*The health and welfare of Australia's Aboriginal and Torres Strait Islander Peoples*, AIHW, 2015, p. 8). Even with their small population representation, Indigenous people are over-represented and suffer significant health inequities including higher mortality rates, higher morbidity rates, lower life expectancy and higher infant mortality rates.



Source: © AIHW 2016, CC-BY 3.0 license <https://creativecommons.org/licenses/by/3.0/au/>

Figure 2.1 Representation of Indigenous Australians

Mortality

Death rates among Indigenous Australians remain significantly high compared to non-Indigenous Australians. Due to the allocation of significant government resources as well as the Closing the Gap campaign implemented in 2006, Indigenous mortality rates fell by 15 per cent between 1998 and 2015.

It is still troubling to know that approximately two-thirds (65 per cent) of Indigenous people die before their 65th birthday, compared to only 19 per cent of non-Indigenous Australians. In addition, the mortality rate for Indigenous people aged 35–44 (both male and female) is approximately four times that of their non-Indigenous counterparts.

The main causes of mortality among Indigenous Australians include:

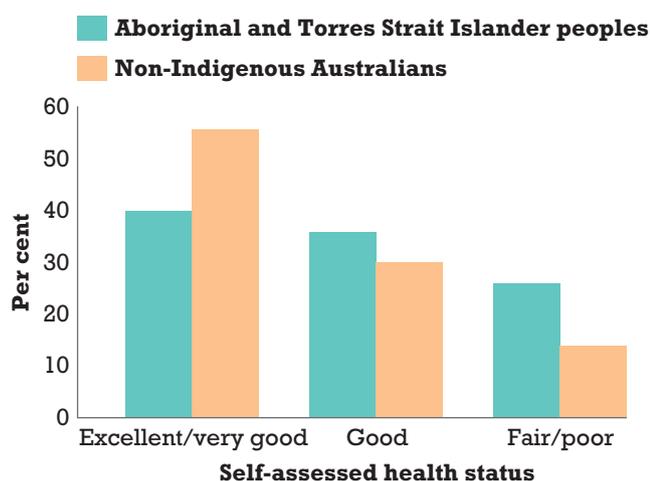
- cardiovascular disease (CVD), accounting for approximately 25 per cent of deaths and occurring at 1.5 times the rate of non-Indigenous Australians
- **neoplasms** or cancer accounting for 20 per cent, with lung cancer being the most significant
- injury and poisoning accounting for 15 per cent, which is two times more likely than among non-Indigenous Australians
- endocrine, nutritional and metabolic diseases, including diabetes at 9.1 per cent, which is four times more likely to occur among Indigenous people than non-Indigenous people
- diseases of the respiratory system (7.6 per cent)
- digestive diseases (5.6 per cent).

Mortality trends are reducing. Between 1998 and 2012 there was a significant decline in mortality rates for Indigenous Australians, with the gap reducing to 17 per cent. There was a specific reduction in CVD (40 per cent), respiratory diseases (26 per cent) and a plateauing of deaths due to external causes. However, there was an increase in cancer rates.

Morbidity

According to the AIHW, the Indigenous population suffers a burden of disease that is approximately 2.3 times the rate of non-Indigenous Australians. As is the case with mortality, the occurrence of morbidity in the Indigenous population is over-represented. In addition, Indigenous people are more likely to have a reduced perception of good health compared to non-Indigenous people, as seen in figure 2.2.

There was a slight improvement (a 5 per cent reduction) in the total burden of disease experienced by the Indigenous population between 2003 and 2011. The main causes of ill health among Indigenous people include CVD, cancer, diabetes, kidney disease, injury, respiratory health and mental health. Chronic diseases account for approximately two-thirds of the health inequities between Indigenous and non-Indigenous Australians.



Sources: ABS and AIHW analysis of 2012–13 AATSIHS. From Health Performance Framework 2014 Report CC-BY 4.0 International licence.

Figure 2.2 Self-assessed health status (age-standardised) by Indigenous status, persons aged 15 years and over, 2014–15

Approximately one in eight Indigenous Australians suffer from CVD, which is 1.2 times more than in the non-Indigenous population. Indigenous people are twice as likely to be admitted to hospital for CVD than non-Indigenous Australians. One in 25 Indigenous persons report having some form of CHD (stroke, vascular disease).

The most common form of cancer among the Indigenous population is lung cancer (Indigenous Australians are 2.6 times more likely to smoke) with approximately 130 cases diagnosed annually. Indigenous people are 1.8 times more likely to suffer from lung cancer than non-Indigenous people. The second most common form is breast cancer, with approximately 95 cases diagnosed each year. However, the incidence of bowel, breast, lymphoma and prostate cancers is declining among the Indigenous population.

In 2013, 11 per cent of the adult Indigenous population suffered from diabetes, while a further 4.7 per cent were at high risk of developing the disease. The Indigenous population is 3.3 times more likely to have diabetes than the non-Indigenous population. Diabetes was listed as the underlying cause of one in five Indigenous deaths between 2008 and 2012.

Indigenous people are 10 times more likely to be hospitalised for chronic kidney disease than non-Indigenous people and most of these hospitalisations require same-day dialysis. Indigenous people are 3.7 times more likely to develop and live with chronic kidney disease. Injury is the second leading cause for hospitalisation of an Indigenous person: 23 per cent of these instances were the result of assault and a further 19 per cent were due to accidental falls.

Indigenous people are 1.2 times more likely to suffer from respiratory diseases than non-Indigenous people and almost one-third report a chronic form of respiratory disease. Indigenous people are being hospitalised for respiratory diseases at 2.4 times the rate of non-Indigenous people.

The Indigenous population suffers greatly from mental illnesses. Between 2008 and 2012 the suicide rate for Indigenous Australians was almost twice the rate of non-Indigenous Australians. Of those aged between 15 and 19 years, the rate was five times as high as for non-Indigenous Australians. Hospitalisations related to mental health issues are twice as common among Indigenous people and account for approximately 11 per cent of health-related problems managed by general practitioners for Indigenous patients.

Infant mortality

The number of deaths of Indigenous infants was almost twice as high as non-Indigenous (per 1000 live births). Infant mortalities were attributed to birth trauma, disorders relating to poor fetal growth and complications during pregnancy and labour. Indigenous mothers are four times more likely to smoke during pregnancy than non-Indigenous mothers.

A progressive step in Indigenous infant mortality is the decline from 13.5 to 5 deaths per 1000 live births between 1998 and 2012. However, non-Indigenous infant mortality rates for the same period fell from 4.4 to 3.3 per 1000 live births.

Life expectancy

Despite advancing medical treatments and emerging technologies to enable births at a younger gestational age, not all babies born have the same start to life. Indigenous mothers have a higher proportion of babies born with medically determined ‘low birth weight’ (12.2 per cent) compared to non-Indigenous mothers (6.1 per cent). Low birth weight has been linked to delayed developmental and **cognitive** abilities, and increased health issues, particularly respiratory and life expectancy.

The life expectancy rate for Indigenous Australians is below that of non-Indigenous Australians although the gap is reducing. According to the AIHW’s *Australia’s health 2016: in brief*, Indigenous-born children could expect to live, on average, 10 years less than non-Indigenous children. In 2012 the estimated life expectancy for an Indigenous male was 69.1 years (10.6 years lower than non-Indigenous males) and 73.7 years for Indigenous females (9.5 years less than non-Indigenous females).

LIFE EXPECTANCY

Non-Indigenous girls born in 2010–12 in Australia can expect to live a decade longer than Indigenous girls born during the same period (84.3 years and 73.7 years respectively).



The gap for men is even larger, with a 69.1 year life expectancy for Indigenous men and 79.9 years for non-Indigenous men.



Australians together 2017 (www.australianstogether.org.au/discover/the-wound/indigenous-disadvantage-in-australia/)

Figure 2.3 Life expectancy of Indigenous compared to non-Indigenous Australians

Sociocultural, socioeconomic and environmental determinants

Sociocultural determinants include factors influencing our health from family, peers, culture, religion and the media. Socioeconomic determinants include the influences of education, employment and income on health. Environmental determinants include geographic location, access to health services and technology. All determinants have a positive or negative impact upon health. In the case of Indigenous Australians, many of these determinants have a negative effect on health, thus increasing the inequities between the health of Indigenous and non-Indigenous Australians, especially in relation to chronic illnesses.

Sociocultural determinants

Table 2.1 Sociocultural influence on health of Indigenous Australians, by residential area

	Current daily smoker (%)	No/low levels of exercise (%)	Lifetime risky drinking (%)
Major cities	13	64	16
Inner regional	17	70	18
Outer regional/remote	21	72	23

Source: © AIHW 2016, CC-BY 3.0 licence <https://creativecommons.org/licenses/by/3.0/au/>

The prevalence of higher risk factors such as tobacco smoking and physical inactivity among Indigenous Australians is much greater than among non-Indigenous people and this contributes to both acute and chronic illness. Indigenous Australians are 2.6 times more likely to smoke and 1.6 times more likely to be obese than the non-Indigenous. However, the number of Indigenous people over the age of 18 who smoke had decreased from 51 per cent in 2001 to 44 per cent at the end of 2013. Indigenous mothers were four times more likely to smoke during pregnancy and this tendency has also declined significantly since 2005. In 2012–13 approximately 57 per cent of Indigenous children lived in a household with a daily smoker, compared to 26 per cent of non-Indigenous children. More than 54 per cent of Indigenous people recorded consumption of alcohol at a ‘risky amount’ (*Australia’s health 2016: in brief*, AIHW, p. 31).

Socioeconomic determinants

In general, people who are socioeconomically disadvantaged are more likely to be in poor health. Education can increase health literacy and the capacity to analyse and evaluate health information. This enables individuals and families to exert more control over their health. Generally speaking, the higher a person’s level of education, the higher their income and employment opportunities are, and this contributes to good health.

Indigenous Australians are more likely to fall into the lower socioeconomic brackets. Their educational attainment is lower than non-Indigenous Australians and this can lead to:

- higher risk-taking behaviours such as smoking or consuming illicit drugs
- poor dietary choices (due to food costs)
- fewer employment opportunities, resulting in health implications such as reduced capacity to purchase fresh fruits and vegetables, engage in proactive protective health measures due to cost (e.g. gym memberships, private health insurance)
- increased likelihood of employment in physical occupations, increasing exposure to harmful substances such as carcinogens and UV radiation.

Since 2013, the unemployment rate of Indigenous Australians has remained stable at 21 per cent (AIHW, *Australia’s Welfare 2017*). This is 4.2 times the unemployment rate for non-Indigenous people. For Indigenous Australians (aged 15 years and over) the average gross weekly

income (household combined) is lower than for non-Indigenous Australians (\$556 per week compared to \$831 per week). As remoteness of geographic location increases, the average weekly income of Indigenous Australians decreases (approximately \$400 per week in very remote areas).

In 2016, approximately 45 per cent of Indigenous Australians (aged 15 and over) were receiving some form of Centrelink payment compared to 26 per cent of non-Indigenous Australians.

School attendance of Indigenous students remains stable at 83 per cent nationally compared to 9 per cent among non-Indigenous students; however, it declines in very remote areas (66 per cent). These attendance rates significantly influence the attainment of educational skills, specifically **literacy** and numeracy skills. Apart from Year 9 numeracy results, all other metacognitive skills assessed by NAPLAN indicate a gap of approximately three years between Indigenous students and their non-Indigenous peers, and more if they are being educated in remote locations (AIHW).

Environmental determinants

As discussed earlier in the chapter, a person's place of residence can affect their level of health. For example, Indigenous children residing in Western Australia and the Northern Territory experience higher rates of disease than Indigenous children living in Queensland and New South Wales.

Significant inequalities exist between remote and very remote areas of residence. Indigenous people living in very remote areas are often the most socioeconomically disadvantaged and therefore suffer a greater burden of disease. Remoteness decreases the access to health services and facilities, resulting in delayed early detection, diagnosis and/or treatment. Seven per cent of the adult Indigenous population reports not using institutionalised health care services due to reported experiences of discrimination from doctors and nursing staff.

Residential remoteness affects education and the Australian government has initiated a target to halve the gap for Indigenous children in reading, writing and numeracy by 2018 (Closing the Gap Campaign). This is because Indigenous children are approximately two to three years behind their peers in literacy and numeracy skills, as evidenced through NAPLAN testing. This gap significantly increases with remoteness.

Role of governments, communities and individuals in addressing health inequities

Great change can only occur when there is intersectional collaboration. This means that improved health is more likely to occur when groups within society work together to socially construct health within their community. All parties have a role to play in improving and effecting change in Indigenous health: the individual, the community groups (local community/ town or school) and the government (local, state and federal).

Governments

The Australian Government has a significant and important responsibility for the health of all its citizens. This responsibility is filtered down through the various government structures at state and local levels.

Politicians, health professionals and individuals all recognise the importance of health promotion in minimising and reducing the health inequalities that exist between groups within our society, especially among the Indigenous population. In 2006, the Australian Federal Government worked closely with Indigenous Australians and other government and NGOs to introduce the Closing the Gap campaign, a social justice initiative that aims to achieve health equality for Indigenous Australians by 2030.

This is a commitment made by the Council of Australian Governments (COAG) that the Australian government will work with Indigenous communities to improve the health and wellbeing of Indigenous Australians. The campaign is divided into seven focus areas: infancy and early childhood; education; employment; economic development; healthy lives; safe and strong communities; and constitutional recognition. Each area has a specific goal or target with

attached strategies. In 2009, Prime Minister Kevin Rudd made a commitment that every year the prime minister would issue a 'Closing the Gap Report Card' on progress towards the goals.

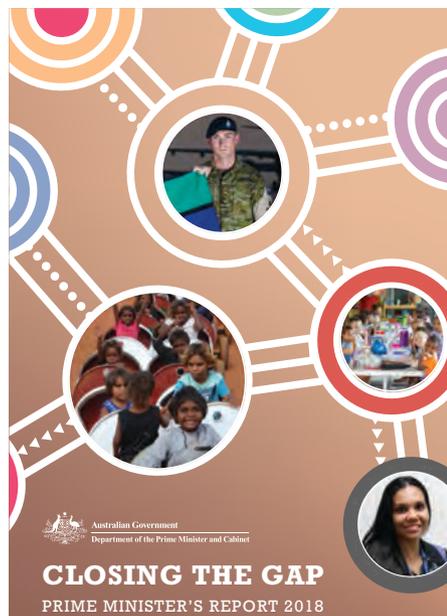
In relation to improving the health and wellbeing outcomes for Indigenous Australians, the Australian government has committed to:

- reducing the life expectancy gap between Indigenous and non-Indigenous people
- reducing infant mortality (thus positively affecting life expectancy)
- increasing school attendance and education attainment
- reducing the gap between Indigenous and non-Indigenous literacy and numeracy
- reducing socioeconomic disadvantage through increased employment.

Communities

As stated previously, intersectional collaboration is vital for success. Communities have a large responsibility in implementing policy and strategies to maximise effect.

At the forefront is the Indigenous community. Given the vast diversity of cultures among the Indigenous population, it is imperative that initiatives and strategies are directed to meet individual community needs and not applied as a blanket concept. For the initiatives to be effective in bringing about change, it is essential that Indigenous communities engage and



Source: Commonwealth of Australia, Department of the Prime Minister and Cabinet, Closing the Gap Prime Minister's Report 2018. CC BY 4.0 International Licence

Figure 2.4 The Australian Government's Closing the Gap campaign



Weblink

Investigate

Investigate the Closing the Gap campaign and the prime minister's introduction.

CLOSING THE GAP PROGRESS 2018 EXECUTIVE SUMMARY

The latest data indicate that three of the seven Closing the Gap targets are on track to be met. The last year in which at least three targets were on track was in 2011.

- The target to halve the gap in child mortality by 2018 is on track. Over the long term (1998 to 2016) the Indigenous child mortality rate has declined by 35 per cent, and there has been a narrowing of the gap (by 32 per cent). Improvements in key drivers of child and maternal health over the past few years suggest there are further gains to be made.
- The target to have 95 per cent of all Indigenous four-year-olds enrolled in early childhood education by 2025 is on track. In 2016, around 14 700 Indigenous children (91 per cent) were enrolled in early childhood programs.
- The target to close the gap in school attendance by 2018 is not on track. In 2017, the overall attendance rate for Indigenous

students nationally was 83.2 per cent, compared with 93.0 per cent for non-Indigenous students.

- The target to halve the gap in reading and numeracy by 2018 is not on track. In 2017, the proportion of Indigenous students achieving national minimum standards in NAPLAN is on track in only one (Year 9 numeracy) of the eight areas (reading and numeracy for Years 3, 5, 7 and 9). However, the gap between Indigenous and non-Indigenous students has narrowed since 2008 across all the NAPLAN areas, particularly reading in Years 3 and 5, and numeracy in Years 5 and 9.
- The target to halve the gap in Year 12 attainment by 2020 is on track. Nationally, the proportion of Indigenous 20–24 year-olds who had achieved Year 12 or equivalent increased from 47.4 per cent in 2006 to 65.3 per cent in 2016. While the attainment



rates for non-Indigenous Australians also improved, the gap has narrowed by 12.6 percentage points over the past decade (from 36.4 percentage points in 2006 to 23.8 percentage points in 2016).

- The target to halve the gap in employment by 2018 is not on track, with Indigenous employment rates falling slightly over the past decade. However, progress is being masked by a change in remote employment programs during this period. If this effect is removed, the employment rate has improved by 4.2 percentage points over the past 10 years. In 2016, the Indigenous employment rate was 46.6 per cent, compared with 71.8 per cent for non-Indigenous Australians.
- The target to close the gap in life expectancy by 2031 is not on track. Between the periods

2005–07 and 2010–12 there was a small reduction in the gap of 0.8 years for males and 0.1 years for females. Over the longer term, Indigenous mortality rates have declined by 14 per cent since 1998.

Source: Commonwealth of Australia, Department of the Prime Minister and Cabinet, Closing the Gap Prime Minister's Report 2018. CC BY 4.0 International Licence

Questions

- 1 What are the specific 'set targets' for the Closing the Gap campaign?
- 2 For each target, identify whether it has been 'achieved' or is 'not on target'.
- 3 For each target, how is the government responding to improving their 'report card' and aiming to meet the set targets?

strengthen community action within their own societies (as outlined in the Ottawa Charter). One successful example of this is the Indigenous-designed and -led Empowered Communities Initiative. This initiative involves Indigenous leaders making decisions, setting priorities and allocating resources at a regional level to empower their people and families, and to attempt to build trust between the Indigenous population and the government. A specific example is the Armidale Aboriginal Mothers and Babies Services in the New England Area of New South Wales where an Aboriginal Health Education Officer and a midwife work with Indigenous mothers to assist with pregnancy care and advocacy within the health care system. They also travel to more remote locations, such as Urala and Walcha, where antenatal health services cannot be provided. Through this program, breastfeeding rates have increased, there has been a reduction in smoking during pregnancy and immunisation rates among Indigenous children have increased.

Individuals

Through study of the Ottawa Charter we know that an individual's ability to exert control over their own health is increased by developing personal skills, specifically in health literacy. The more skills, knowledge and understanding an individual has about health, the greater their health outcomes should be.

As already pointed out, Indigenous people are affected by a range of factors that minimise good health. However, as the Closing the Gap campaign highlights, improvement in literacy, numeracy, school attendance and attainment of education are vital factors in improving an individual's capabilities for engaging in healthy behaviours.

Therefore, Indigenous individuals have a responsibility to increase their level of education. In New South Wales, public schools can support them to do this through an 'equity loading' provided by the Department of Education to help schools meet the additional learning needs of Indigenous students. The aim is to improve these students' retention and engagement with the education system in order to improve their educational outcomes. In addition, specific universities offer 'bonus ATAR' marks for schools in rural and remote areas (to encourage higher education) and scholarships for Indigenous students are provided so that they can complete higher education at a university, TAFE, Registered Training Organisation (RTO) or through a cadetship.

Indigenous individuals can further their education through employment incentives, becoming doctors, nurses and health professionals in communities with high Indigenous populations.

Individuals have a responsibility to increase their own level of education and understanding, as well as improve their communities through empowering others to achieve the same.

Socioeconomically disadvantaged people

An individual's socioeconomic status (that is, their level of education, employment and income) is a strong determinant for their level of health. People in lower socioeconomic brackets tend to participate in more risk-taking behaviours; they have increased rates of mortality and morbidity and reduced rates of life expectancy – almost three years less than those in higher socioeconomic brackets (*Australia's health 2016: in brief*, AIHW, p. 183).

Socioeconomic status is determined by income, employment/occupation and education level. Alternatively, it can be determined by an amalgamated method called the Index of Relative Socio-Economic Disadvantage (IRSD) which is used by the ABS during the census conducted every five years. It tracks low income, low educational attainment, high unemployment and jobs in relatively unskilled occupations within areas of Australia.

Nature and extent of health inequities

Socioeconomically disadvantaged people suffer greater burden of morbidity, mortality and a reduced life expectancy. People within this economic group also suffer greater prevalence of chronic illnesses such as CVD, diabetes, mental illness and asthma.

Mortality

If all Australians had the same mortality rate as the top 20 per cent of the high socioeconomic status population there would have been approximately 54 000 fewer deaths between 2009 and 2011. People in socioeconomically disadvantaged areas suffer higher rates of mortality from all causes: almost 29 per cent higher.

- Lung cancer mortality rates were almost 1.6 times higher than those in higher socioeconomic areas.
- Death from CHD was 1.4 times the rate among people in higher socioeconomic areas.
- Preventable or premature deaths were 1.8 times higher in the low socioeconomic group than in the highest group.

Table 2.2 Inequalities in leading causes of death

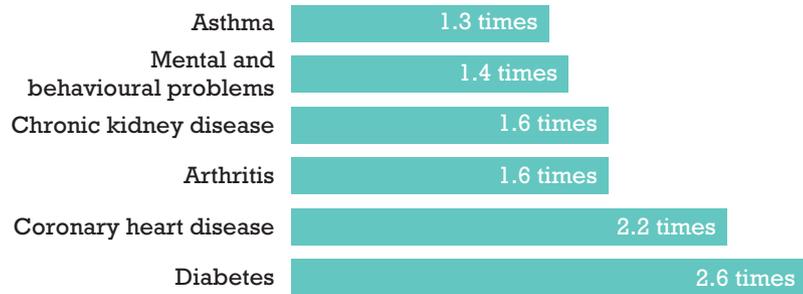
	Year	Lowest socioeconomic group (per 100 000)	Highest socioeconomic group (per 100 000)	Rate ratio: lowest/highest socioeconomic group
Coronary heart disease	2009–11	98	71	1.4
Cerebrovascular diseases	2009–11	46	42	1.1
Dementia and Alzheimer's disease	2009–11	32	34	0.9
Lung cancer	2009–11	40	25	1.6
COPD (Chronic obstructive pulmonary disease)		27	16	1.6
All causes		639	495	1.3
Potentially avoidable deaths		194	105	1.8

Source: *Mortality inequalities in Australia 2009–11*, AIHW, 2014 © Australian Institute of Health and Welfare 2014. Bulletin no. 124. Cat. No. AUS 184. CC BY 3.0 Licence (<https://www.aihw.gov.au/copyright>)

Morbidity

According to the AIHW's 2016 report, when comparing the lowest and highest socioeconomic areas, chronic diseases were more common among socioeconomically disadvantaged people than in the general population.

- Diabetes was 2.6 times higher.
- Coronary heart disease was 2.2 times more common, reflecting poor dietary choices (reduced fruit and vegetables) and increased intake of saturated fat.
- Prevalence of stroke was 2.2 times higher than in high socioeconomic populations.
- Lung cancer was 1.6 times higher, reflecting more smoking among the lower socioeconomic.



Source: *Australia's health 2016: in brief*, © AIHW 2016, p.29. CC-BY 3.0 License (<https://creativecommons.org/licenses/by/3.0/au/>)

Figure 2.5 Socioeconomically disadvantaged morbidity

Infant mortality

According to the MyHealthyCommunities website, infant mortality rates for 2013–15 were higher among the socioeconomically disadvantaged, with 6.1 deaths per 1000 live births compared to 2.6 deaths per 1000 live births in wealthier areas. As an example, in Sydney's North Shore and Melbourne's bayside suburbs, the infant mortality rate was 2.3 deaths per 1000 live births. In the Northern Territory the rate was 7.6 deaths per 1000 live births. The male infant mortality rate was consistently higher than the female rate. The rates for mothers who smoked during pregnancy were significantly higher in socioeconomically disadvantaged areas (33.1 per cent) than high socioeconomic areas (1.8 per cent).

Women in higher socioeconomic areas visited antenatal classes more regularly, almost twice as often as those who were socioeconomically disadvantaged. The percentage of low birth rates was highest for mothers in low socioeconomic areas. While there has been a significant decline in infant mortality due to an increase in pre- and post-natal care, infant deaths most commonly occurred on the day of birth or before the baby reached four weeks of age. There is a link between the infant mortality rate among the socioeconomically disadvantaged, the Indigenous populations and people residing in rural and/or remote locations.

Sociocultural, socioeconomic and environmental determinants

Australians experience a relatively high standard of living. While money cannot buy happiness, it certainly affords good health. According to the OECD, the average Australian household has an approximate disposable income of \$42 000 per year, which is more than the average OECD disposable income of approximately \$37 000. In Australian society, there is a considerable gap between the lowest and highest economic groups, with the highest paid income earners (top 20 per cent) receiving almost five times that of their lowest paid counterparts (bottom 20 per cent).

A total of 72 per cent of the Australian population aged 15–64 years is employed in paid occupations, although almost 10 per cent more men are employed than women. The OECD average is 66 per cent so Australia is performing well in this area.

In terms of education, 77 per cent of adults aged 25–64 years have completed secondary education. A greater number of males complete high school (79 per cent) than females (76 per cent). This was similar to the OECD average of 76 per cent. In regard to quality of education, Australians score slightly higher than the OECD average on the Programme for International Student Assessment (PISA) scale. On average, females outperformed their male counterparts in this testing process.

People in socioeconomically disadvantaged populations are more likely to engage in higher risk-taking behaviours and lifestyle factors that contribute to poorer health outcomes. These include greater use of tobacco products, increased consumption of alcohol (at medium- to high-risk levels) and decreased physical activity, especially among females. Cultural barriers also limit educational attainment and employment in trades which, in turn, can lead to increased injuries. Environmental factors impacting the socioeconomically disadvantaged include: decreased access to primary health services resulting in delayed diagnosis and treatment, increased housing density reducing the quality of living conditions, decreased access to diagnostic services due to financial constraints and greater road mortality rates due to speeding and fatigue on country roads.

Investigate

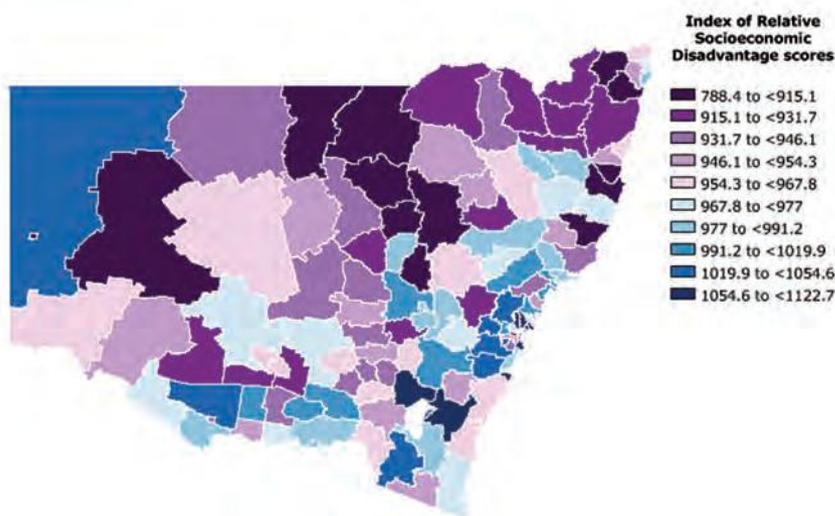
Investigate the UAC selection rank adjustment website, or follow the link.

Navigate through the site and identify how UAC aims to reduce the socioeconomic and environmental determinants for individuals to access a higher education.

- 1 Identify the criteria that make an individual eligible for selection rank adjustment.
- 2 Using your understanding of Indigenous and socioeconomically disadvantaged populations in Australia, explain the reasoning behind the rank adjustment scheme and its relationship to health.



Weblink



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Figure 2.6 Areas of relative socioeconomic disadvantage in New South Wales

Activity

Relative socioeconomic disadvantage

Follow the weblink to explore and investigate the map of New South Wales (NSW) and the Australian Capital Territory (ACT) health areas to identify the complex influence that socioeconomics has on health and the importance of identifying priority population groups.



Weblink

Role of individuals, communities and governments in addressing health inequities

The achievement of good health needs to come about as a joint initiative between individuals, communities and governments.

Individuals

Education is one of the most powerful factors in improving health. It is important for individuals to take responsibility for their own health by gaining the necessary knowledge and understanding to maintain good health, reduce risk factors (such as alcohol consumption, tobacco smoking, inactivity) and increase protection. Useful strategies include:

- taking advantage of immunisation programs
- using QUIT Healthline programs
- using local parks and recreation facilities to engage in physical activity
- following recommendations such as ‘slip, slop, slap, seek, slide’.

Individuals in a family unit can educate each other about health and, in turn, this will increase the health knowledge of their wider community.

Community

It is important for members of a community to engage in health promotion activities if they are to maintain good health. This is particularly important in communities of low socioeconomic status, where the level of education and income may exclude some members from engaging in healthy activities.

Communities can develop strong partnerships with governments and NGOs to increase the resources available for local groups to use and promote health. Examples include communities raising funds and awareness for the Cancer Council by hosting ‘Relay For Life’. Initiating after-hours general practitioner (GP) services reduces the load on hospital emergency services and increases community engagement.

Communities also have a responsibility to implement government policies and legislation within their groups and schools. Implementing the New South Wales Department of Education’s Health Schools Canteen Strategy will improve students’ knowledge about healthy food and lead to better decisions being made in the future.

Government

The Australian government recognises the impact of socioeconomic status on health. It addresses this by providing a universal health care system that covers the basic health needs of all citizens (Medicare). Doctors can bulk bill the full cost of a visit by people who are socioeconomically disadvantaged. In addition, through the Pharmaceutical Benefits Scheme (PBS), prescription medications are subsidised by the government to reduce the financial burden on those in need.

Other government initiatives such as public housing, concession cards and disability pensions are designed to make life more affordable for the socioeconomically disadvantaged.



The elderly

The elderly

See worksheet 2.1, which you can find on your student website, if you wish to study this group and how they experience health inequities.



People with disabilities

People with disabilities

See worksheet 2.2, which you can find on your student website, if you wish to study this group and how they experience health inequities.

Review

- 1 Describe two groups within the Australian population that suffer from health inequalities.
- 2 Outline the mortality and morbidity trends for two groups experiencing health inequities.
- 3 Assess the influence that sociocultural, socioeconomic, and environmental determinants have on the health of the Indigenous population.
- 4 Compare the health status of two Australian priority population groups.
- 5 Analyse the role the government, communities, and individuals have on improving the health status of one priority population group.

HIGH LEVELS OF PREVENTABLE CHRONIC DISEASE, INJURY AND MENTAL HEALTH PROBLEMS

When you have read this section you should have investigated CVD, cancer and one other condition (diabetes, respiratory disease, injury or a mental health problem). This chapter looks in detail at CVD, the three types of cancer, and diabetes.

Cardiovascular disease (CVD)

Nature of the problem

Cardiovascular disease (CVD) is a broad term used to characterise a range of blood vessel and heart diseases such as coronary or ischemic heart disease (angina, heart attack), cerebrovascular disease and peripheral vascular disease. The major causes of CVD are atherosclerosis and arteriosclerosis.

Atherosclerosis

Atherosclerosis is caused by the build-up of fat and/or cholesterol that forms plaque on the interior walls of blood vessels and significantly reduces or blocks the blood supply, thus causing a heart attack (blocked heart vessel) or cerebrovascular disease (blocked blood supply to the brain).

Arteriosclerosis

Arteriosclerosis is a form of atherosclerosis that occurs when the walls of the blood vessels harden and thicken and consequently lose their elasticity, usually resulting from atherosclerosis and the calcification (build-up of calcium salts) of the blood vessel walls.

Coronary or ischemic heart disease

This is the most common form of CVD suffered by Australians. The term encompasses heart attacks (also known as myocardial infarctions) and angina pectoris. A myocardial infarction is the irreversible death (necrosis) of heart muscle resulting from a complete closure or blockage of one or more coronary arteries. Angina pectoris occurs when there is insufficient oxygen being supplied to the heart, causing chest pains. Angina pectoris is not a heart attack but a sign that a person is at greater risk of suffering a heart attack.

Cerebrovascular disease

Cerebrovascular disease is the medical term for a stroke. This occurs when there is a disruption, blockage or bleeding of an artery in the brain. There are two types of cerebrovascular disease: ischemic and haemorrhagic. Ischemic occurs when there is a blockage in the blood vessel and haemorrhagic happens when the blood vessel ruptures, causing bleeding. The effects of a stroke are vast and depend on the areas of the brain affected, duration of the stroke, level of health prior to the stroke and the area of damaged tissue. Hypertension (increased blood pressure) is a risk factor for cerebrovascular disease.

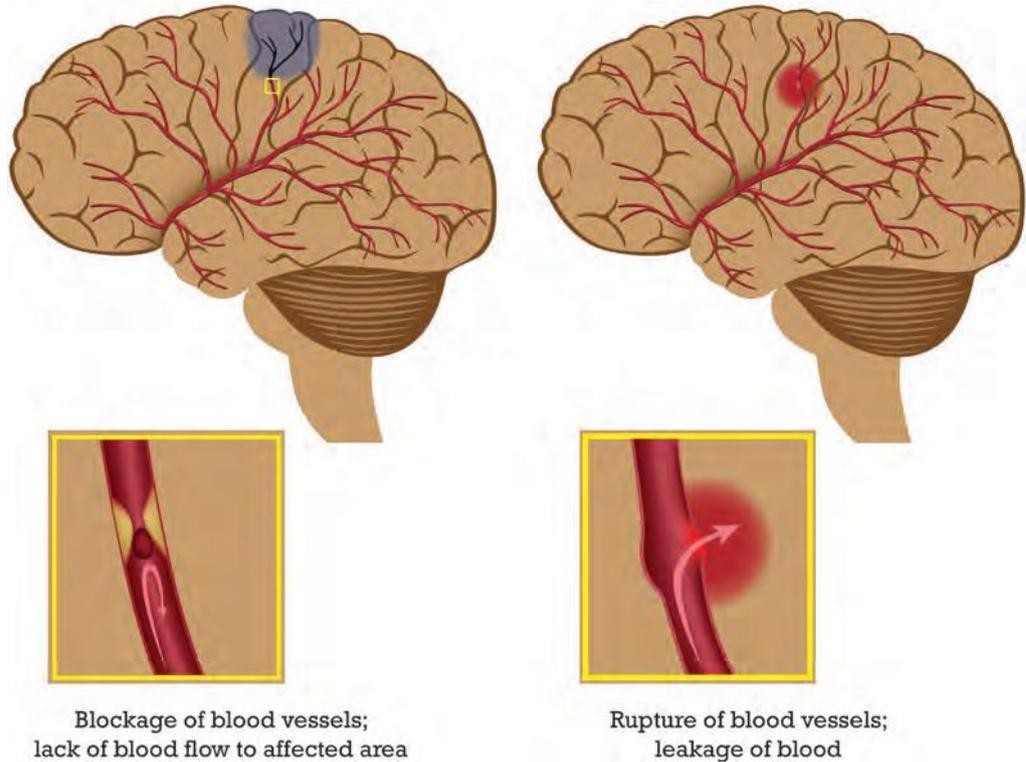


Figure 2.7 Types of stroke: ischemic stroke (left); haemorrhagic stroke (right)

Peripheral vascular disease (PVD)

Peripheral vascular disease is a circulatory disease where blood vessels (arteries and veins) outside the heart and brain narrow and cause blockages that reduce oxygen delivery to areas such as limbs, kidneys and stomach. The main cause of PVD is arteriosclerosis and the blockages or reduced blood supply often result in decaying tissue in extremities such as fingers, toes and limbs. Amputation can often result if this condition is left untreated. PVD has been linked to lifestyle behaviours such as smoking tobacco and lack of physical activity, and is also closely linked to people with diabetes.

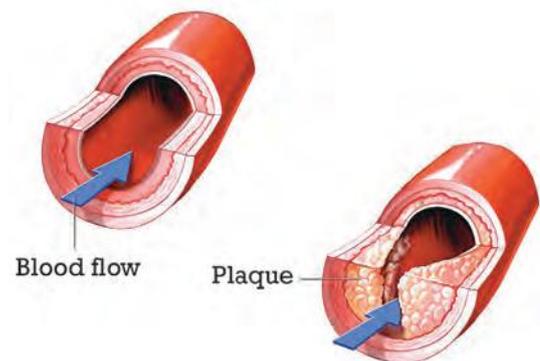


Figure 2.8 PVD (a) normal artery;
(b) atherosclerotic artery

Investigate

Watch the Heart Research Institute's (HRI) video called 'Cardiovascular disease is Australia's (and the world's) number one killer' (10 May 2015). Then answer the following questions.

- 1 Identify the risk factors for CVD.
- 2 How many Australians have CVD risk factors?
- 3 Which chronic diseases contribute to CVD?
- 4 Explain why these chronic diseases directly affect CVD.
- 5 Explain the main concerns of the WHO in terms of CVD.
- 6 Describe the protective factors for CVD.

For further information visit the HRI home page or follow the link.



Behavioural risk factors of heart disease

The main risk factors of heart disease are:

- unhealthy diet, high in saturated fat, salt and sugar
- lack of physical activity
- use of tobacco
- harmful use of alcohol.

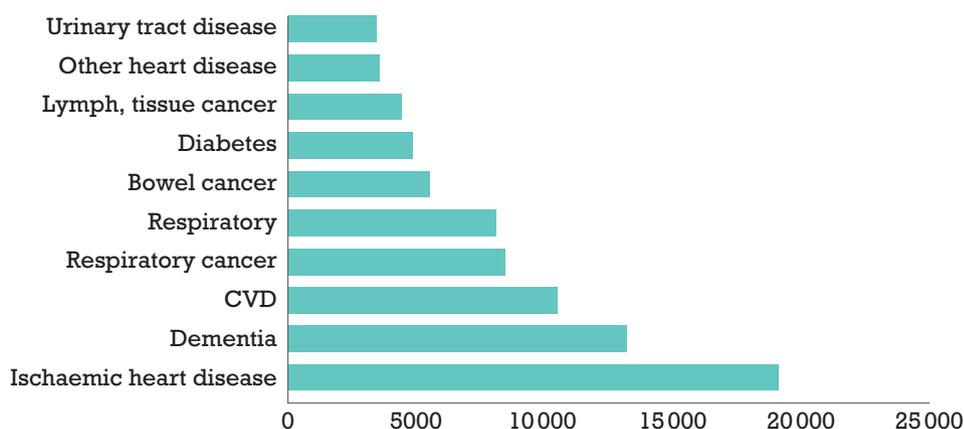
These risk factors may produce the following effects in individuals and may lead to an increased risk of developing a heart attack, stroke, heart failure or other complications:

- high blood pressure (hypertension)
- high blood **glucose**
- raised blood lipids levels
- overweight and obesity.

Extent of the problem (trends)

Mortality

One in three deaths in 2014 were due to CVD (approximately 45 500 people). Despite declining mortality statistics across all age groups for CVD (an approximate 82 per cent decline since 1968), in 2015 it was Australia's second leading cause of death for males and females combined, with CHD accounting for the greatest mortality rates, followed by cerebrovascular disease.



Source: Australian Bureau of Statistics, 3303.0 – Causes of Deaths, Australia, 2016 © Commonwealth of Australia: CC-BY 2.5 Australia license.

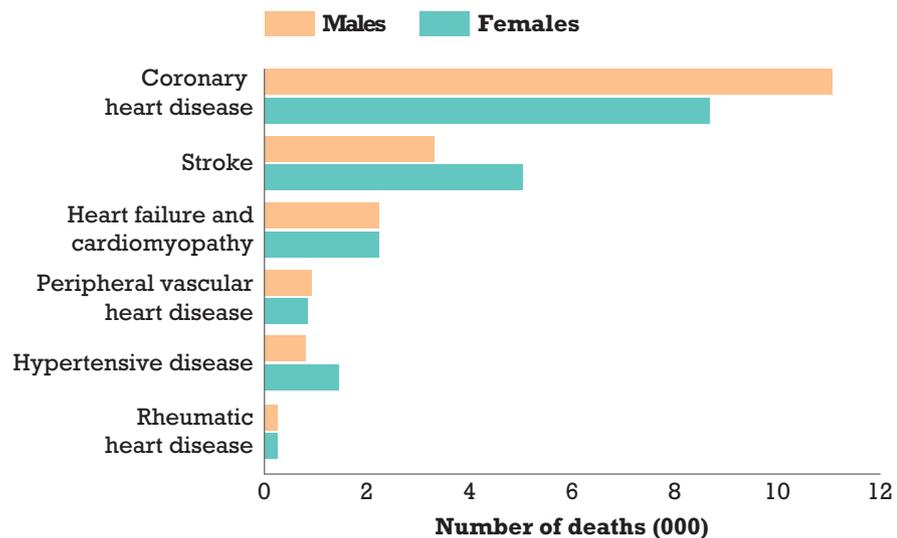
Figure 2.9 Top 10 causes of death in Australia, 2016

The long-term trend for CVD is positive with the mortality rate declining significantly over the last 40 years. This is due to improvements in health literacy, fewer risk-taking behaviours

contributing to CVD and advancements in medical treatments. However, rates are still high for specific subgroups within our society, such as the elderly (after 65 years) and most significantly those aged 85+ years. Males affected by CVD are over-represented in all age groups and geographic locations. As shown in figure 2.12, the more isolated an individual is, the greater the occurrence of mortality caused by CVD.

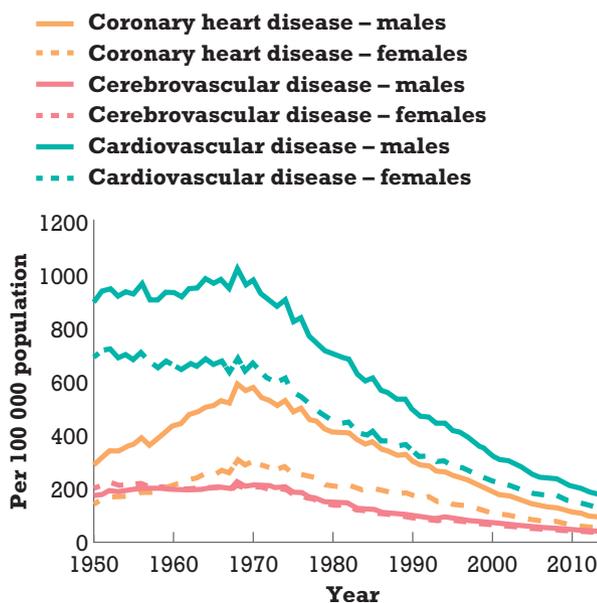
Mortality rates among the socioeconomically disadvantaged and the Indigenous population are also high with both males and females over-represented in both subgroups.

While CVD mortality rates overall are declining, CHD is still the leading cause of death in Australia, accounting for 13.4 per cent of all deaths in 2013.



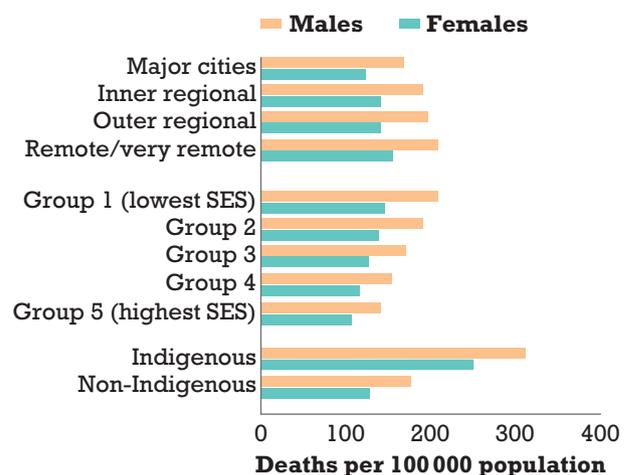
Source: Cardiovascular health compendium, AIHW, updated 2017 CC-BY 3.0 License (<https://creativecommons.org/licenses/by/3.0/au/>)

Figure 2.10 Major causes of CVD death



Source: AIHW Bulletin 141, September 2017 CC-BY 3.0 License (<https://www.aihw.gov.au/copyright>)

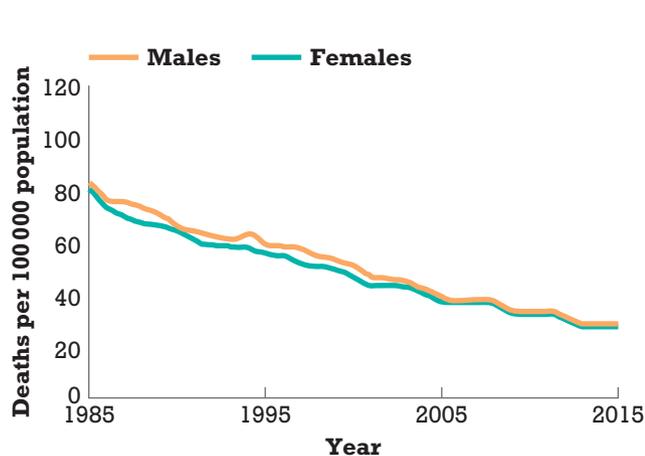
Figure 2.11 Long-term trends in CVD death rates, by sex, 1997–2011



Source: Cardiovascular health compendium, AIHW, updated 2017 CC BY 3.0 Licence

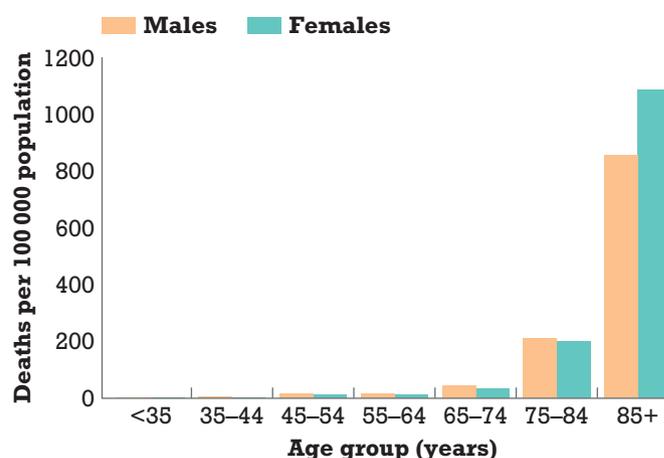
Figure 2.12 Long-term trends in CVD death rates, by location, SES and Indigenous status

The mortality rates for cerebrovascular disease among females are far greater than for males in the 85+ age group. Since 1981 the trend has been declining overall, but it slightly increased and surpassed males in 2010–11. Mortality from cerebrovascular disease is significantly higher in Indigenous populations than non-Indigenous in both males and females.



Source: *Cardiovascular health compendium*, AIHW, 2017 CC-BY 3.0 Licence

Figure 2.13 Trends in stroke death rates, by sex

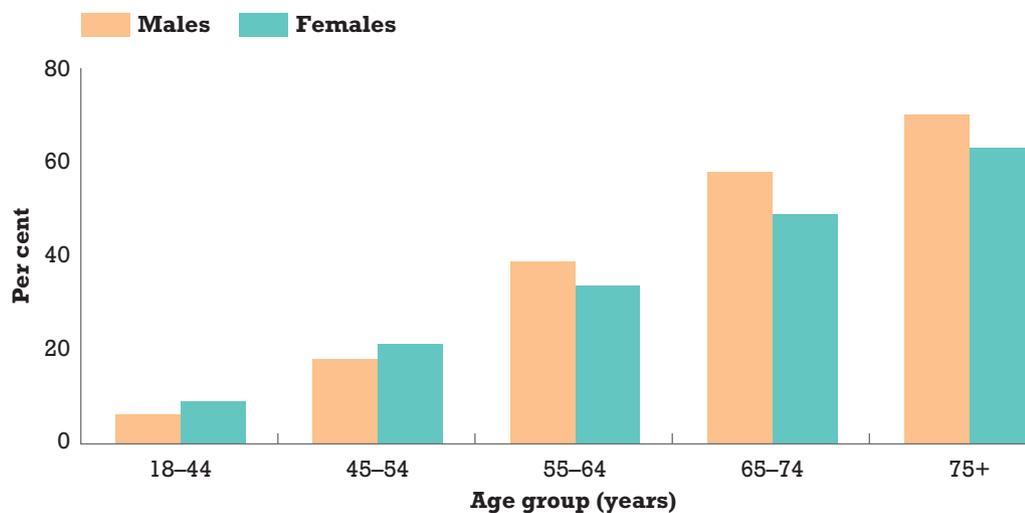


Source: *Cardiovascular health compendium*, AIHW, 2017 CC-BY 3.0 Licence

Figure 2.14 Stroke death rates, by age and sex

Morbidity

A total of 29 per cent of Australian adults suffer from CVD (approximately 3.7 million people) and two-thirds of diabetes sufferers also have CVD (*Australia's health 2016: in brief*, AIHW, Ch. 3). The presence of comorbidities increases with age, especially for CVD. In 2011 almost 70 000 people experienced an acute coronary event, with most of these (63 per cent) occurring in males.



Source: *Cardiovascular health compendium*, AIHW, 2017 CC BY 3.0 Licence (<http://creativecommons.org/licenses/by/3.0/au/>).

Figure 2.15 CVD morbidity rates, by age and sex, 2014–15

CVD also increases in morbidity with age. Approximately half (or 53 per cent) of people aged 65–74 suffer from CVD, as do almost two-thirds of people aged 75 and over.

Australians residing outside a major capital city are at a significantly greater risk of CVD (approximately 26 per cent). One in four people living in regional and rural areas suffer from the condition compared to their metropolitan counterparts where the ratio is one in five.

Indigenous Australians are more likely to suffer from CVD than non-Indigenous Australians (27 and 21 per cent respectively). Approximately one in four Indigenous Australians suffers from CVD and it is more common among females than males (almost 10 per cent higher).

It is estimated that 3 per cent of the Australian population (approximately 645 000) suffers from CHD (2014–15). Of those 645 000, 73 per cent suffered from a heart attack and 27 per cent from angina.

The prevalence of CHD was higher among men than women and increased swiftly with age. The rates for people aged 75 and over were nine times higher than those aged 45–54.

In 2012, approximately 2 per cent of the Australian population had experienced cerebrovascular disease and this was more prevalent in the aged population – almost three in every four people who had suffered a stroke were aged 65. In 2014 there were almost 100 incidences of stroke per day. However, the trend for cerebrovascular disease is declining by almost 27 per cent in four years (2010–14).

Risk and protective factors

There is a range of risk factors that contribute to the increased likelihood of a person developing CVD and most are modifiable. These include: tobacco smoking, high body mass index (BMI), alcohol use, physical inactivity and hypertension.

Tobacco smoking is the single most preventable cause of morbidity and mortality in Australia. The inhalation of the chemicals in cigarettes increases hypertension and the tendency of the blood to clot. Hypertension places undue stress on the heart and coronary arteries and can contribute to increased rates of atherosclerosis. Smokers are five times more likely to develop CVD compared to non-smokers and the risk of CHD and stroke is almost doubled in heavy smokers. The risk of mortality from sudden cardiac arrest is greater among smokers, although this risk decreases when an individual stops smoking.

Having a high BMI is directly linked to increased risk of CVD. People with high BMI generally have higher rates of mortality. This is due to overweight or obese people having ‘at risk’ lipoproteins (blood cholesterol) and triglyceride levels, typically acquired from diets high in saturated fats that damage blood vessels. Having high-density lipoproteins (HDL) at or above 6.5 mmol/L increases a person’s risk of CVD by four. In addition, having a large waist circumference indicates excessive abdominal fat and this is another contributing factor to CVD (substantial risk for males is 102 cm and for females 88 cm). Being overweight or obese is directly linked to diet, physical inactivity and alcohol use.

Four out of five adults with CVD (84 per cent) reported having three or more risk factors at the same time, including 18 per cent with five or six risk factors.

Non-modifiable risk factors for CVD include age (65+ years), family history or genetics, sex, ethnicity, diabetes and socioeconomic status.

A person is at greater risk of developing heart disease if they have a male relative (father or brother) who experienced a heart attack prior to 55 years of age or a mother or sister who suffered one prior to 65 years of age. If both first-degree relatives (both parents) suffered from heart disease before 55 years of age, an individual’s risk of developing heart disease is double that of the general population.

There is an increased risk among females if their mother suffered a stroke. This is slightly higher if a first-degree relative (parent) suffered a stroke at a young age.

Cholesterol, or high cholesterol, is inherited and known as familial hypercholesterolemia. A person who inherits this will experience an increased risk of low-

density lipoprotein (LDL) cholesterol in the blood. This can lead to CHD. There is also a definitive link between hypertension, diabetes and increased risk of suffering CHD and cerebrovascular disease.

Protective factors include eating a healthy nutritious diet low in saturated fats, sugar and salt, and decreased consumption of alcohol, reducing blood cholesterol (<4 mmol/L), regular physical activity (60 minutes a day) and maintaining a healthy blood pressure (120/80±10).

Sociocultural, socioeconomic and environmental determinants

Sociocultural

Sociocultural factors influencing CVD are varied and cannot be attributed to one or a set of factors, but rather an accumulation of influences. Sex has a distinct influence on CVD. Males have higher rates of CVD and this is attributed to masculine behaviours, such as ignoring warning signs and a reluctance to seek or access preventative strategies or medical services. People who have a family history of CVD are more at risk than those who do not. This is particularly prevalent in Indigenous families where family history, socioeconomic disadvantage and residing in remote areas increase the risk associated with CVD. Positive sociocultural factors include the increased exposure and awareness of health promotion campaigns. Non-government and government agencies use the media to encourage people to stop smoking, increase the consumption of fresh fruit and vegetables, and educate people about the warning signs of a heart attack. Increased awareness, education, access to healthy foods and improved food labelling have enabled individuals and families to make informed decisions about the fat and sugar content of their diets.

Socioeconomic

In many areas relating to health, people who are socioeconomically disadvantaged have poorer levels of health, higher levels of chronic disease, less education about implementing protective behaviours, less disposable income to use on preventative health measures and fewer opportunities for employment. All these factors can contribute to ill health. CVD is one of the resulting conditions. Almost 20 per cent of people aged 14 and over in this group smoked and smoking contributes significantly to atherosclerosis, which leads to CVD. This can be attributed to lower levels of education, which can result in poor health literacy and decision-making skills. Another result of lack of education is that 66 per cent of people in low socioeconomic areas had insufficient physical activity levels, leading to 26 per cent being classified as overweight or obese (having a BMI of over 25 and over 30 respectively).

Coronary heart disease and stroke among socioeconomically disadvantaged people was 2.2 times higher than among those in the highest socioeconomic group, with women being twice as likely to suffer CVD than their peers in the highest socioeconomic group, due to reduced physical activity and increased rates of smoking and obesity. Studies have also found that there are links between higher educational achievement and lower blood pressure levels as well as reduced prevalence of hypertension, a known contributing risk factor of CVD. In addition, a link has been established between women's educational attainment and weight loss or gain. Women with low educational attainment were on average 2.1 to 4.4 kg heavier.

Environmental

Time is essential in the diagnosis and treatment of heart attacks and stroke. Therefore, people living in rural and remote regions are less likely to access immediate and timely primary health care to diagnose CVD and receive treatment. People who live in the major cities and inner regional areas of Australia have greater access to **diagnostic** technology, such as ultrasounds and contrast therapy imaging, to assist medical staff in diagnosing and selecting appropriate treatment

to prolong life. Access is also affected by sex with the mortality rate for CVD in males almost double that of females. Males are less likely to use health professionals for preventative health care (blood pressure, cholesterol checks) once a condition such as CHD has manifested.

An added complication is that once the disease manifests and requires medical intervention, those individuals residing in rural and remote regions may have to travel vast distances for treatment in a metropolitan hospital, where there is the appropriate medical technology and personnel (for angioplasty, coronary artery by-pass surgery). As discussed in other areas of this chapter, the poor lifestyle behaviours of some populations residing outside regional areas comprise smoking, alcohol consumption and poor dietary habits – all of which contribute to increased morbidity and mortality through CVD.

Groups most at risk

Certain population groups are at a greater risk of developing, suffering and dying from CVD.

Socioeconomically disadvantaged

This population group has higher rates of mortality for all causes than the highest socioeconomic group. The rate of premature, preventable death was 1.8 times that of high socioeconomic populations. For CHD, the age-standardised mortality rate was 98 per 100 000 in the low socioeconomic population compared to 71 per 100 000 in the high socioeconomic group.

Indigenous Australians

Due to the low socioeconomic status of many Indigenous Australians living in rural and remote areas, this group is at risk. A 2006 study found that 15 per cent of Indigenous Australians lived in very remote areas. In addition, they have higher rates of CVD (27 per cent) than non-Indigenous Australians (21 per cent).

Rural and remote

The rise in occurrence of CVD along with the decreased time for treatment increases the risk for people living in rural and remote locations. This is in addition to the increased rate of smoking and poor dietary habits that are more common among these populations.

Elderly

There are high rates of incidence and mortality in the 65+ and 85+ years age groups.

Review

- 1 Identify the different forms of cardiovascular disease.
- 2 Outline the difference in epidemiology for cardiovascular disease between males and females.
- 3 Describe the nature and extent of cardiovascular disease in Australia.
- 4 Explain the influence of the determinants of health on cardiovascular disease.
- 5 Evaluate the risk and protective factors for cardiovascular disease.
- 6 To what extent is cardiovascular disease a national priority health area?

Cancer (skin, breast, lung)

Nature of the problem

Cancer is a disease affecting the cells of the human body. In a healthy body, cells grow and multiply in a controlled and highly specific, organised manner. Cancer is the uncontrollable, abnormal division and growth of cells. Cancer can develop from virtually any type of tissue cell. Cells affected can be found anywhere in the body and can potentially spread

to different regions. Cancer cells are influenced by the ‘normal’ cells that surround them, which often feed the cancer cells through blood vessels that supply them with oxygen and nutrients until they create their own blood vessels (angiogenesis). When most cancerous cells divide they form a solid mass of tissue known as a tumour. Cancerous tumours are malignant, which means they have the potential to spread to other regions of the body by breaking off and travelling through the blood or lymphatic system (metastasis) or invade nearby tissue. Benign tumours do not spread and are confined to their original mass. When removed, they are unlikely to grow back.

Cancers are classified by the cell type they affect and include:

- carcinoma: develops within the epithelial tissue which lines the body surface and organs, e.g. skin cancer
- lymphoma: develops within the immune system, affecting lymphocytes (leucocyte or white blood cells), e.g. Hodgkin lymphoma
- sarcoma: develops within the connective tissues (bones, muscle, cartilage), e.g. bone and soft tissue tumours
- leukemia: develops within the bone marrow.

Skin cancer

There are three main types of skin cancer: basal cell carcinoma, squamous cell carcinoma and melanoma.

Basal cell carcinoma

This is a non-melanoma skin cancer occurring in the epidermis that develops from high or intermittent exposure to UV radiation from the sun (head, face, neck). Basal cell carcinoma (BCC) is often slow growing.

Squamous cell carcinoma

This is a non-melanoma skin cancer originating in the surface of the epidermis that occurs where the skin has had the most excessive exposure to UV radiation (head, forearms, hands). Squamous cell carcinoma (SCC) develops quickly over weeks/months.

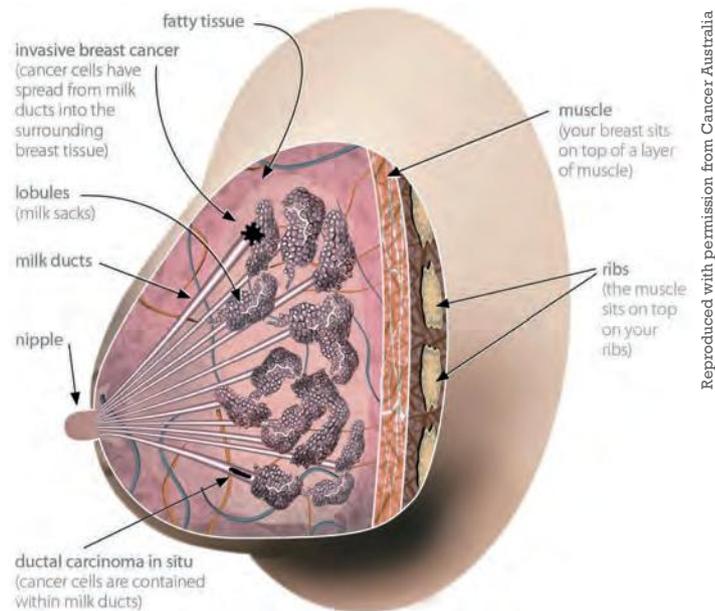
Melanoma

Melanoma is the most serious form of skin cancer. It occurs in regions of the body overexposed to UV radiation from the sun. Melanoma forms in the skin’s melanocytes cells (pigment). It commonly occurs in moles due to the abnormal division of melanocytes within the mole – either outwards (forming irregular shapes) or downwards through the layers of the epidermis.

Breast cancer

Breast cancer is the abnormal growth of cells lining the breast lobules (producing breast milk) or ducts (transporting milk to the nipple). It most commonly occurs in females but can also develop in males.

There are many different types of breast cancer depending on the growth and spread of the cancerous cells. The most invasive form is metastatic breast cancer where the cancer has spread from the breast to other regions of the body.



Reproduced with permission from Cancer Australia

Figure 2.16 Breast cancer sites

Lung cancer

Lung cancer is a malignant cancer that occurs when abnormal cells within the lung (one or both) divide and multiply in an uncontrollable manner. There are four different types of lung cancer.

- Non-small cell is the most common form of lung cancer and includes adenocarcinoma (mucus-producing cells in outer part of lung affected), squamous cell carcinoma (occurs in larger airways) and large-cell undifferentiated carcinoma (cancer not clearly identified as adenocarcinoma or squamous).
- Small cell, which typically occurs in the middle of the lungs and spreads rapidly.
- Mesothelioma affects the pleura (covering of the lung), resulting from exposure to asbestos.
- Mediastinum occurs in the cavity space between the lungs.

Extent of the problem

In 2011, cancer was the leading cause of disease burden in Australia. Lung cancer was attributed to the highest proportion of cancer burden followed by colorectal, breast, prostate and pancreatic cancers.

In 2014, three in every 10 Australians died from cancer-related illnesses and it was predicted that in 2017, 47 753 Australians would die from cancer (131 deaths per day on average). More than half (57 per cent) would be males and more than two-thirds (87 per cent) would be aged 60 years and over. However, the mortality rate for all cancers has decreased from 209 per 100 000 in 1982, to 162 per 100 000 in 2016 and 161 per 100 000 in 2017. A distinct positive is the relative survival rate after diagnosis of cancer. The five-year relative survival rate improved from 40 to 66 per cent for males and from 52 to 68 per cent for females for all cancers. Once a survivor surpassed five years following their diagnosis, the chance of surviving a further five years was 91 per cent.

In 2017 it was estimated that the incidence of cancer in Australia would rise to 72 169 males and 62 005 females (134 174 in total), compared to the 68 936 males and 55 529 females (124 465 in total) diagnosed in 2013. This would equate to approximately 367 people being diagnosed with cancer each day in Australia. It was estimated that 71 per cent of those would be people aged 60 years and over and 54 per cent would be male. In addition, the data predicted that one in two

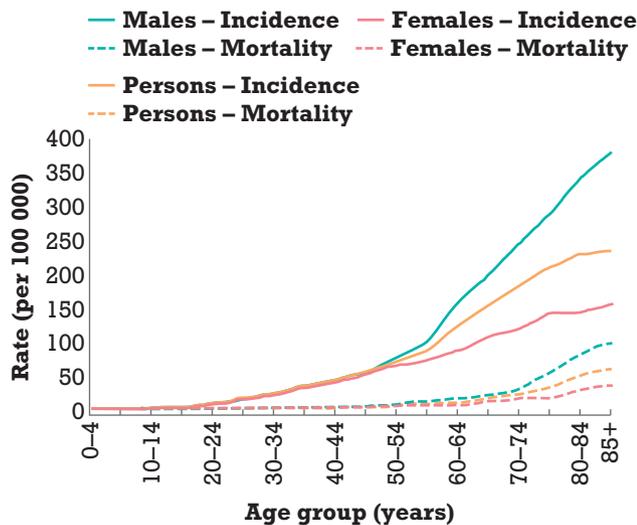
(both males and females) would be diagnosed with cancer by their 85th birthday and the risk of death by their 85th birthday due to cancer was one in four males and one in six females.

In 2017, males would have been most commonly diagnosed with prostate cancer (one in seven risk of diagnosis) followed by colorectal cancer (one in 11), melanoma (one in 13) then lung cancer (one in 14). Females would be most commonly diagnosed with breast cancer (one in eight), followed by colorectal (one in 15), melanoma (one in 21) then lung cancer (one in 23).

Skin cancer trends

Australia has one of the highest incidences of skin cancer in the world – almost two to three times that of the United Kingdom, United States and Canada. In 2014 melanoma was the fourth most commonly diagnosed cancer and the tenth leading cause of mortality in Australia. In its report, *Cancer compendium: Information and trends by cancer type*, the AIHW predicted that melanoma would be the eighth leading cause of mortality in 2017.

Eighty per cent of newly diagnosed cancers are skin related (melanoma/non-melanoma) with most skin cancers caused by exposure to UV radiation (sun). In 2014, 2067 Australians died from skin cancer (600 from non-melanoma and 1467 from melanoma cancer). Two in three Australians will be diagnosed with non-melanoma skin cancer by the time they are 70 years old, equating to more than 750 000 people diagnosed and treated. Non-melanoma skin cancer is more prevalent in males than females, with almost double the incidence rate. General practitioners' reports indicate that more than one million patients per year seek medical assistance for skin cancer. The five-year survival rate for melanoma is 88 per cent for males and 93 per cent for females and, for non-melanoma skin cancer, 68 per cent for males and 75 per cent for females. The mortality rate from melanoma skin cancer increased between 1968 and 2014 by almost 1150 people. Over the same time period, the age-standardised mortality rate increased from 3.3 deaths per 100 000 (1968) to 5.5 deaths per 100 000 (2014).



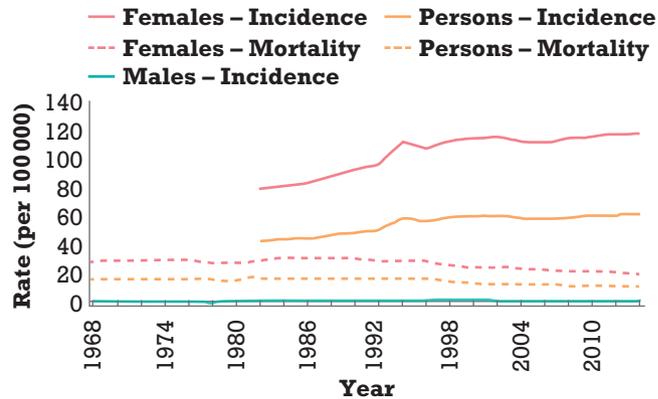
Source: Australian Institute of Health and Welfare 2018. CC-BY 3.0 licence.

Figure 2.17 Estimated age-specific incidence and mortality rates for melanoma skin cancer, by sex, 2017

Breast cancer trends

Breast cancer was the fourth leading cause of cancer death in Australia in 2014 and the second most common cause of death from cancer among females. There were 2844 deaths (2814 females and 30 males) in 2014 and this figure was estimated to increase beyond 3110 in 2017. The age-standardised mortality rate in 2014 was 11 deaths per 100 000 (20 females and 0.2 males), and

this was predicted to remain stable in 2017. The mortality rate for breast cancer increases with age among females but remains steady across all age groups for males. The risk of someone dying from breast cancer by their 85th birthday was one in 76 (one in 41 females and one in 3582 males).



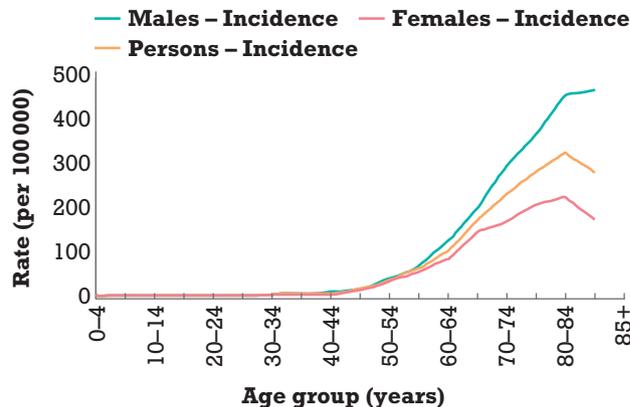
Source: Australian Institute of Health and Welfare 2018. CC-BY 3.0 licence.

Figure 2.18 Estimated age-specific incidence and mortality rates for breast cancer, by sex

In 2013, breast cancer was the second most commonly diagnosed cancer with 16 045 new cases (15 903 in females and 142 in males). The age-standardised incidence rate was 64 cases per 100 000 (123 for females and 1.1 for males). For females, the incidence rate of breast cancer is predicted to increase with age up to 65–69 years and then decline. For males, the prediction is that the incidence rate will remain steady across all ages. In 2017, the risk of an individual being diagnosed with breast cancer by their 85th birthday was one in 14 (one in eight females and one in 715 males).

Lung cancer trends

Lung cancer was the fifth most commonly diagnosed cancer in 2013 and was estimated to remain stable (at fifth) in 2017. Lung cancer was the leading cause of death by cancer in Australia in 2014. A total of 8251 people died from lung cancer and, of that figure, 4947 were males and 3304 were females. The age-standardised mortality rate was 31 deaths per 100 000 (40 males and 23 females). Lung cancer was predicted to remain the most common cause of mortality from cancer in 2017 with an estimated 9021 deaths (5179 males and 3842 females). The age-standardised mortality rate is predicted to remain stable at 31 deaths per 100 000, with 38 for males and 24 for females. The mortality rate for lung cancer will greatly increase with age for both males and females.



Source: Australian Institute of Health and Welfare 2018. CC-BY 3.0 licence.

Figure 2.19 Estimated age-specific incidence and mortality rates for lung cancer, by sex, 2017

In 2013 the lung cancer incidence rate was 11 174 (6627 males and 4548 females), which equates to 9 per cent of all cancer diagnoses. Once a person reaches 85 years of age, the risk of being diagnosed with lung cancer is one in 13 for males and one in 22 for females. The five-year survival rate once diagnosed with lung cancer was 16 per cent (2009–13), which equates to approximately 15 924 Australians living with lung cancer at the end of 2013.

In 2017, 12 434 new cases of lung cancer were diagnosed in Australia, 7094 being male and 5340 female, which equates to 9.3 per cent of all new cancer cases diagnosed in this time period. In 2017, 18.9 per cent of deaths were attributed to lung cancer (5179 males and 3842 females).

Risk and protective factors

A risk factor is any influence associated with increasing someone's chances of developing a certain condition, such as cancer. Risk factors are modifiable (meaning they can be altered) or non-modifiable. Having a risk factor, or multiple risk factors, does not mean a person will develop cancer. It does however increase the 'risk' of developing cancer.

Modifiable risk factors for all cancers include lifestyle behaviours and environmental risks. Non-modifiable factors include inherited genes, age, sex and family history.

Protective factors are actions that enhance health and decrease the risk of disease such as cancer. They are predominantly lifestyle related (avoiding sun exposure, not smoking, engaging in preventative screening).

Skin cancer

Factors that increase the risk of developing skin cancer include:

- age: more than half the population aged over 50 years will develop skin cancer
- sex: skin cancer is more prevalent in males than females
- genetics: certain genetic conditions contribute to increased risk, for example Xeroderma pigmentosum, a condition that prevents the skin from repairing itself after UV damage
- health history: there is increased risk if a family member has already suffered or if there is a history of unusual moles, excessive sunburn causing blistering, or exposure to solariums (solariums emit UVA and UVB radiation, both known **carcinogens**)
- fair complexion: people with fair skin, freckles, blue or green eyes, blond or red hair have increased risk of developing skin cancer.

In Australia, most skin cancers can be prevented through the use of sun protection, which should be used when the UV Index is 3 or higher, or if a person is outdoors for extended periods, or at the snow. The times of the day UV is 3 or higher are published by the Bureau of Meteorology as the sun protection times, which are available on the free SunSmart app, created by Cancer Council Victoria. During these times, five forms of sun protection are recommended, including covering clothing, a broad-brim hat, a broad-spectrum sunscreen SPF30 or higher, sunglasses and shade.



Weblink

Sunsmart

Download and explore the SunSmart app on IOS or Android.



SunSmart app images provided courtesy Cancer Council Victoria, 2018

Figure 2.20 SunSmart app

Breast cancer

Influences related to an increased risk of breast cancer include:

- sex: being female increases the risk
- age: as people age the risk of developing breast cancer increases
- family history: a strong family history of cancer, including the number of family members affected, the age at which diagnosis was made and the side of the family involved
- hormonal factors: post-menopausal (increased oestrogen and androgens associated with higher risk), contraceptive pill (small risk associated with taking this, up to 10 years after ceasing), using hormone replacement therapy for five years or more post-menopause
- menopause: the age at which women experience menopause doubles their risk (55+ years)
- puberty: early onset puberty (<12 years) affects the time exposed to oestrogen and other female hormones.

One of the greatest protective factors for breast cancer is physical activity. Studies have indicated that one and a half to four hours per week of brisk exercise lowers the risk of breast cancer in post-menopausal women. Having children, and a greater number of children, decreases the risk of breast cancer; as does the age at which women bear children. Women who bear children under the age of 30 have a lower risk of breast cancer. Breastfeeding those children for a period of 12 months or more can contribute to a slightly reduced risk of breast cancer. A positive protective factor is engaging in preventative screening, such as self-breast checks and mammograms every two years for women over the age of 50.

Lung cancer

The risk of suffering from lung cancer is increased through:

- smoking: any form of tobacco consumption (cigarettes, cigars and pipes) contributes to an increased risk of lung cancer and this is further increased if a person has been smoking from a young age or smokes/smoked a large amount of tobacco
- exposure to carcinogens: exposure to second-hand smoke (passive smoking), asbestos, workplace substances (arsenic, diesel fumes), air pollution and radon (radioactive gas)
- history: increased risk if there is a personal or family history of lung cancer or diseases specific to the lungs, such as tuberculosis or emphysema
- radiotherapy: increased risk of lung cancer if radiotherapy has been experienced to the chest region
- HIV: there is a link between the HIV virus and lung cancer.

Protective factors that decrease the risk of lung cancer are compelling. In an Australian study on cancer causation, it was estimated that 81 per cent of lung cancers were directly caused by smoking tobacco. Measures to increase protection against lung cancer include: not smoking or quitting smoking, avoiding second-hand smoke and avoiding exposure to carcinogens in the workplace and at home.

Sociocultural, socioeconomic and environmental determinants

Sociocultural

Cancer is complex and it does not discriminate. Sociocultural determinants contributing to cancer include family, peers, media, cultural practices and beliefs, and religion.

Living in Australia has its own cultural concept that often centres around outdoor living. Australians enjoy a consistent climate that affords a lifestyle where exposure to the sun is viewed as an acceptable part of life. Australians enjoy summer days at the beach, outdoor barbecues and activities on the water such as surfing, water skiing and stand-up paddle boarding. All these lifestyle behaviours and choices have led to the increased prevalence of skin cancer in Australia. However, health promotion initiatives and strategies, including media advertising, have helped Australians better understand the risks. More parents and carers are now influencing young people with protective behaviours to reduce the risk of melanoma.

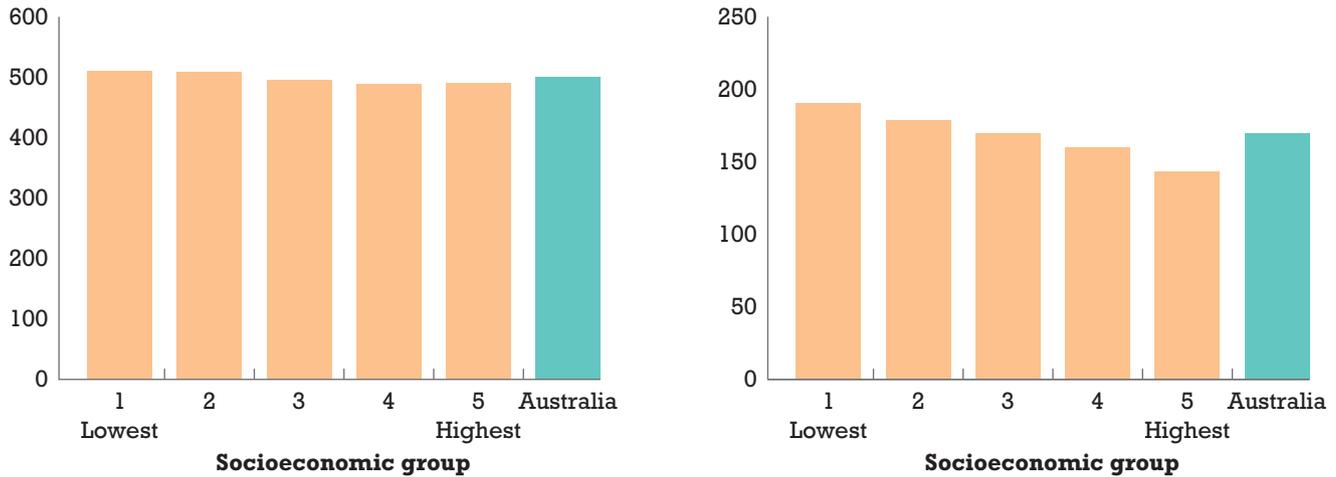
A history of cancer in the family increases the risk of diagnosis. However, genetics are not the sole determinant; others are lifestyle behaviours and sociocultural factors. Having family members or friends who smoke or live a sedentary lifestyle can increase the risk of an individual adopting these negative behaviours and thus developing cancer. People who live in remote areas of Australia tend to engage in risky health behaviours (such as smoking, heavy alcohol consumption and poor nutrition) at higher rates.

Socioeconomic

People residing in remote areas of Australia are often disadvantaged in relation to educational and employment opportunities. The mortality rate for all cancers combined is highest among Australians living in socioeconomically disadvantaged areas and lowest for those residing in the most socioeconomically advantaged areas (190 per 100 000 and 143 per 100 000 respectively). Socioeconomically disadvantaged Australians are at an increased risk of death from cervical cancer (2.4 times more likely), lung cancer (1.7) and colorectal cancer (1.3) than their socioeconomically advantaged counterparts. The incidence rate for all cancers is also greater in socioeconomically disadvantaged groups. People who are socioeconomically disadvantaged are more likely to be diagnosed with lung cancer (1.7), cervical cancer (1.4), and pancreatic or bladder cancer (both 1.2). People in the socioeconomically advantaged group are more likely to be diagnosed with melanoma, prostate and breast cancer (in females).

Environmental

A person's place of residence has a large influence on the effect of risk factors, diagnosis and treatment of cancer. Australians living in rural and remote areas are significantly disadvantaged in regard to accessing primary health services. Statistical information confirms that cancer is more commonly diagnosed (due to greater access to medical services) in inner regional areas compared to remote areas of Australia (516 per 100 000 and 462 per 100 000 respectively). Living in remote areas increased the prevalence of lung, cervical, unknown primary site and bladder cancer, whereas inner regional areas and major cities had higher diagnoses of melanoma, prostate, kidney and colorectal cancers. Mortality rates for all cancers was highest in very remote areas (188 per 100 000) and lowest in major cities (162 per 100 000).



Source: *Cancer in Australia*, AIHW, 2017, p. 73 © Australian Institute of Health and Welfare 2017. CC-BY 3.0 licence.

Figure 2.21 (a) New cases, 2008–12; (b) number of deaths for all cancers combined, by economic disadvantage, 2010–14



Source: *Cancer in Australia*, AIHW, 2017, p. 72 © Australian Institute of Health and Welfare 2017. CC-BY 3.0 licence.

Figure 2.22 (a) New cases per 100 000, 2008–12; (b) deaths per 100 000 for all cancers combined, by remoteness area, 2010–14

Groups at risk

The following population groups are at a higher risk of developing cancer:

- Indigenous people: three Indigenous Australians are diagnosed with cancer every day. While this group has a lower rate of cancer diagnosis, they are 30 per cent more likely to die from cancer than non-Indigenous Australians. Indigenous Australians suffer higher rates of lung, liver and uterine cancers.
- Socioeconomically disadvantaged: there are higher mortality and incidence rates for all cancers in this group.
- People residing in rural and remote locations: the more remote the population is, the higher the rates of mortality are.
- People from cultural and linguistically diverse backgrounds: this is due to difficulties in accessing primary health services as well as cultural barriers to diagnostic services and treatments, such as pap smears and mammograms.

Review

- 1 Identify the different types of cancer.
- 2 Describe the process of cell division in regard to cancer.
- 3 Describe the nature and extent of cancer.
- 4 Explain the risk and protective factors for cancer.
- 5 Analyse the contribution made by determinants of health on cancer.
- 6 Justify cancer as a national health priority area.

Diabetes

Nature of the problem

Diabetes mellitus is a chronic health issue where the pancreas is unable to produce insulin (the hormone that controls blood glucose levels) or use insulin effectively and sometimes both of these occur. Without insulin, or the effectiveness of insulin, the body cannot transform glucose into energy. Rather than being converted, the glucose remains in the blood resulting in high blood glucose. Blood glucose levels are referred to as glycaemia (hypoglycaemia or hyperglycaemia). There are three main types of diabetes.

- **Type 1:** autoimmune disease usually diagnosed in childhood. The immune system is activated to destroy the cells within the pancreas, which produce insulin.
- **Type 2:** where the body becomes resistant to the effects of insulin and/or cannot produce enough insulin for the demand.
- **Gestational diabetes mellitus (GDM):** when, during pregnancy, there is an increased rise in blood glucose levels. This typically only lasts for the duration of the pregnancy.

Hypoglycaemia, sometimes called a hypo or low, is a condition that occurs when a person's blood glucose level (BGL) has dropped below 4mmol/L. Hypoglycaemia only occurs in people who take insulin. Hyperglycaemia indicates a high blood sugar level and develops over hours, even days. Ketoacidosis occurs when the body has insufficient insulin and the body's cells cannot use glucose for energy. To make up for this, the body begins to burn fat for energy instead. This leads to accumulation of dangerous chemical substances in the blood – called ketones – that also appear in the urine.

Diabetes is commonly a comorbidity factor of other chronic health conditions (such as heart disease and, kidney disease) and can result in blindness and limb amputation, typically lower limbs. Approximately 4400 diabetes-related amputations are performed every year in Australia and this is the second highest rate in the developed world.



Weblink

Investigate

Follow the link to the Diabetes Australia website and read the recommendations for people who have to live with diabetes.

Extent of the problem (trends)

The ABS National Health Survey 2014–15 estimated that 5.1 per cent (or 1.2 million) Australians had diabetes (self-reported data). Type 2 was the most common (accounting for 85 per cent) and 15 per cent had Type 1. The ABS acknowledged, based on statistical data, that for every four adults diagnosed with diabetes there would be one adult suffering from diabetes but not diagnosed. Ten per cent of all deaths in Australia in 2013 were attributed to diabetes. These mortality rates have been consistently stable since 1997 with age-standardised rates of 52–62 deaths per 100 000 people per year. Females were 1.6 times more likely to die from diabetes than males and most deaths occurred in people aged 65 years and over (88 per cent). Diabetes is attributed as an underlying cause of different classifications of death, including CHD (23 per cent of deaths) and stroke (6 per cent).

While more females died from diabetes than males, males have a higher prevalence (6 per cent males and 4 per cent females). Approximately 68 per cent of people living with diabetes also had the comorbidity factors of CVD and/or chronic kidney disease. In 2013–14 approximately 930 000 people were hospitalised with diabetes or diabetes-related conditions, accounting for 9 per cent of all hospitalisations. Five to ten per cent of pregnant women develop GDM in the 24th–28th week of pregnancy.

Risk factors and protective factors

Type 1 diabetes is a genetically inherited illness and therefore has very limited risk and protective factors.

Type 2 diabetes risk factors are well established. Age is a strong contributing risk factor to developing type 2 diabetes because people over the age of 40 have increased risk, especially if they are also overweight or hypertensive. Indigenous Australians aged over 35 also have an increased risk. Lifestyle behaviour such as physical inactivity, combined with being overweight or obese (as a result of poor nutrition habits) is another significant contributing risk factor. Family history of type 2 diabetes is also a major risk factor. Mothers who give birth to a baby that weighs more than 4.5 kg or had GDM when pregnant have an increased risk of developing type 2 diabetes. Females who suffer from polycystic ovary syndrome (PCOS) also have an increased risk of type 2 diabetes.

Risk factors for developing GDM include: having a family history of type 2 or gestational diabetes; being overweight when pregnant; descending from the following cultures: Indigenous, Vietnamese, Chinese, Polynesian, Melanesian and Middle Eastern; having had GDM in previous pregnancies; or suffering from PCOS.

Protective factors for type 1 diabetes are: regular insulin injections (sometimes up to six times per day) or appropriate use of insulin pump; regular monitoring of blood glucose levels; eating a healthy diet (usually specific for diabetics) and engaging in regular exercise.

Protective factors can delay and sometimes prevent the onset of type 2 and gestational diabetes. If family history is a known risk factor, then reducing weight (particularly waist measurement) decreases the likelihood of developing diabetes. In conjunction with this, eating a healthy, well balanced, nutritional diet will assist in managing blood glucose levels, keeping them within the acceptable range (4–6 mmol/L). Exercising regularly will reduce and prevent weight gain, reduce blood pressure and also improve the effectiveness of insulin. Avoiding or quitting smoking will also decrease the risk of developing type 2 diabetes.

Sociocultural, socioeconomic and environmental determinants

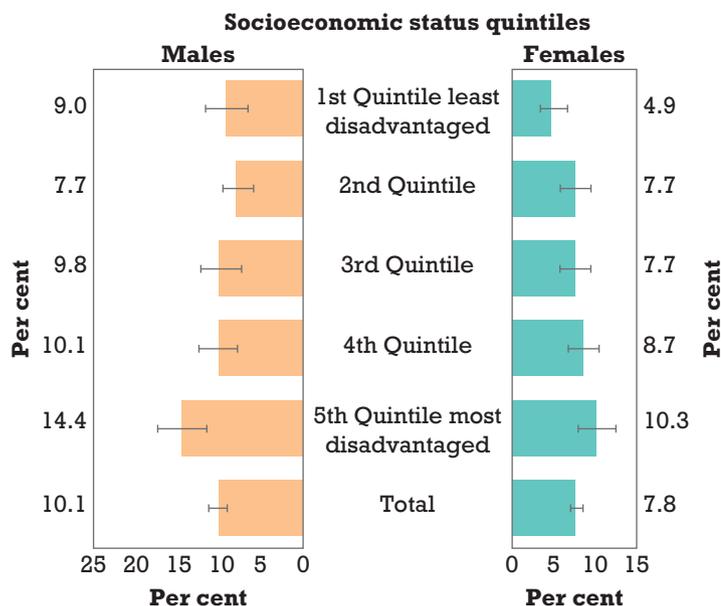
Sociocultural

Influences that impact on an individual's risk of developing diabetes include: culture, family, media and religion. Families that engage in poor lifestyle behaviours increase their own and their dependants' risk of developing type 2 diabetes. Poor diet, smoking and sedentary lifestyles increase

the risk to the parent/carer but also influence the choices of the children in their care, increasing the likelihood of them repeating behavioural patterns when they are older. Individuals who engage in isolated or social binge drinking are at increased risk of diabetes due to resultant weight gain and hypertension. Certain cultures have a greater risk of developing diabetes, particularly GDM (see risk factors) and type 2 diabetes. These include Chinese, Indian, Pacific Islander and Indigenous cultures. Being of Indigenous culture increases the risk of type 2 diabetes diagnosis by 30 per cent.

Socioeconomic

As discussed earlier in the chapter, socioeconomics (level of education, level of employment and income) has a large influence on either the prevention or development of type 2 diabetes. People with lower socioeconomic status are at higher risk of developing diabetes. This is primarily due to a lower level of education and, therefore, a lesser understanding of healthy eating and exercise habits. These individuals typically engage in poor diets, are more likely to smoke, have increased alcohol consumption and be physically inactive, all of which are contributing risk factors for type 2 diabetes. Lower levels of formal education mean the socioeconomically disadvantaged are less aware and/or likely to engage in health promotion initiatives aimed at reducing the risk factors for diabetes.



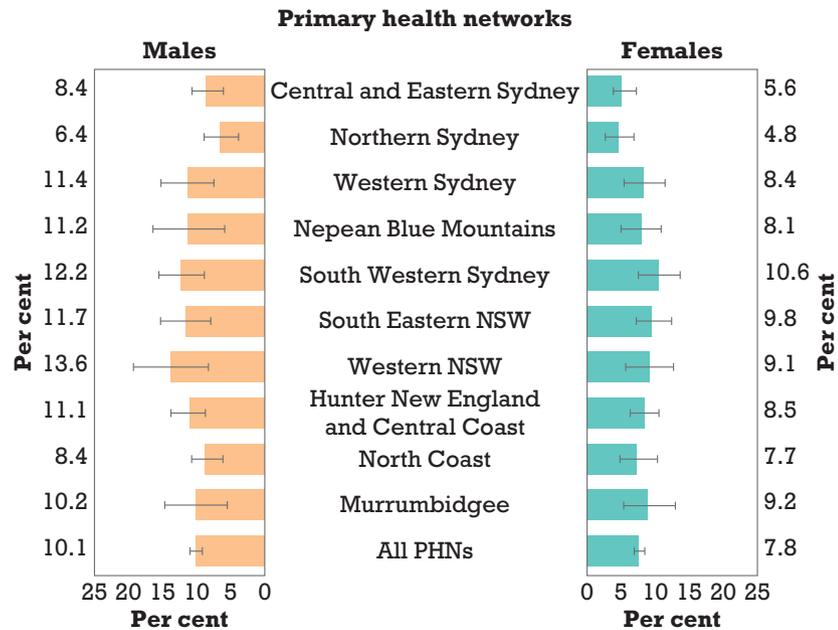
Source: <http://www.healthstats.nsw.gov.au>. Reproduced by permission, NSW Health © 2018

Figure 2.23 Diabetes rate by socioeconomic status and sex, adults 16 years and over. Each quintile represents 20 per cent of the population.

Environmental

People who reside outside Australian major cities are more likely to be diagnosed with type 2 diabetes. This is related to the socioeconomic status of people in rural and remote areas, as well as their cultural and ethnic diversity. In Australia, 43 per cent of Indigenous people live in regional areas while 25 per cent reside in remote regions of the country. Living in rural and remote areas decreases access to primary health services for consultation, information and monitoring of risk factors such as weight, hypertension and blood glucose levels. In addition, access and resources for pregnant mothers is reduced with many having to travel enormous distances for pre-natal care. This may influence their level of care, access to the Oral Glucose Tolerance test for GDM and monitoring for warning signs during pregnancy. Access to specialist health services and the necessary pharmaceuticals for people living with type 1 and type 2 diabetes may also be reduced.

This influences the appropriate management of diabetes, which could influence comorbidity factors such as CHD and kidney diseases. Some diabetics need to monitor their glucose levels and inject insulin six times a day. This requires medical equipment and resources to which living in a remote region may have reduced access.



Source: <http://www.healthstats.nsw.gov.au>. Reproduced by permission, NSW Health © 2018

Figure 2.24 Diabetes by age and sex, 16 years and over

Groups at risk

Indigenous Australians are 3.5 times as likely as non-Indigenous Australians to have diabetes. Indigenous Australians are four times more likely to die from diabetes and four times more likely to be hospitalised as a result of having the disease.

People residing in rural and remote areas are 1.9 times more likely to die from diabetes and 1.8 times more likely to be hospitalised compared to those living in major cities.

Individuals who are socioeconomically disadvantaged are 3.6 times more likely to be diagnosed with diabetes, 1.8 times as likely to be hospitalised and twice as likely to die from diabetes compared to those in the highest socioeconomic populations.

Review

- 1 Describe the extent of diabetes in Australia.
- 2 Outline the risk and protective factors for diabetes.
- 3 Compare the different types of diabetes.
- 4 Explain the groups most at risk of diabetes in relation to the determinants of health.
- 5 Justify the inclusion of diabetes as a national health priority area.



Weblink



Respiratory disease

National Health Priority Areas

If you have chosen respiratory disease as one of your two options, go to your student website and find worksheet 2.3. Follow the weblink to the Garvan Institute to see a synopsis of all the National Health Priority Areas.

A GROWING AND AGEING POPULATION

Healthy ageing

It is important that as people age, they promote and maintain a healthy lifestyle to delay or prevent illness. Healthy ageing means that throughout all the different life stages, illness is prevented or effectively treated. The national aim is for people to age without increasing the demand on health care services and systems. This is being promoted to individuals and communities throughout the states and territories of Australia.

Ways of ensuring healthy ageing include:

- increasing health literacy and educating the population regarding good health practices (e.g. five fruit and two vegetable campaign to encourage healthy eating and the national physical activity guidelines)
- engaging in preventative health promotion initiatives such as 'slip, slop, slap, seek, slide' (to avoid skin cancer)
- encouraging the use of preventative screening such as mammograms (breast cancer), regular blood pressure and cholesterol checks (CVD)
- using medical technologies to diagnose chronic conditions to minimise impact (diabetes).

When older Australians are healthy the country can benefit from their ongoing contribution to the workforce. When they enjoy good mobility they are more able to contribute positively to community initiatives and activities. Prolonged good health can result in fewer acute illnesses and/or disabilities and delay the onset of chronic conditions, thus increasing social and emotional wellbeing.

More people with chronic disease and disability

Increased life expectancy can result in greater numbers of older Australians living with chronic illness or disability. Australia's population continues to age (one in seven people were aged 65+ in 2016) and the AIHW has predicted that this older generation will double by the year 2057, placing a greater strain on health and welfare systems and services.

In 2012, 51 per cent of males and 54 per cent of females aged over 65 had some form of disability, with that proportion increasing dramatically once people reached the age of 85 (80 per cent of males and 82 per cent of females).

Cancer and CVD were the leading causes of burden for the ageing population, followed by neurological conditions, musculoskeletal conditions, then respiratory conditions. These conditions were the same across the sexes but occurred in a dissimilar order.

- Males: cancer, CVD, respiratory, neurological and musculoskeletal conditions.
- Females: CVD, cancer, neurological, musculoskeletal and respiratory conditions.

Due to the increased population living with chronic diseases, in 2017 the Australian Department of Health established a framework to implement policies, strategies and services to reduce the impact chronic conditions have on Australians and the Australian health care system. This framework is shared between the federal government, state and territory governments and aims for **intersectoral** collaboration and improved health outcomes. The framework has three main objectives:

- 1 Focus on prevention for a healthier Australia.
- 2 Provide efficient, effective and appropriate care to support people with chronic conditions to optimise quality of life.
- 3 Target priority population groups.

Demand for health services and workforce shortages

With an ageing population and increases in chronic disease, the burden placed on the Australian health care system and services will increase. Current health services in the aged sector include: medical, specialist and other health professionals; hospitals, nursing homes and residential aged care centres: respite and support services; and community-based aged care programs.

Health services

Visits to medical professionals by people aged 65+ years have increased rapidly since 2005. This population group accounted for approximately 6.2 million Medicare claims for GP services (5 per cent of GP usage among the total population). Those aged people living in residential care (excluded from the previous data) made up 9 per cent of the total Medicare claimed services in 2014–15.

In 2013 there were 1.4 million emergency department (ER) presentations by people aged 65 years and older, accounting for 20 per cent of the total number of ER presentations for the Australian population. More than 58 per cent of those presenting were triaged as an 'emergency' and received treatment within 10 minutes of presentation. Patients admitted overnight commonly presented with diseases of the circulatory system, injury and poisoning. The main reasons for same-day hospitalisation of aged patients were dialysis, **rehabilitation** services, radiotherapy, chemotherapy and **palliative care**.

Another important responsibility for governments is the increasing number of older people who will require dental services, with almost half requiring partial or full dentures after the age of 65 years. Maintaining good oral health is an important consideration in the overall health of the ageing population. Of people aged 65 years and over, 42 per cent wore partial or full dentures in 2013 and more than 53 per cent of the aged population reported using dental services (*Oral health and dental care in Australia: key facts and figures 2015*, AIHW 2016).

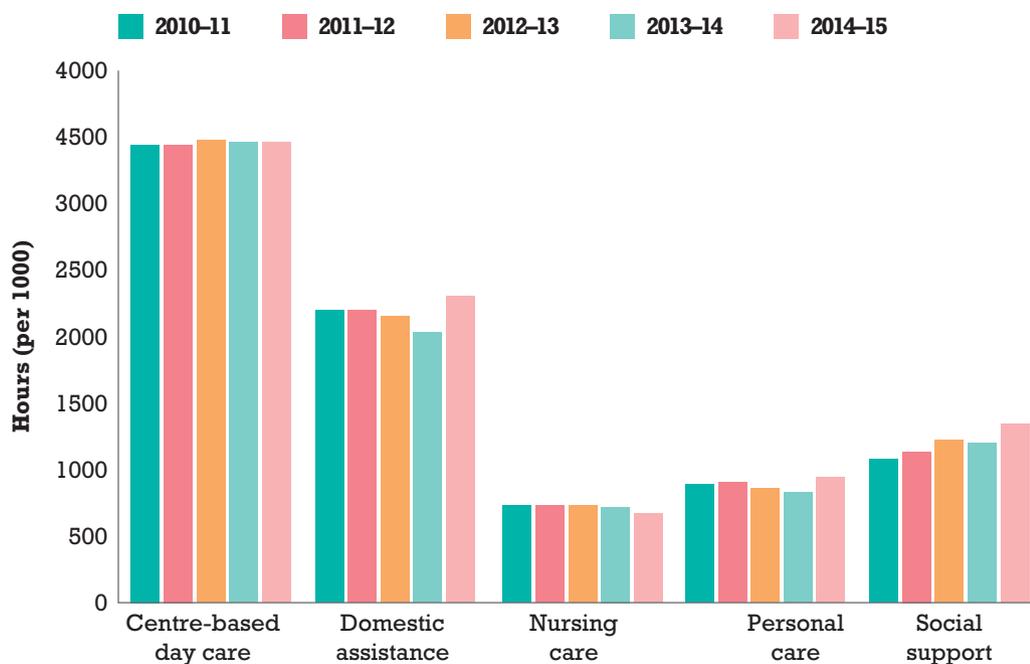
Aged care

The government created the Commonwealth Home Support Program (CHSP) to provide basic aged care services to those still residing at home. The goal is to increase independence, maintain living standards and allow people to remain in their home as long as possible. This program amalgamated and replaced the Commonwealth Home and Community Care Program (HACC) in 2015. In its last five years of operation the HACC reported small changes to the types of services used.

Home Care (the home care packages program) assists older, frailer people to remain at home in a safe environment. Care packages are individually based on a needs analysis and provide a complex level of care to assist the elderly to live independently at home. The average age of a person receiving a Home Care package was 82.5 years in 2015 and 86 300 aged people received a Home Care package.

In 1992 the government launched the Community Aged Care Packages (CACPs) program, which provides people in their homes with household duties (laundry), household maintenance and horticultural services (among others). The number of aged people accessing this program has risen significantly, doubling since 2005.

Residential aged care provides permanent accommodation for those people unable to care for themselves in their home environment, or short-term accommodation to give their carers some respite. In 2015, 97 per cent of residents in care were 65 years and older; 224 000 of those were in permanent care and 51 400 used the respite residential program. The number of residential places available has risen by 18 per cent to cater for the ageing population living with chronic conditions that require additional care and assistance.



Source: *Older Australians at a glance*, AIHW, 2017, p. 62 © Australian Institute of Health and Welfare 2017. CC-BY 3.0 licence.

Figure 2.25 Selected home and community care services support received by people aged 65+, per 1000 people (hours)

Workforce shortages

In 2013 there were approximately 216 300 workers in residential care services, predominately in aged care. More than 80 per cent of these workers were female and nearly half were employed on a part-time basis. In the past, the residential care sector has experienced difficulty in securing workers due to low pay rates and the absence of secure employment opportunities.

The Department of Health and Ageing estimated that the current workforce in aged care would need to increase threefold to meet the health care services demands in 2050. Increasing the challenge for the government and private health organisations is the need to meet these labour force demands with fewer work-aged people available in the population pool and difficulties retaining workers. According to Health Workforce Australia (now NSW Health), nurses and nursing staff will be in particular demand with an estimated shortage of 100 000 nurses by the year 2025.

In 2009, COAG created Health Workforce Australia (HWA) to research and seek solutions to the many barriers to the health workforce and recommend changes required to cater for future health requirements of Australia.

Availability of carers and volunteers

In Australia, 2.7 million people care for a family member, friend or neighbour suffering from a chronic health condition. These caring services range greatly and include personal care services (meals, cleaning, showering, toileting); transport; and assistance with shopping or medical appointments. Most carers are female (1.5 million) and aged between 25 and 64 (67 per cent) with 11 per cent of carers aged less than 25 years of age. Most of those carers (71 per cent) live with the individual requiring care and assistance.

When a person is responsible for most of the personal care being provided, they are classified as the 'primary carer'. Nearly two-thirds of primary carers aged 25–64 find it increasingly difficult and stressful to meet the everyday living costs required for themselves

and the person they are caring for. This is because approximately 50 per cent of carers are classified as low-income earners.

In 2010, 6.1 million Australians volunteered their time to an aspect of community life such as sport, emergency services, school and aged care. In that time, 18 per cent of men and 25 per cent of women were directly engaged in volunteer work for welfare and community services.

With the shortage of paid carers in the health and welfare sector, the reduced number of available carers for the growing ageing population, along with the increase in chronic disease morbidity among the general population, the challenge for future generations will be to meet the increasing demand to care for the aged. Challenges will include meeting the financial hardship that carers experience. Maintaining emotional and mental wellbeing will be important because caring can be highly taxing, both physically and psychologically. Carers often ignore their own poor health with 40 per cent of them suffering from a chronic illness, some often linked to their carer role (such as depression or joint pain).

CHAPTER SUMMARY

- **Indigenous Australians** and the **socioeconomically disadvantaged** are specific subgroups within our population that experience greater levels of health inequalities.

Indigenous Australians

- Indigenous Australians have a lower life expectancy, increased mortality rates for cardiovascular disease (CVD), cancer, injury, metabolic diseases, diseases of the respiratory system and digestive diseases. Their mortality rates are reducing in CVD, respiratory diseases and for external causes.
- They suffer approximately twice the burden of disease of non-Indigenous people in areas such as CVD, cancer, diabetes, kidney disease and injury.
- The infant mortality rate is twice as high as for non-Indigenous people.
- Factors contributing to their ill health include smoking, alcohol consumption, lower levels of academic attainment, lower disposable incomes, fewer employment opportunities, residential isolation and lack of access to primary health care services.
- The Closing the Gap campaign set specific targets to reduce the inequities experienced by the Indigenous population: to reduce infant mortality, increase life expectancy, increase school attendance and academic attainment, improve literacy and numeracy and reduce socioeconomic disadvantage.

Socioeconomically disadvantaged

- The socioeconomically disadvantaged suffer higher rates of mortality for lung cancer, coronary heart disease and premature death.
- They have a greater burden of disease for diabetes, coronary heart disease, stroke and lung cancer.
- Poor health is made worse by less disposable income, lower levels of education, higher rates of smoking and increased risk-taking behaviours.

CVD

- One in three deaths are caused by CVD, but mortality rates declining (although still high among Indigenous and socioeconomically disadvantaged people).
- Approximately 30 per cent of Australians suffer from CVD and the risk increases with age and geographic location.

- Modifiable risk factors for CVD include smoking, having a high BMI or waist circumference, high cholesterol, abdominal fat and a diet high in saturated fats. Non-modifiable risk factors include age (65+), sex (males more than females), genetics/family history.

Cancer

- Cancer (breast, skin and lung) places a high burden on Australian health services. Lung cancer is worst, followed by colorectal, breast, prostate and pancreatic cancer.
- Three in every 10 Australians will die from cancer-related illnesses.
- Australia has one of the highest incidences of skin cancer in the world.
- Each cancer has a specific set of risk factors but common non-modifiable risk factors for cancer include age, sex and genetics.
- Indigenous people, the socioeconomically disadvantaged, people in rural and remote locations, and people born overseas are at a higher risk of developing cancer.

Diabetes

- There are three types of diabetes mellitus: type 1 (autoimmune), type 2 and gestational.
- Ten per cent of the mortality rate is attributed to diabetes, with females dying at a higher rate than males. Males suffer higher rates of morbidity than females.
- Diabetes is a comorbidity factor for CVD and chronic kidney disease.
- Non-modifiable risk factors include genetics, age and ethnicity. Modifiable risk factors for type 2 diabetes include increased weight, reduced physical activity and poor nutrition.
- Indigenous Australians, people living in rural and remote locations and the socioeconomically disadvantaged are at a greater risk of developing diabetes.

Ageing

- Australia has an ageing population with more than half of the elderly suffering from chronic illnesses. Cancer and CVD are the leading causes of burden in the aged population.

CHAPTER REVIEW ACTIVITIES



Extra
exam-style
questions

- 1 **Describe** healthy ageing.
- 2 **Outline** the extent and trends of the aged population living with chronic illnesses and disabilities.
- 3 **Compare** the determinants of health for an aged person (65+) and an individual in their 30–40s.
- 4 **Explain** the variety of care available for the aged population living with chronic illness.
- 5 **Assess** the impact the ageing population has on the health care system.



CHAPTER 3

Role of health care facilities and services

Health care in Australia

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Complementary and alternative health care approaches

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HEALTH CARE IN AUSTRALIA

When you have read this section you should be able to evaluate health care in Australia, discuss issues of access, and assess whether care is adequate.

Health care services are available to all Australian citizens. However, the level to which they are accessed varies depending on the availability and cost involved, as well as on a person's socioeconomic advantage or disadvantage, level of disability or illness, knowledge of services and more.

Health services in Australia are both public and private. Public health services are funded federally via the Medicare scheme and each state is responsible for their allocation and administration. Private health services vary greatly in the type of medical specialty provided.

While improvements are definitely made in the prevention of illness, disease and death, the Australian health system is focused predominately on diagnosis and treatment. This is supported by the health budget, which was \$170.4 billion dollars in 2015–16, 3.6 per cent higher than in 2014–15.

Range and types of health facilities and services

Health services in Australia are organised into two categories: institutionalised and non-institutionalised.

Institutionalised health services

Institutionalised health services are those that require the patient to be accommodated and are seen as infrastructural services.

Hospitals

Hospitals provide both general and specialised treatments. While there are many hospitals in metropolitan areas, regional populations are limited to base hospitals and patients must be transported to the metropolitan ones for more specialised medical treatment. An example is Dubbo Base Hospital with its closest metropolitan hospital being the John Hunter Hospital in Newcastle.

Hospitals can be publicly or privately owned and operated. Public hospitals are financed and administrated by state health departments and cater for the majority of patients. Patients in a public hospital can be treated as public or private patients (that is, they can use their private health insurance). Private hospitals are financed and administrated by private, non-government companies.

Psychiatric hospitals

Psychiatric hospitals provide medical treatment for people who suffer from emotional and mental illnesses, commonly psychotic mental illnesses. Some are attached to hospitals or operate as individual entities. These too can be either publicly or privately operated.

Nursing homes

Nursing homes provide long-term, live-in care for the elderly, people with chronic illnesses or people with disabilities who require full-time care. Nursing homes provide individualised care for those who cannot care for themselves. These can be private or public.

Non-institutionalised health services

This type of health service includes those provided by hospital outpatient departments, general practitioners (GPs) and specialist medical services such as those provided by orthopaedic surgeons, obstetricians, immunologists and cardiologists. To access these specialist health services, a person requires a pre-screening consultation and referral from a GP.

Health-related services

Health-related services include those that aim to improve or maintain health. They include services provided by dentists, physiotherapists and optometrists and they do not require a GP's referral.

Pharmaceuticals

Pharmaceuticals are medicines (prescribed by doctors) that treat both acute and chronic illnesses. Pharmaceutical companies are privately owned and operated. Medicare subsidises payments for medicines listed on the Pharmaceutical Benefits Scheme (PBS) and private health insurance companies may cover costs for non-PBS pharmaceuticals.

Responsibility for health facilities and services

The responsibility for health care services across Australia is shared between the federal, state and territory, and local governments. The private sector also plays a role.

Federal government

The federal government has many responsibilities for the health of its citizens although it is very limited in the direct delivery of services. The federal government formulates health policies, some of which it implements, others it directs the states and territories to implement. It collects taxes from taxpayers and disburses them among states and territories to pay for medical and health services such as hospitals. The federal government's main responsibility is the administration of the national health scheme, Medicare. It also produces and delivers national health promotion initiatives such as the National Tobacco Campaign.

State and territory governments

State and territory governments have the direct responsibility to administrate, legislate and deliver the health services available within their boundaries. They are responsible for the governance of the public hospitals, psychiatric hospitals, nursing homes and family health centres. Each state government has a direct role in the operation of public hospitals. They also legislate and regulate private hospitals and private health services. In addition, they have a direct role in administering and funding immunisation, mental health and dental programs, family and women's health services, and they play a significant role in the creation and delivery of health promotion initiatives.

Local government

Local governments have a specific and important responsibility to their direct communities. Their role is to implement immunisation programs, ensure that health and wellbeing services are available, construct and maintain healthy recreational structures such as local swimming pools, cycleways, parks and recreation facilities. Local governments maintain hygiene and sanitary standards in the community by providing waste disposal services. In addition, they operate community programs such as Meals on Wheels and provide home care to encourage, and enable people to remain living in their homes.

Private sector

Despite the complex relationship and partnership that exists between the three levels of government in the delivery of the health system, the majority of non-institutionalised health services are privately operated, funded and delivered. They offer a wide range of services that include those provided by GPs, dentists, physiotherapists, podiatrists, pharmacists and many more. These are businesses operating services for profit. The private sector must abide by the legislative procedures set by the government and are monitored to ensure health, safety and wellbeing is guaranteed. Some private operations are not-for-profit organisations that receive funds from the government in addition to those raised through donations. These include Cancer Council Australia, The Heart Foundation and Royal Life Saving Society Australia.

Equity of access to health services and facilities

Australia is highly regarded for the way it implements the social justice principles of **equity**, diversity and supportive environments within its health care system. All Australian citizens are afforded universal, basic health care through the Medicare scheme, no matter what their race, gender, geographic location or socioeconomic status might be. They can access public hospitals, GPs, after-hours care and subsidised prescriptions because they are all covered by Medicare. In addition, the government regulates a wide range of specialist services to ensure that effective and high-quality care is provided to all Australians.

The Australian government also recognises that there are groups within our society (priority population groups) that experience lower levels of health and health care. To cater for these, it implements programs and strategies to improve their access to, and use of, services. An example of this is the Medicare Safety Net. When an individual or family exceeds a certain monetary amount on health care costs, the government further reduces the cost of pharmaceuticals or increases the rebate for using specialist services. This is essential to ensure that some groups within our society – such as the elderly and socioeconomically disadvantaged – can access and use health services for chronic illness.

Physical access to health services varies across the country. With eight out of 10 Australians living within 50 kilometres of the coastline of Australia, this is where most health services are concentrated. People living in rural or remote areas of the country have less access to basic health care. There are fewer GPs in these areas and this results in patients

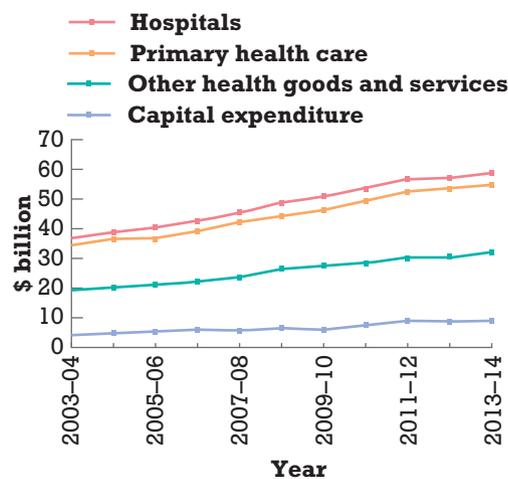
waiting longer for consultations and diagnosis. Base hospitals in rural areas are less likely to have surgeons and operating theatres, so patients have to travel sometimes hundreds of kilometres for treatment. This is also the case for specialist and private services. The Royal Flying Doctor Service is one of the government’s strategies for combatting this inequality. Its medical professionals travel to remote locations to provide basic health care to isolated communities, visiting population groups such as Indigenous Australians living in remote communities and people living in socioeconomically disadvantaged areas.

Cultural barriers can sometimes prevent people from accessing health care, as is evident among the Indigenous populations and people born overseas. To address this and improve access, the federal and state governments work in conjunction with the Office for Aboriginal and Torres Strait Islander Health to fund services for the Indigenous community. Through this initiative, local Indigenous people operate their own health care centres, thus improving the rate of access. This is essential because Indigenous populations suffer greater prevalence of chronic illnesses, especially in very remote areas.

Health care spending versus early intervention and prevention spending

Expenditure

Health care, particularly quality health care, is expensive. Excluding the Australian Defence Force health services, correctional services, health services and private donations to non-government organisations, \$155 billion was spent on health care in Australia in 2013–14. Of this, \$59 billion was spent on hospitals, \$55 billion on primary health care (predominately GP services), \$32 billion on other health care and goods and \$9.1 billion on capital expenditure. Currently the health care expenditure is around \$170 billion.



Source: *Australia’s Health 2016*, AIHW, p. 37 © Australian Institute of Health and Welfare 2017. CC-BY 3.0 licence.

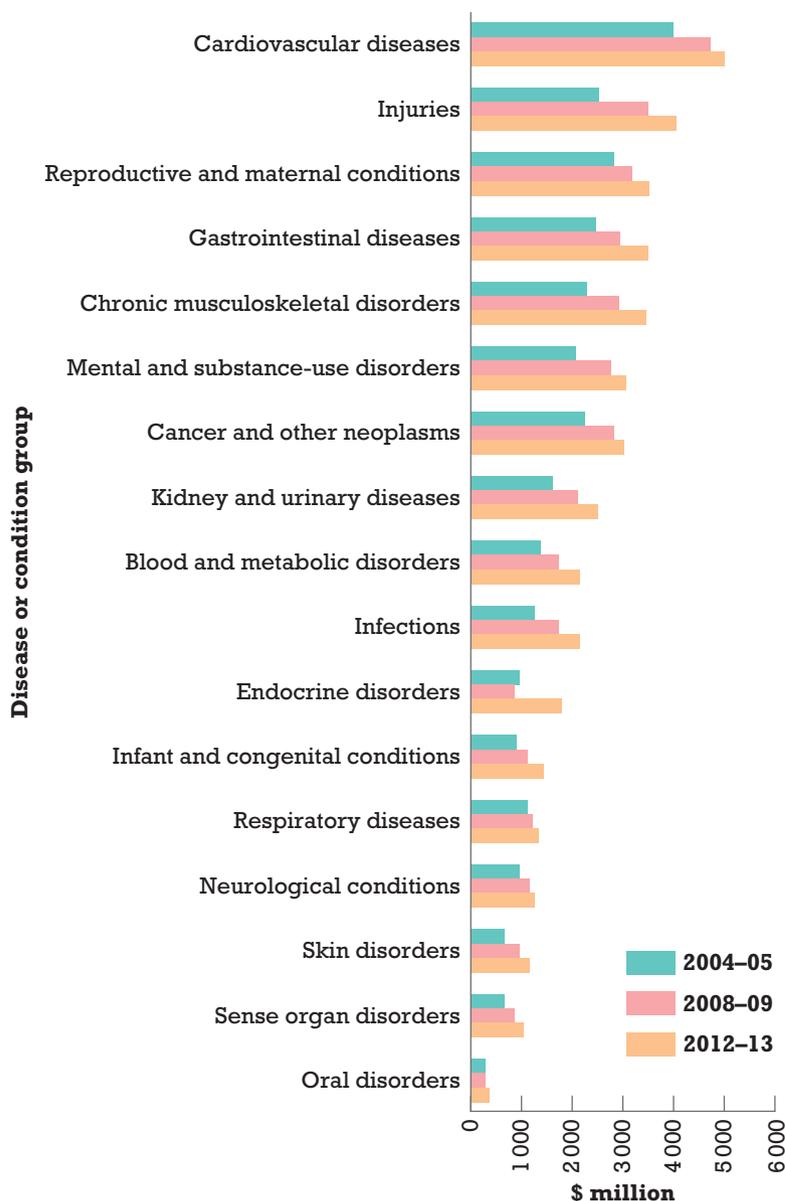
Figure 3.1 Health expenditure by area of spending, 2003–04 to 2013–14

In 2013–14, combined government expenditure on health was \$105 billion (or 68 per cent of total expenditure). The federal government contributed \$63.5 billion and state and territory governments, \$41 billion. The rest came from private health insurance – \$13 billion, and non-government organisations (NGOs) – \$9.4 billion.

Funding the public hospitals is a shared responsibility between the federal, state and territory governments. In 2013–14 the federal government provided \$17 billion (or 37 per cent) of the funding for public hospital services while the state and territory governments

provided \$25 billion (or 54 per cent). Expenditure on admitted patient services accounted for approximately 70 per cent of the total hospital expenditure, with emergency services and non-admitted care accounting for the rest.

Of those admissions to public hospitals, cardiovascular disease (CVD) accounted for the highest expenditure – approximately \$5 billion. The cost of men’s CVD was higher (\$2.9 billion) than for women (\$2.1 billion). Other high expenditures for males in hospitals included: injuries, mental and substance use disorders, kidney and urinary diseases, infections and cancers and other neoplasms. The female patient expenditure was highest for reproductive and maternal conditions, chronic musculoskeletal disorders, blood and metabolic disorders (anaemia).



Source: *Australia’s Health 2016*, AIHW, p. 40 © Australian Institute of Health and Welfare 2017. CC-BY 3.0 licence.

Figure 3.2 Disease or condition spending, 2004–05 to 2012–13

In addition to its contribution to public hospital services, the federal government provided a large percentage (78 per cent) of the expenditure for medical services – \$21 billion. It also contributed \$8.4 billion for benefit-paid medications, covering 84 per cent of the expenditure in this area. The outstanding funds in these areas were sourced from NGOs.

Funding for community health services is largely the responsibility of the state and territories. They contributed \$6.2 billion (79 per cent) to community health services expenditure.

In 2013–14 individual contributions accounted for \$27.5 billion – nearly 18 per cent of the total health expenditure. Individuals also contributed approximately \$9 billion in costs for co-payments, over-the-counter (OTC) medicines, non-subsidised medication and private prescriptions, and spent almost \$5.3 billion on dental services.

The Australian Federal Government has slightly reduced its contribution to the total overall health budget since 2011 – from 70 to 68 per cent. The main reasons for the decrease were changes made to the PBS, private health insurance rebates and medical expenses tax rebates. The areas most affected by the reduced funding included public health, benefit-paid pharmaceuticals, patient transport and health administration. However, there was no resultant reduction in services provided and the quality of health services did not deteriorate. In some areas, expenditure increased – for example, medications (private prescriptions and OTC pharmaceuticals), aids and appliances.

Indigenous Australians have a different expenditure profile to non-Indigenous Australians. The spending for Indigenous Australians is highest on mental and substance use disorders as well as kidney and urinary diseases – more than \$200 million in 2013.

Prevention

Australia spends almost \$2 billion on preventative public health each year, equating to 1.3 per cent of national health spending. This figure only includes government spending and could be far higher if the health measures provided by non-government and private organisations were included.

In 2010 the NHMRC funded the Assessing Cost-Effectiveness in Prevention study that evaluated more than 120 preventative health interventions. The conclusion of the study was that the cost of interventions was offset by the savings, resulting in a reduced need to treat the disease. This provides strong evidence that the population's health could be improved by preventative initiatives aimed at specific diseases that contribute a high burden of expenditure. Prevention can also benefit a healthy ageing process. One preventative initiative developed by the Australian Health Policy Collaboration is the 'Health Tracker', which aims to educate people about chronic disease and how it can be prevented through protective behaviours.

Impact of emerging new treatments and technologies on health care

As previously stated, the expenditure on health care has increased in the areas of aids, appliances and pharmaceuticals. This could be attributed to advances and developments made in medical technology. Technology is a major component in health care and will be a significant driver of future costs to the health care system and services. Science, biomedical research and technology have brought significant advancements in enabling people to live longer, live healthier (antibiotics and vaccines) and reduce disability (prostheses). They have contributed significantly to reducing mortality through diseases and injury, as well as prolonging morbidity (keyhole surgery, robotic-assisted surgeries).

Nanotechnology allows surgeons to be more precise and less invasive in surgical operations. This can reduce the cost of treatment and, in turn, lead to better results for patients, lower health care costs and wider access to services. At Israel's Bar-Ilan University, researchers have developed a 'nanobot' that targets and delivers cancer drugs to defective cells while leaving healthy cells unharmed. Likewise, at the University of California in San Diego, nanoengineers have used a microcannon to blast tumours with anti-cancer drugs with exact precision.



Weblink

Investigate

Look at the Australian Health Policy Collaboration website. Find Australia's Health Tracker by Area.

Cost

Science and technology comes at a price. Artificial limbs and prostheses are becoming more advanced and also more expensive, sometimes costing hundreds of thousands of dollars. Scientists in the United States have experimented with regenerative spinal cord tissue by implanting polymer fibres (thinner than a strand of hair) alongside damaged neurons to transmit electronic impulses. A bionic kidney has been developed to assist those with chronic kidney and urinary diseases, thus replacing the need for transplant organs and the complications of immune rejection. The kidney has a hybrid design whereby kidney cells are combined with specialised microchips to filter waste from the bloodstream, all controlled by the human heart. Surgeons are using 3D-printed body parts in areas such as the rib cage, sternum and vertebrae. Complex surgery can be conducted using the da Vinci robotic surgical system to provide better patient outcomes, although this is very costly. The robot seen in figure 3.3 costs in excess of \$1 million and \$1500 worth of parts need to be replaced after every surgery. Training surgeons to use this technology is also highly costly.

Robotics in surgery

Follow the weblink to read an article about robotics used in surgery. Answer the following questions.

- 1 Outline the kind of operations that have been jointly carried out by surgeons and robots.
- 2 Describe the reasons for robot surgeon technology to be investigated and developed.
- 3 Explain the benefits this technology can offer to the patient and the health care system.
- 4 Identify the limitations of such technology.



Weblink



Shutterstock.com/Zappa2Photo

Figure 3.3 Robotics are increasingly common in the operating theatre

Other technologies used in the Australian health care system include equipment such as MRI and CT scans to diagnose illness, mammogram screening to diagnose breast cancer, bowel screening procedures, and life support machines. Advancements in diabetes management have continued with the development of the insulin pump and a device to measure long-term blood glucose levels that is implanted in the patient's arm. The advances in antibiotics, defibrillators,

vaccines (cervical cancer, scheduled childhood immunisation program) and pharmaceuticals to assist with both acute and long-term conditions all aim to decrease the incidence of disease. Many of these pharmaceuticals are placed on the PBS scheme, thus increasing the health care cost to the Australian government.

While it is indisputable that improving the health of individuals, communities and the nation is a priority, many of these technologies and treatments are costly and difficult to access. Whether or not an individual can access these medical advancements depends on their financial circumstances. Meanwhile, the nation carries extra costs through Medicare, the Medicare Safety Net and the PBS.

Health services in regional or rural areas typically do not have access to equipment commonly found in metropolitan hospitals, such as operating theatres (let alone robot-assisted surgery), MRI machines, pathology services, imaging services and occasionally even emergency departments. People living in rural and remote regions have to travel long distances to access these medical services if they require diagnosis and treatment of certain conditions.

There is a direct correlation between an increasing ageing population and extended life expectancy and the use of medical technology. The expenditure for treatment of prostate cancer is rising, cataract surgeries are increasing in the 75–79 age group, and hip replacement surgery has increased, with the fastest growing group being 70–74 year olds.

Activity



Weblink

Navigate to the Cancer Council Australia website and locate the information on the HPV vaccine (or follow the link).

- 1 Describe diseases the HPV virus is attributed to and its relationship to cancer.
- 2 Explain the function of the HPV vaccine.
- 3 Explain why the vaccine was introduced.
- 4 If only females suffer from cervical cancer, explain why both males and females aged 12–13 years will be immunised with Gardasil 9 from 2018 onwards.
- 5 Describe the success of the HPV vaccine.
- 6 Compare the cost of preventative measures for good health and the cost to cure ill health.

Health insurance

Medicare

Medicare is a universal, nationally funded health care scheme. It provides access to free or subsidised medical and hospital services for all Australian residents (including migrants and New Zealand citizens). Medicare, originally known as Medibank, was first introduced in 1975 under the Whitlam Government. The Hon. Bill Hayden stated that the purpose of Medibank was to provide the ‘most equitable and efficient means of providing health insurance coverage for all Australians’. The Hawke Government in 1984 renamed the health scheme Medicare and claimed that the health insurance legislation was ‘a major social reform’ that would ‘embody a health insurance system that is simple, fair and affordable’, aligning with the social justice principles in the Ottawa Charter. Medicare is funded by taxpayers who contribute a Medicare levy of 2 per cent of their taxable income and this is reduced for low-income earners.

Medicare provides:

- Free (**bulk billing**) or subsidised treatment by health professionals such as doctors, specialists, optometrists, and (in specific circumstances) dentists and other allied health services (X-rays, pathology). Benefits are paid based on 85 per cent of the Medicare scheduled fee with the individual contributing the ‘gap’ costs. This is known as the Medicare

Benefits Schedule. In addition, the government operates the Medicare Safety Net where it keeps track of the ‘gap’ amount individuals or families pay annually. When an individual (or family) exceeds the government’s base amount (approximately \$450 worth of gap payment) it will increase the benefit payments made to the individual or family.

- Free treatment and accommodation for patients in a public hospital.
- Seventy-five per cent of the Medicare scheduled fee for services and procedures for a private patient in a public or private hospital (but not including hospital accommodation, theatre fees, medicines and other items).
- Reduced-cost prescriptions known as the PBS. The government identifies a range of prescription pharmaceuticals that it subsidises to make them more affordable and accessible. In addition, it provides a PBS Safety Net where further subsidies are applied when a patient exceeds a set amount on prescriptions. This is set at approximately \$1500 per patient/per year. In monetary terms, prior to meeting the PBS Safety Net each prescription medication could cost \$38.30. After reaching the PBS Safety Net that cost is reduced to \$6.30. The PBS Safety Net is calculated per calendar year.
- The freedom for patients to seek treatment from a GP of their choice.
- Government rebate where the cost of **premiums** for private health insurance may be reduced if a person is covered by a registered Australian health insurer for hospital, general and extras, or both. The rebate is income tested.

Table 3.1 Private health insurance rebate schedule, 2018

Singles	up to \$90 000	\$90 001 to \$105 000	\$105 001 to \$140 000	\$140 000 and above
Families	up to \$180 000	\$180 001 to \$210 000	\$210 001 to \$280 000	\$280 000 and above
Rebate				
	Base tier (%)	Tier 1 (%)	Tier 2 (%)	Tier 3 (%)
<age 65	25.415	16.943	8.471	0
Age 65–69	29.151	21.180	12.707	0
Age 70+	33.887	25.415	16.943	0
Medicare Levy surcharge				
All ages	0	1.0	1.25	1.5

Source: © Australian Taxation Office for the Commonwealth of Australia

Disadvantages of Medicare

The disadvantages of Medicare include:

- As a public health scheme used by a large percentage of the population, there are increased waiting times for non-life-threatening medical procedures and surgeries in public hospitals. In 2014–15, 1.8 per cent of patients waited more than a year for surgery, 90 per cent had their surgery within 253 days and 50 per cent within 35 days. The average waiting time was 36 days (*Australia’s health 2016*, AIHW, p. 314).
- An increasingly ageing population with decreasing mortality and increasing morbidity places greater strain on the public health system and services. As a result, current public **infrastructure** and resources are inadequate to meet the demands and this leads to higher expenditure by governments.



Weblink

Investigate

Investigate the Public Hospital Waiting List Calculator via the Health Insurance Comparison website, or follow the link.

- Public patients in public hospitals have little choice of treating doctor, specialist or surgeon.
- Health professionals determine their fee and payment options, so patients may not be able to use the bulk billing option and may have to pay the 'gap' for services.
- Individuals who earn above a certain income and who do not have private health insurance are required to pay the Medicare Levy Surcharge (MLS). The MLS is calculated at 1 to 1.5 per cent of the individual's taxable income. This is paid in addition to the 2 per cent Medicare Levy.
- The government encourages citizens over the age of 30 to purchase (as a minimum) health cover through private health insurance. Should an individual not source private health insurance, for every year after their 30th birthday they will be charged an additional 2 per cent on top of the premium for the remainder of their life or for 10 consecutive years. This is known as Lifetime Health Cover (LHC). As an example, if an individual is 40 years old when they purchase private hospital cover for the first time, they will pay 20 per cent more than if they had purchased when they were 30 years old. The maximum loading is capped at 70 per cent. After paying the additional loading for 10 consecutive years the loading is removed, or if a couple purchased joint hospital cover then it is divided between the two; for example, one person has a 20 per cent LHC, the other 0 per cent and the loading is 10 per cent.
- Medicare does not cover ancillary services; nor does it cover an Australian citizen when travelling overseas.

Private health insurance

There are two types of private health insurance (PHI) cover: hospital and general treatment (ancillary services). Hospital cover includes all or some of hospital treatment, accommodation, theatre and doctor fees when in a public hospital as a private patient or in a private hospital or day surgery facility. There are four major categories of hospital cover to choose from: Top, Medium, Basic and Public Hospital only. General treatment covers ancillary services such as physiotherapy, optical and dental. These are categorised as comprehensive, medium and basic. The ancillary services differ greatly between funds and policies. Singles/families can purchase these insurance policies individually or as a package.

Benefits of PHI

- Treatment as a private patient in a public or private hospital, which means having a choice of doctor/surgeon, hospital attended and date of treatment (within reason).
- Timely access to specialists, private hospitals, surgery and medical support services; especially for elective (non-urgent) procedures.
- Greater range of specialist and ancillary services available to maintain or improve health.
- Peace of mind through increased access to doctor and/or hospital services, as well as ambulance services available in an emergency.
- Access to a range of ancillary services including general dental, orthodontic, optical, complementary therapies, medical appliances, ambulance transport and more.

Investigate

- 1 Use the Health Insurance Comparison website: Public Hospital Waiting List Calculator.
- 2 Select a variety of procedures related to different health conditions and calculate:
 - a the number of patients admitted to hospital
 - b the 'median' days patients waited for this procedure.
- 3 Go to the Choice website and look for health buying guides: health insurance (or follow the link). Read the article and describe the advantages and disadvantages of private health insurance.

COMPLEMENTARY AND ALTERNATIVE HEALTH CARE APPROACHES

While Australia's health system offers a wide range of institutionalised and non-institutionalised services, there is increasing demand for services that aim to improve health and wellbeing and prevent the onset of chronic disease. Many people are turning towards less western or traditional medical practices to complementary and/or alternative medicines (CAM). According to the New South Wales Department of Health, CAM 'refers to a diverse group of practices and products *not* considered part of evidenced based, conventional medicine'.

Complementary medicines and therapies are used in *conjunction* with traditional medical approaches. As an example, a patient may be treated for a torn anterior cruciate ligament (ACL) by a physiotherapist who recommends acupuncture in conjunction with the physiotherapy to improve recovery. Alternative health products and/or services may be used *instead* of, or replace, traditional treatment and medicines; for example, when a patient suffering from cancer declines chemotherapy treatment and seeks assistance from a herbalist.

The 2014 *Complementary Medicines Industry Survey* indicated that the CAM industry accounts for approximately \$3.5 billion of consumer expenditure per annum with 17 per cent of the complementary medicines industry generating \$15 million or more in annual revenue. It is estimated that more than three quarters of Australians use CAMs.

Significant increases in revenue are being experienced by pharmacies and supermarkets that sell herbal medicines, **vitamins**, **minerals** and dietary supplements. In 2013, sales of krill oil, used for lowering triglyceride levels, increased by 180 per cent and sports nutrition by 14 per cent. In addition to herbal treatments and supplements, CAM also covers therapies such as acupuncture, naturopathy, homeopathy, aromatherapy, chiropractic and more.

Reasons for growth of complementary and alternative health products and services

The Commonwealth government regulates the provision of complementary and alternative medicines and therapies through the Therapeutic Goods Administration and the Complementary Medicines Branch. There has been an increase in the acceptance and use of CAM from both the consumer and the medical profession due to the regulation and acceptance by government authorities, including the World Health Organization (WHO). With this increased acceptance comes greater access and use of such therapies and medicines. As more positive benefits are witnessed, CAM's popularity increases. Consumers are looking for opportunities to exercise greater control over their health; for example, using vitamins and herbs rather than pharmaceuticals to treat anxiety and headaches. People are also researching and using CAMs to a greater degree. A growing awareness and acceptance of eastern cultures has also resulted in a wider acceptance of CAM practices such as acupuncture and homeopathy. Private health insurance companies have also acknowledged the benefits and positive health effects of CAMs and many cover them in their ancillary benefits schemes.

Range of products and services

There are many different types of complementary and alternative medicines and therapies. Some of them overlap, providing further justification for the **holistic** approach to health that has brought about their popularity and use by Australians.

The medicines can be categorised as:

- herbal: contain active herbal ingredients from plants or other organisms
- traditional: combination of plant, animal and/or minerals and include Chinese medicines

- homoeopathic: wide variety of naturally sourced materials, mostly plants and minerals
- vitamins and minerals: synthetic vitamins and minerals administered by naturopaths
- essences: contain flower, shell, gem and/or crystal products.
Some of the more commonly accessed therapies include:
- acupuncture: penetration of the skin with fine needles to stimulate specific meridians (lines of energy)
- chiropractic: diagnosis and treatment of mechanical disorders of the musculoskeletal system because it is believed that disease and disorders can be alleviated by realigning the bones to improve nerve function
- Reiki: Japanese treatment involving the manoeuvring of hands just above the surface of the skin to affect the unseen life force energy that flows through the body and that may be obstructing the healthy functioning of mind and body systems
- massage: the practice of kneading and rubbing muscles to alleviate tension built up within the muscle fibres. This can be performed as preventative or curative. Massage is extremely popular and includes specialisations such as: sports, Swedish, deep, shiatsu, reflexology and more.

Making informed consumer choices

While the WHO, medical professionals and consumers are all recognising the many positive benefits of complementary and **therapeutic** treatments, there are accompanying risks.

In order to minimise harm, before undertaking any form of complementary or alternative therapy an individual should follow these guidelines.

- Consult a health professional in case there are negative side effects the individual is unaware of, such as negative interactions with any current western medication being consumed. For example, St John's wort (a herb) is not advised for individuals currently consuming antidepressants or antibiotics. Combined with antidepressants this herb can potentially create a harmful level of serotonin in the brain. If taken with antibiotics it could potentially reduce the effectiveness of the antibiotic.
- Purchase Australian-made complementary medicines that are labelled 'Registered Aust R' or 'Listed Aust R'. This indicates that the therapy and/or medicine has been approved by the Therapeutic Goods Administration, thus improving the safety and reducing the potential harm associated with the CAM.
- Be an informed consumer. The Internet is a minefield of misinformation, especially medical, and much information is based on the benefit to the provider of the goods rather than the consumer. Avoid products or services not offered or regulated within Australia. Using reputable websites and researching a range of sources is also highly recommended.
- Request qualifications. With the increase in popularity and regulation many CAMs are now registered practitioners who have had formal training. When using a CAM a consumer should request to see their training qualifications and research the institute they received their qualifications from. For example, a masseuse should have received formalised training such as certificate IV in basic massage, or greater.
- Be suspicious of complementary and alternative medicines for sale on social media. The products may be unregulated, in toxic quantities, of poor quality or have passed their use-by date. There is no protection under Australian law if the product is bought from overseas.

CHAPTER SUMMARY

- Health care in Australia can be categorised as institutional (hospitals, nursing homes, psychiatric institutions) or non-institutional (outpatient services).
- The federal government's responsibility in health care is primarily to formulate national policies and legislation, collect and disburse funds for health from taxpayers, legislate Medicare and deliver national health promotion initiatives.
- State and territory governments administer public hospitals, psychiatric and nursing homes, legislate private hospitals and health care services, fund immunisation programs and have a direct role in family and women's health services, dental programs and health promotion initiatives.
- Local governments implement immunisation programs, deliver infrastructure to promote health (swimming pools, cycleways), manage waste disposal services and coordinate home care programs.
- The majority of health services in Australia are privately owned and operated. They must abide by legislative policies developed by the government.
- The health care expenditure on treatment services far exceeds the expenditure on early detection and prevention.
- Medical science and technology is making advances in health care; however, there are equity and access issues with these procedures, medicine and care is not always available and comes with a high cost.
- Medicare scheme was developed to ensure equitable access to basic health care for all Australian citizens.
- Advantages of Medicare include bulk billing or subsidised GP, pathology and imaging services, free treatment and accommodation in a public hospital, reduced-cost pharmaceuticals (PBS), safety net, rebates for private health insurance and choice of GP.
- Disadvantages of Medicare include increased waiting lists in public hospitals, decreased available beds in public hospitals, little choice of treating doctor/surgeon, large gap fees, Medicare surcharge levy, lifetime health cover loading, no cover for ancillary services.
- Private health insurance provides additional health care services, treatment as a private patient in a public hospital, timely access to health services, greater range of services and facilities, peace of mind and reduced waiting times for elective surgery.
- Complementary therapies are used in conjunction with traditional treatments.
- Alternative therapies are used in place of a traditional western treatment.
- The increasing popularity of CAMs is due to acceptance by the WHO, increased regulations and training requirements, greater awareness of benefits of eastern medicine among practitioners and the community, and PHI acknowledgement and covering in ancillary benefits.
- To make an informed decision consumers should consult a health physician, only buy Australian made or regulated therapies and medicines, request qualifications for a provider, complete independent research using reputable websites.

CHAPTER REVIEW ACTIVITIES

- 1 Describe the type and range of health care services in Australia.
- 2 Describe the advantages and disadvantages of Medicare.
- 3 Explain the responsibilities for health care in Australia.
- 4 Describe an emerging technology in health and/or medicine. Explain how equitable the access is for all sections of the community.
- 5 Justify an individual's decision to purchase private health insurance.





CHAPTER 4 Addressing Australia's health priorities

IN THIS CHAPTER

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

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HEALTH PROMOTION BASED ON THE FIVE ACTION AREAS OF THE OTTAWA CHARTER

From your preliminary studies, you will understand that the Ottawa Charter is a health promotion framework consisting of five principles: developing personal skills, reorientating health services, strengthening community action, building healthy public policy and creating supportive environments.

Levels of responsibility for health promotion

The three levels of government include: federal (or Commonwealth), state and territory, and local. Each level has its own responsibilities for health promotion but their operations overlap.

The federal government has the responsibility of leading and creating a national environment committed to improving health. It achieves this by collaborating with international organisations such as the World Health Organization (WHO) and the United Nations (UN), as well as with the Australian states and territories. A main responsibility of the federal government in health promotion is to develop public policies that address the national health priority areas, taking into consideration the contribution of the determinants of health (for example, the National Tobacco Strategy, National Mental Health Strategy). The federal government conducts financial planning to maximise resources and expenditure across all levels of government and allocates funds for health promotion and research.

LEARNING TIP

Use this acronym to remember the five principles of the Ottawa Charter: **DRSBC**

- Develop
- Reorient
- Strengthen
- Build
- Create

State and territory governments are responsible for the delivery and implementation of health promotion initiatives within their state or territory, including funding non-government initiatives. According to NSW Health (Partnerships for Health), in 2017 the New South Wales state government contributed \$150 million to 310 different non-government organisations (NGOs). State and territory governments build healthy public policy by prioritising health issues, creating and enforcing laws, raising funds through taxes and allocating funding for expenditure on health. They have a shared responsibility to work productively with other levels of government – federal and local – as well as NGOs and communities to promote health and contribute to health promotion programs.

Local governments have direct responsibilities to the people living within their community area. Having limited expenditure for health promotion initiatives, local governments rely on funding from the state and federal governments to facilitate initiatives and programs. Many of the health promotion initiatives focus on creating supportive environments. An example is local government working with the Cancer Council to raise funds for research (Relay for Life). They also maintain physical activity spaces within their geographical area to encourage active participation by residents (cycleways, local swimming pools, parks, sporting fields). Local governments contribute to the development of personal skills by administering health programs such as young mothers' meetings and men's shed programs, working with NSW Health to provide road safety programs for young drivers, and with the Department of Education on the mandatory K–10 PDHPE syllabus.

Individuals play an important role in maintaining their own health. Since governments of all levels allocate considerable funds to promoting good health, individuals are responsible for taking advantage of programs and facilities provided in order to lead a healthy lifestyle. Primarily, individuals are responsible for educating themselves in order to make informed decisions. By increasing their health literacy they become empowered and can influence others to maintain good health. Examples of this include: enrolling in community health programs, seeking assistance from a GP or Quitline to cease smoking, actively seeking accurate health information, or joining cooking classes to learn about healthy eating.

Benefits of partnerships in health promotion

Government sector, non-government organisations and local community

The social construct of health acknowledges the importance of a shared responsibility for health between all levels of government, NGOs, community groups and individuals. The interrelationship and cooperation between these groups is essential for the success of health promotion and the impact it has on people's health.

Intersectoral collaboration

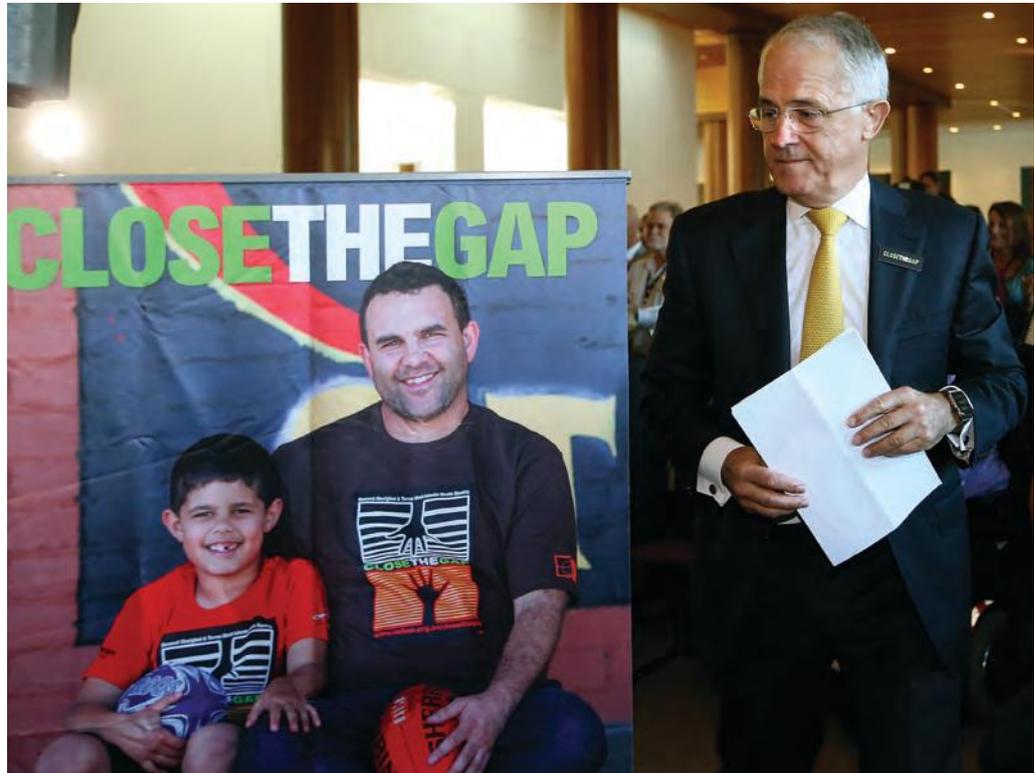
This term is used to define the cooperation and partnerships between different agencies, communities and individuals. It operates on the premise that when multiple groups contribute, engage and employ health promotion the outcomes are far greater than when agencies, communities and individuals work in isolation. Health promotion is therefore most effective when key stakeholders collaborate and use multiple approaches based on the five principles of the Ottawa Charter, as well as on social justice principles.

Benefits of intersectoral collaboration

Benefits of intersectoral collaboration include the pooling of resources to enable a greater impact and greater health promotion exposure.

Resources can include: funds, media, infrastructure, materials, knowledge and expertise. By working in partnerships, health promotion can target and impact the determinants of health to a greater extent. An example is the Closing the Gap campaign where federal, state and

territory, local governments, as well as communities and individuals, have involvement in the initiative. This has the added benefit of government collaboration to provide a uniform approach and reduce duplication. This is also evident in the way the ACARA Health and Physical Education syllabus has been developed. Collaboration and consultation between the federal and state/territory governments have led to a resource that the states and territories are committed to delivering. Through a shared approach to health promotion, communities and individuals feel more empowered in the decision-making process and this results in greater engagement and investment in initiatives to reduce ill health in the community.



Newsphoto/Kyrn Smith

Figure 4.1 Prime Minister Malcolm Turnbull at the launch of the Close the Gap Progress and priorities report, 2016

How health promotion based on the Ottawa Charter promotes social justice

In addition to the five principles of the Ottawa Charter, the social justice principles form the foundation for health promotion. They aim to increase the effectiveness of health promotion through equity, diversity and supportive environments. Incorporated as a single entity rather than in isolation, the Ottawa Charter and social justice principles specifically enhance the health promotion strategies and enable access by those people within society who are in most need of the initiatives.

Social justice principles

The social justice principles (SJP) include:

- equity: resources are allocated in accordance with the needs of individuals and populations
- diversity: recognises and addresses the differences between groups and communities, such as culture, language, sexuality, etc.
- supportive environments: recognises the significant impact that an environment has on health outcomes.

These are amalgamated and supported within the five principles of the Ottawa Charter.

1 Developing personal skills (DPS)

This involves improving and empowering the individual to exert control over their own health decisions through education and the development of health literacy.

All three social justice principles are supported within DPS when there is free access to public education (equity). Federal, state and territory governments all have the responsibility to provide and encourage health promotion initiatives that cater for diverse cultural differences. Education can increase health literacy and curriculum and teaching resources need to be provided in different languages. This is primarily a state and territory responsibility advocated through the departments of education. Instilling different language interfaces on websites that aim to increase health literacy – such as NSW Health iCanQuit – empowers diversity. Providing a range of services that draw attention to ways of preventing illnesses – such as the Quitline telephone service, health brochures on quitting smoking, advertisements and support from health professionals – all promote a supportive environment. Ultimately, the government can provide the health promotion initiatives but it is the responsibility of individuals to get involved and empower themselves (with knowledge and skills) to make decisions that will enhance their health. Parents have a big responsibility to educate children and model protective health behaviours so that the cycle of healthy ageing continues through the generations.



Figure 4.2 iCanQuit webpages

2 Reorienting health services (RHS)

This involves moving the focus of the **health sector** towards health promotion and prevention of morbidity and mortality rather than taking a curative approach. This is the responsibility of the federal government because it concerns the decisions, procedures and processes used by health professionals within the health system. While the government makes these decisions, individuals and communities do have influence and they exert this through lobbying for change and voting in government elections.

Equity is addressed in RHS by ensuring access is available to all Australian citizens, in particular to groups that are disadvantaged (Indigenous, socioeconomically disadvantaged, elderly, disabled, people living in rural and remote locations and people born overseas). Direct examples of equity are the Medicare scheme and the distribution of health resources to areas in most need (Royal Flying Doctor Service). Local communities have a responsibility to cater for the needs of their population and this may include offering incentives for health professionals to move to the area (offering them rent subsidies).

Diversity must be addressed within health departments and this can include offering translation services to patients, providing information on health issues in a variety of languages, and the allocation of resources based on the particular cultural health issues within the area. Health centres operated and administered by Indigenous people are an example of the social justice principles within RHS. In certain areas of Australia, the Indigenous community administers health services to specifically cater for people who would have otherwise not sought medical treatment from 'traditional' medical centres due to feelings of discrimination,

misunderstanding and cultural difference. These medical centres provide supportive environments and reduce the barriers Indigenous people face when seeking medical assistance. They also provide transport services to increase access.

3 Strengthening community action (SCA)

This involves the community making decisions to improve the health status of that community. Individuals have a large responsibility to engage in health-promoting events in their community and raise awareness of issues with their local representatives and government officials. Their engagement ensures that the diverse needs of the community are recognised and acted upon, enabling a supportive environment. This is dependent on governments providing necessary funding and resources and is an example of a cooperative relationship. The Closing the Gap campaign addresses SCA through the involvement of Indigenous people and elders in the planning at local and regional levels, and demonstrates all three social justice principles: equity, diversity and supportive environments.

4 Building healthy public policy (BHPP)

This relates to the legislation regarding health and taxes imposed to enable protective behaviours. Legislation and policies are the primary responsibility of the government. They recognise diversity and supportive environments. Individuals and communities can influence and assist by being actively involved in the political process and advocating for health issues. Under the Medicare scheme, all taxpayers are levied but high-income earners pay an extra 2 per cent. This is an example of equity. Another example is the laws passed by governments that support good health, such as workplace health and safety legislation (*Work Health and Safety Act 2011*).

5 Creating supportive environments (CSE)

The places where people live, work and play are protected to increase their ability to live a healthy life. Providing healthy supportive environments increases awareness of protective behaviours. The government's role is important in creating and enforcing laws such as the *Work Health and Safety Act 2011* that communities have the responsibility to enact. Other examples include: fire safety procedures, chemical safety, demolition work and more. Also, the New South Wales state government's *State Environment Planning Policy (Affordable Rental Housing) 2009* aims to provide a consistent planning regime for the provision of affordable rental housing in the state and ensure homes meet required standards for health and safety. Communities and individuals have the responsibility to ensure neighbourhoods are safe and enjoyable through programs such



© Newcastle City Council: Islington Park playground

Figure 4.3 Newcastle City Council local community park

as Neighbourhood Watch and parkrun. Local governments are responsible for encouraging and ensuring equity and access to parks and leisure facilities that promote health (for example, skate parks and community parks).

The Ottawa Charter in action

The Ottawa Charter, when implemented in conjunction with intersectoral collaboration, can improve the effectiveness of health promotion initiatives and strategies. The Ottawa Charter targets social justice principles (equity, diversity and supportive environments) as well as the underlying determinants affecting multiple levels of influences on poor health.

National Heart Foundation

The National Heart Foundation, using the Ottawa Charter as a framework, developed a health promotion initiative to increase the physical activity of all Australians. It acknowledges the effect that physical inactivity has on health conditions such as cardiovascular disease (CVD), cancer and diabetes. It specifically cites the Ottawa Charter, stating that it acknowledges the charter's comprehensive approach and the combination of the five principles as the most effective method to promote health.

Developing personal skills

The National Heart Foundation recognises the effectiveness of **mass media** to promote health messages and has used a range of media campaigns in an attempt to educate people and promote the importance of physical activity on health. These campaigns include television commercials, community service radio announcements, posters and newsletters distributed to schools and workplaces. One campaign was the #girlsmakeyourmove, which was designed to draw attention to, and educate the community about, the alarmingly high rates of female inactivity between the ages of 15 and 17 years, where almost 60 per cent take little to no exercise.

Reorienting health services

It is already a firmly established belief that prevention is better than cure. The National Heart Foundation emphasises the importance for health professionals who are educating or counselling individuals to have the goal of affecting these individuals' behaviour, knowledge and attitudes; and to choose health strategies based on an individual's needs. GPs treat approximately 83 per cent of the adult population each year and since research has demonstrated the public's credibility in the authority of medical practitioners, it is important that they use their role to provide advice on healthy living; for example, by screening patients for body mass



Australian Government's Girls Make Your Move Campaign © Commonwealth of Australia, Department of Health

Figure 4.4 The #girlsmakeyourmove media campaign

index (BMI) and providing advice about weight loss. They can also prescribe appropriate physical activity regimes for cardiac rehabilitation.

Strengthening community action

The National Heart Foundation states that partnership programs are the most prudent way of achieving broad changes in the community. Communities play a vital role in advocating for increased physical activity facilities in their area. To achieve this they can partner with transport planners, environmental officers, the education sector, local government, and sport and recreation managers. Community members can advocate for the implementation of the Health Impact Assessment (HIA) to appraise and improve the health consequences of local projects. For example, if there is a plan to improve public transport infrastructure, the HIA can provide health, transport and environmental solutions. Intersectoral collaboration and combined resources can bring about good outcomes such as decongested roads, cleaner air and increased physical activity in the community (walking or cycling to public transport).

Building healthy public policy

All sectors of the government and community can influence policy regarding physical activity guidelines. The National Heart Foundation believes that planning, transport, education, local government and sports and recreation policies all influence the physical activity or inactivity of citizens. It recommends applying affordable pricing structures to encourage people to use physical activity programs and facilities such as local swimming pools. Regulations are required to ensure that women, the elderly and those with special needs can access facilities and programs. It is important to consider safety when planning community sport and recreation facilities; for example, providing adequate lighting, well-maintained facilities and footpaths, and conducting a physical activity impact assessment on any new developments. Regulating public transport and parking fees can positively discriminate in favour of walking or cycling.

Creating supportive environments

A significant component of the National Heart Foundation's initiative outlines a variety of strategies to encourage physical activity. They state that both structured and incidental physical activity can be influenced through the careful planning of public spaces. This includes the installation of safe, accessible pathways and cycleways to encourage different modes of transport, parks designed with intrinsic appeal (such as waterways, trees and shade), and parks that encourage less structured physical activity (such as skate ramps or BMX tracks). Other suggestions include workplaces installing showers, bike racks and lockers to encourage staff to engage in physical activity, ensuring pathways on local streets are well lit, and placing street furniture in the shade. It also encourages clubs and recreation facilities to offer childcare, and advocates for urban developments to be centred around local amenities (such as shops) that can be easily accessed on foot or by bike.



Investigate

Follow the link to the websites of beyondblue and Youth Beyond Blue. Look at their structure and proprietary areas, and their latest campaigns/messages. Identify ways in which these organisations apply the social justice principles of the Ottawa Charter.

Investigate

The National Heart Foundation – Promoting physical activity.
Identify the application of the social justice principles in the National Heart Foundation's Promoting Physical Activity initiative.

CHAPTER SUMMARY

- Health promotion aims to educate and empower individuals to increase their control and decision-making over their own health.
- There are five principles in the Ottawa Charter: developing personal skills, reorienting health services, strengthening community action, building healthy public policy and creating supportive environments.
- The federal government has the responsibility of leadership and creating an environment committed to improving health. The federal government develops health promotion policies. It conducts financial planning for health promotion and allocates funding to the various levels of government to implement health promotion.
- State and territory governments deliver and implement health promotion. They prioritise and allocate funding, enforce laws, and raise taxes to positively promote health.
- Local governments implement community-organised health promotion events and initiatives.
- Benefits of intersectoral collaboration are improved resources, funding, increased exposure, uniform approach, increased expertise and effectiveness of health promotion initiatives.
- Health promotion is based on the Ottawa Charter and the social justice principles.

CHAPTER REVIEW ACTIVITIES

- 1 Using examples, **outline** health promotion.
- 2 **Describe** the responsibilities for health promotion.
- 3 **Explain** the benefits of intersectoral collaboration in health promotion.
- 4 **Explain** the principles of social justice and how they align to the principles of the Ottawa Charter.
- 5 Using a health promotion strategy you have studied, **evaluate** the implementation of the Ottawa Charter.





HSC CORE 2: FACTORS AFFECTING PERFORMANCE

CRITICAL QUESTIONS

How does training affect performance?	73
How can psychology affect performance?	98
How can nutrition and recovery strategies affect performance?	111
How does the acquisition of skill affect performance?	127

Source: Personal Development, Health and Physical Education Stage 6 Syllabus

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OUTCOMES

When you have read this section you should be able to:

- 1 assess training types and their influence on energy systems, and examine the relationship between the principles of training and physiological adaptations
- 2 explain different types of motivation, and evaluate psychological strategies used by athletes
- 3 critically analyse athletes' nutritional needs and justify recovery strategies
- 4 describe how environment and individual characteristics influence skill acquisition, and evaluate appraisal measures.

KEY TERMS

adaptation	glycolysis
adenosine	haemoglobin
diphosphate	hydrogen ions
anaerobic	hypertrophy
anxiety	isokinetic
arousal	isometric
associative	isotonic
autonomous	lactic acid
ballistic	resynthesis
creatine	triglycerides
cryotherapy	vasoconstriction
dynamic	vasodilation
fartlek	
glucose	
glycogen	



CHAPTER 5

Training and performance

IN THIS CHAPTER

Energy systems	75
Types of training and training methods	81
Principles of training	89
Physiological adaptations in response to training	93

LEARNING TIP

To be successful in the PDHPE HSC exam it is essential that you respond to questions using the relevant syllabus information. The most effective method of achieving this is to 'code' your syllabus to assist recall. Main critical questions can be identified as CQ1, CQ2 ... and then the dash points related to that critical question can be labelled CQ1A, CQ1B, etc.

CQ 1 How does training affect performance?	
<p>Teacher Note: Students should be provided with opportunities to explore the concepts dealt with in this module through a variety of practical experiences.</p>	
Students learn about	Students learn to
<ul style="list-style-type: none"> • CQ1A energy systems <ul style="list-style-type: none"> – alactacid system (ATP/PC) – lactic acid system – aerobic system • CQ1B types of training and training methods <ul style="list-style-type: none"> – aerobic, eg continuous, Fartlek, aerobic interval, circuit – anaerobic, eg anaerobic interval – flexibility, eg static, ballistic, PNF, dynamic – strength training, eg free/fix weights, elastic, hydraulic • CQ1C principles of training <ul style="list-style-type: none"> – progressive overload – specificity – reversibility – variety – training thresholds – warm up and cool down • CQ1D physiological adaptations in response to training <ul style="list-style-type: none"> – resting heart rate – stroke volume and cardiac output – oxygen uptake and lung capacity – haemoglobin level – muscle hypertrophy – effect on fast/slow twitch muscle fibres 	<ul style="list-style-type: none"> • analyse each energy system by exploring <ul style="list-style-type: none"> – 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 • assess the relevance of the types of training and training methods for a variety of sports by asking questions such as <ul style="list-style-type: none"> – 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? • analyse how the principles of training can be applied to both aerobic and resistance training • examine the relationship between the principles of training, physiological adaptations and improved performance

Source: Personal Development, Health and Physical Education Stage 6 Syllabus © NSW Educational Standards Authority for and on behalf of the Crown in right of the State of New South Wales, 2012

Figure 5.1 Coding the syllabus for better understanding

This chapter explores the physiological and psychological effects of training on athletes. Through this exploration you will gain a better understanding of how an athlete's performance is constructed and affected by numerous elements.

Energy is dynamic and never static. It is constantly changing from one form to another as biological functions dictate. The ability to participate in sport, especially effectively, is largely derived from the energy our bodies produce. Energy is sourced from foods (kilojoules) that are broken down into chemical energy (stored in between atoms) and converted into mechanical energy (movement by the musculoskeletal system). The main purpose of consuming food is for it to be broken down into phosphorylate adenosine diphosphate (ADP), which **resynthesises** the energy rich compound **adenosine triphosphate** (ATP). ATP is responsible for providing the energy for movement. ATP is a molecule made up of adenosine and three smaller phosphate molecules linked by high-energy bonds.



Figure 5.2 ATP molecule; adenosine and three phosphate molecules

When we move, the high-energy bond securing the last phosphate molecule breaks, releasing energy and heat.

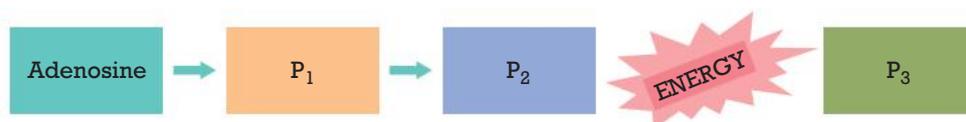


Figure 5.3 High-energy bond breaks detaching phosphate and releasing energy

When this occurs, the adenosine molecule is left with only two phosphate molecules, changing it to ADP.

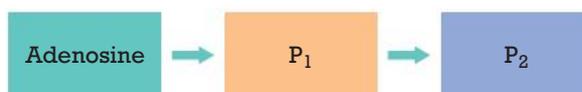


Figure 5.4 Adenosine diphosphate; with the loss of a phosphate molecule, ATP becomes ADP

The human body must receive a continuous supply of energy (food) to enable it to perform daily functions (cognitive, digestive, glandular) and tasks. It is important to have a strong understanding of food types in order to understand the processes the body undertakes in generating energy.

When food is digested it is broken down into substances that can be used by the three energy systems. Carbohydrates break down into glucose that is converted further into **glycogen** and stored in the liver. Fats break down into triglycerides and free fatty acids (FFAs). Proteins break down into amino acids. Glucose/glycogen, **triglycerides**/FFAs and amino acids are all used to make ATP. Carbohydrates contain 16 kilojoules per gram; fats, 37 kilojoules per gram, and protein, 17 kilojoules per gram.

Carbohydrates

Carbohydrates are essential because two of the three energy systems rely upon this source of fuel. It is also the main nutrient needed for moderate-intensity workloads. Glucose, also known as *dextrose* or *blood sugar*, is produced through **glycolysis**, which is the process whereby carbohydrates are broken down through digestion. After absorption in the small intestine,

glucose can then be used directly by cells for energy. If the energy supply is not required or used straightaway, then glucose is stored in the muscles and the liver in the form of glycogen in a process called glucogenesis; or it is converted to fats (lipids) to be stored.

There are two types of carbohydrates: simple and complex. Simple carbohydrates are natural sugars (found in fruit and vegetables) or refined sugars (found in cakes, biscuits and soft drinks). Complex carbohydrates are starches (found in wholemeal foods such as pasta and bread) and are the best source of carbohydrates for energy production (see chapter 7 for more information).

Fats

Fats play many roles in the body.

- Fats provide the body's largest store of potential energy.
- Fats insulate and protect vital organs.
- In the form of cholesterol, fats contribute to the production of steroid hormones.
- Fats contribute to the cell membrane structure.

Fats (known as lipids) consist primarily of triglycerides and **free fatty acids** (FFAs). They are important because they provide the bulk fuel supply for low to moderate exercise over a long duration (such as marathon running or cycling). As a fuel source they take time to be metabolised and converted into ATP. One of their disadvantages is that they can cause discomfort (such as stomach cramps) or decrease performance because of the amount of time they remain in the intestine being digested. Triglycerides need to be further broken down for use as energy and this is done through a process called **lipolysis** where they are converted into FFAs. Once converted, they are, with the assistance of oxygen, converted into glucose by a process called oxidation. That glucose is then used to create ATP or energy.

Protein

Protein is only used as an energy fuel in extreme circumstances and only after all the carbohydrates and fats have been exhausted. Protein, once broken down, is converted into amino acids. Strength, power and endurance athletes require high levels of protein as a source of fuel and to increase muscle **hypertrophy**.

ATP

- 1 Explain the process by which ATP provides mechanical energy for athletes.
- 2 Teach this concept to someone else using verbal and visual aids. (This will increase your own understanding of the process.)

ENERGY SYSTEMS

The energy systems in the body are: the adenosine triphosphate/phosphocreatine (ATP/PCr) or **anaerobic lactic acid system**, the anaerobic **lactic acid** (glycolytic) system, and the **aerobic** energy system. The first two are anaerobic, meaning that they do not require oxygen to generate energy. The third, as the name suggests, is aerobic (literally meaning 'with air') because it uses the presence of oxygen to synthesise ATP.

While these systems are present in isolation, it is important to understand that they all work in unison. The intensity and duration determine which energy system is employed to supply the ATP.

Adenosine triphosphate/phosphate creatine (ATP/PCr) system

Source of fuel

The ATP/PCr system, also known as the alactacid system, is used for very short, high intensity, explosive movements. It uses stored adenosine triphosphate (ATP) molecules in the muscle. When this limited supply is exhausted, it uses phosphate creatine (PCr) molecules to resynthesise adenosine diphosphate (ADP) to form new ATP molecules. An enzyme called creatine kinase (CK) separates the phosphate (P₁) and creatine molecule, and the energy resulting from this reaction enables the individual phosphate (P₁) to attach to the ADP molecule. Attaching a new phosphate molecule therefore resynthesises ADP to ATP. This cyclical process continues until the fuel source PCr is exhausted. The ATP/PCr system does not generate new ATP; rather, it resynthesises ADP molecules.

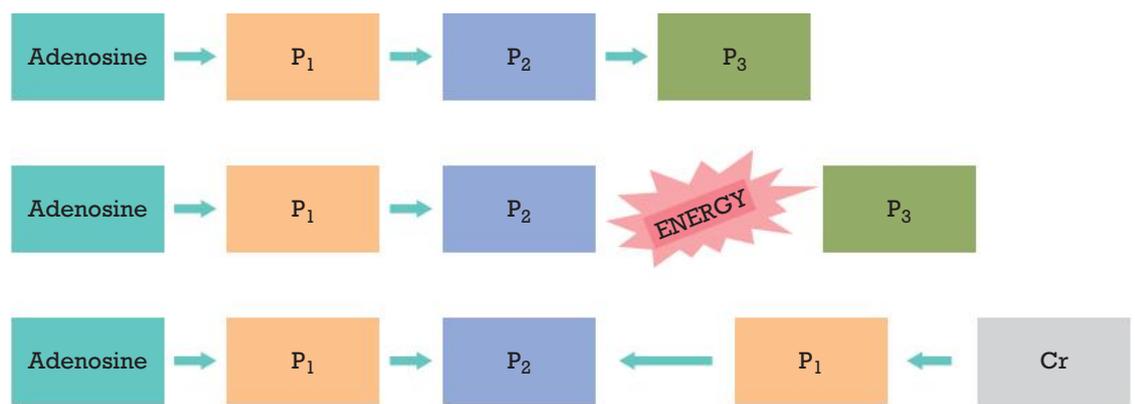


Figure 5.5 Adenosine triphosphate (ATP) resynthesising, using phosphate creatine (PCr)

Efficiency of ATP production

The ATP/PCr is effective because it quickly delivers energy through the chemical reactions of the breakdown of ATP and resynthesis of ADP. It is also considered efficient because the energy molecule ATP and the fuel supply PCr are already stored within the muscle. The recovery rate is also fast because the PCr stores can restock themselves within two minutes. The disadvantage of the ATP/PCr system is that it does not generate fresh or new ATP molecules, which means that once the athlete has exhausted their supply of PCr they cannot sustain their efforts.

Duration

The ATP/PCr energy system can only last for a limited time span of approximately 10–20 seconds of high-intensity effort. At maximum effort this time is reduced to 10–12 seconds. This means that the ATP/PCr system is the primary energy system of athletes competing in short, explosive events such as sprinting, long jump and discus.

Cause of fatigue

The ATP/PCr energy system uses 'stored' PCr. After approximately 10–20 seconds of high-intensity activity, the lack of available PCr in the muscle results in an inability to resynthesise ATP molecules.

By-products of energy production

When the high-energy bonds of the ATP molecule break, releasing the phosphate (P₃), it simultaneously releases heat. Heat is the prominent by-product of the ATP/PCr energy system.

Process and rate of recovery

Recovery is achieved through passive rest. After approximately 30 seconds, 50 per cent of PCr is restored ready for use again. Full recovery occurs after the athlete rests for approximately two minutes, making this a highly efficient energy system.

Lactic acid system

This anaerobic system is also referred to as the anaerobic glycolysis system. If movement or exercise lasted longer than 20 seconds and the ATP/PCr energy system was depleted, the body would seamlessly transition to this system.

The lactic acid system relies on digested fuels (such as carbohydrates) to be partially broken down into glucose. A negative of this system is that partially breaking down carbohydrates without oxygen creates pyruvic acid, which transforms into lactic acid without the presence of oxygen, and this is the major by-product and contributor to the athlete's fatigue.

Source of fuel

The major source of fuel for the lactic acid system is the simple and complex carbohydrates ingested by the athlete. These are broken down through glycolysis to form glucose in the bloodstream and glycogen that is stored in the muscles and liver.

Efficiency of ATP production

The lactic acid system continues to resynthesise ATP quickly and efficiently. For each glucose molecule, the system can produce two ATP molecules (or three if using glycogen), thus making it more efficient than the ATP/PCr energy system.

Duration

This system is used predominately for short, high-intensity exercise lasting for up to two minutes, or three minutes if intensity is moderate. Athletes using the lactic acid system for their event include those participating in 400-metre sprints, short-distance swimming events and team sports such as football.

Cause of fatigue

Predominately the pyruvic acid being converted into lactic acid causes the system to fatigue. However, it is the creation of hydrogen ions (H⁺) that prevent the athlete from continuing. This acidification of the muscle fibres inhibits glycogen breakdown and affects the fibres' calcium binding capacity, thus impeding muscle contractions.

By-products of energy production

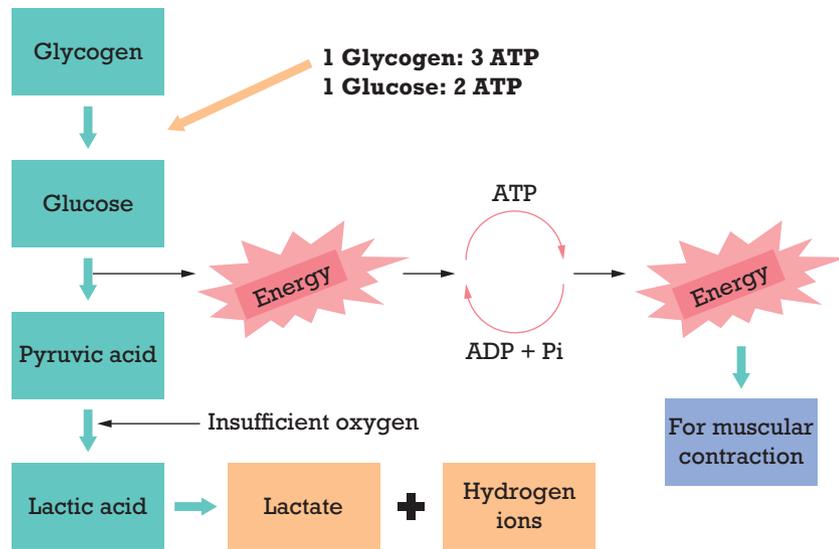
The processes used to break down the carbohydrates and then glucose, result in lactic acid accumulating in the muscle fibres (See figure 5.6 on page 78). This lactic acid is the major by-product and, as stated previously, a predominant contributor to fatigue.

Process and rate of recovery

The lactic acid system takes considerably longer than the ATP/PCr system to recover because of the additional chemical reactions that take place in the cells. It can take anywhere between 20 minutes and two hours of passive rest for the athlete to be fully replenished and recovered. The time taken to recover can fluctuate depending on time, type and intensity of exercise.

Explain

Explain how ATP is generated for activities lasting less than two minutes at high intensity.



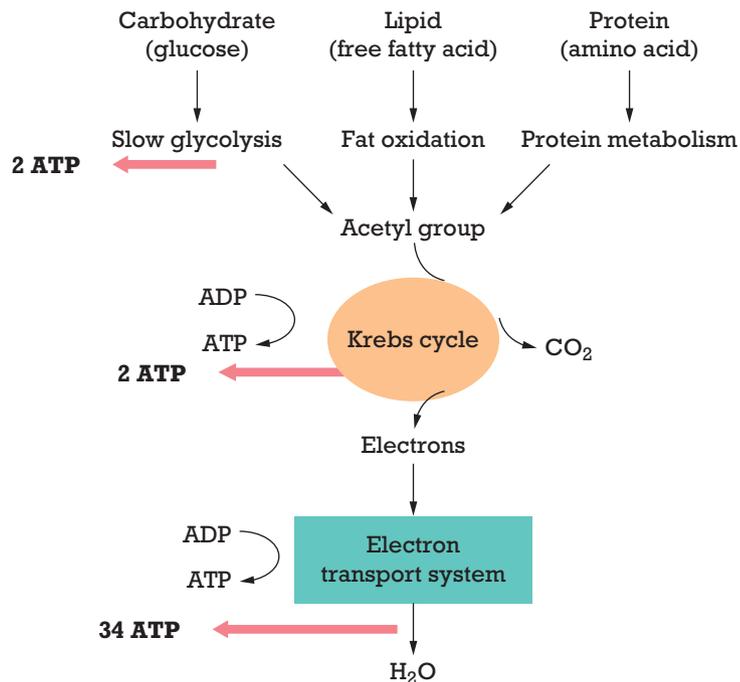
Adapted from www.theendurance.runner.com

Figure 5.6 Anaerobic glycolysis process

Aerobic energy system

Also known as the *aerobic glycolysis* system, this is the only energy system that uses oxygen to generate ATP. The aerobic energy system is the dominant system for everyday movement because it fuels long-duration, low- to moderate-intensity exercise.

This energy system is predominant in team sports such as soccer and football, or long-duration events such as triathlons and marathons. It is also the most complex system, with various chemical reactions occurring to produce an abundance of ATP.



Adapted from www.zenofitness.com

Figure 5.7 Aerobic glycolysis process

The aerobic energy system has three main chemical reactions producing ATP: *aerobic glycolysis*, the *Krebs cycle* and the *electron transport system*. Oxygen can take between two to four minutes to reach the working muscles; therefore, it is a system that is continually in a cyclical state.

Source of fuel

This system uses carbohydrates (glucose and glycogen), fats (triglycerides > FFAs) and protein (amino acids) to generate ATP. The key feature of this system is that it also uses *oxygen*. It also uses the pyruvic acid created by the lactic acid system and, with the presence of oxygen, turns it into carbon dioxide, water and ATP.

Efficiency of ATP production

The ATP/PCr and lactic acid systems resynthesise ATP fast, which is an advantage for those energy systems although they only contain a very limited supply of ATP. However, the aerobic system, while it takes longer to generate ATP, makes an abundance of ATP (38) meaning that the athlete can (theoretically) continue to exercise as long as the body is receiving fuel.

Duration

The major advantage of this energy system is its duration. This system can continue producing ATP, and therefore movement, as long as it has fuel (CHO, FFAs, amino acids, O₂) to continue to generate ATP working at low to moderate intensities. Typically, moderate-intensity activity can last between one and two hours.

Cause of fatigue

The main reason that the aerobic energy system fatigues is the lack of fuel supply (glucose, FFAs, amino acids). Lactic acid is no longer the dominant issue or cause of fatigue due to the presence of oxygen. In addition, the inefficient delivery of oxygen to the working muscles (to assist in the conversion of energy) also leads to fatigue, as well as the poor removal of waste products.

By-products of energy production

The chemical conversions produce carbon dioxide (CO₂) and water (H₂O) as by-products of the reactions. The H₂O produced is lost through perspiration or used by other cells within the body. The CO₂ is exhaled during activity. Neither of these by-products has a detrimental effect on performance.

Process and rate of recovery

This is highly dependent on the intensity of the athlete during activity. If the athlete is working at high intensity for an extended duration, their recovery time will be greater than someone working at a lower intensity. The main influence on recovery is the replenishment of glucose and glycogen. Generally speaking, recovery for the aerobic system can take anywhere between 24–48 hours.

It is important to understand that these energy systems do not work in isolation and it is the intensity of the activity that dictates which energy system is to be employed. As exercise begins, ATP is produced anaerobically through both the ATP/PCr and the lactic acid system. As the athlete's heart rate and respiration rate increase, so does the delivery of oxygen to the muscles and thus, the aerobic system dominates.

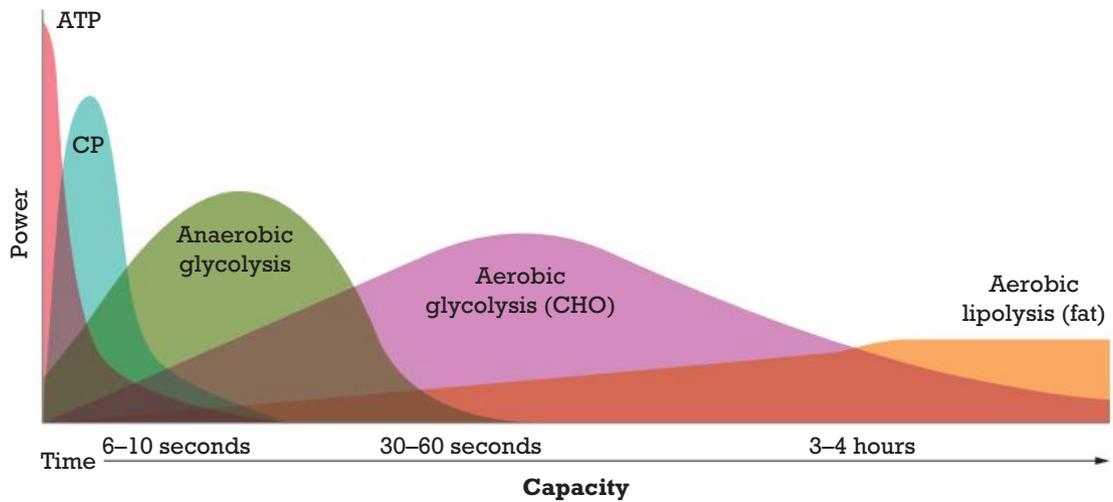


Figure 5.8 Interactions of the energy systems in movement

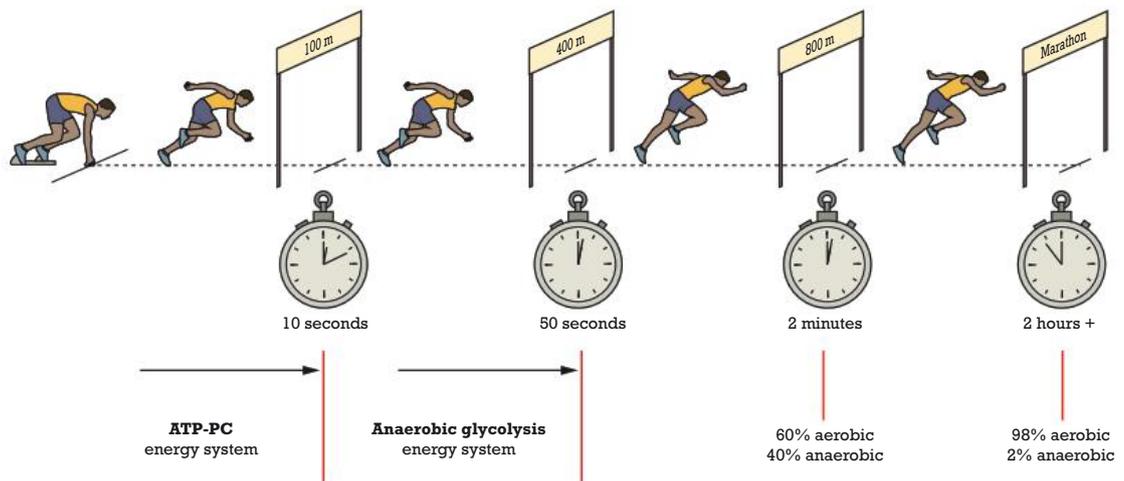


Figure 5.9 Energy system usage over time

Three systems



Draw up the following table and complete it. There is a digital table on your student website.

Name of energy system	ATP/PCr	Lactic acid	Aerobic
Also known as:			
Aerobic or anaerobic			
Source of fuel			
Efficiency of ATP production			
Duration			
Cause of fatigue			
By-products			
Rate of recovery			
Sporting examples			

TYPES OF TRAINING AND TRAINING METHODS

This section covers aerobic training, anaerobic training, flexibility training and **strength training**. Each type of training has unique methods that are effective in developing, sustaining and/or improving its particular area. It is important to understand the different methods used when training athletes as they each have individualised focus and performance outcomes.

Aerobic training

Aerobic (meaning ‘with air’) training involves various methods that aim to develop and improve the cardiorespiratory system and, therefore, the efficient and effective delivery of oxygen and nutrients to working muscles. Aerobic training involves large muscle groups (for example, legs).

Aerobic training requires consistent application for improvement and adaptation to occur. This means a person must train for a minimum of three days per week for a duration of at least 30 continuous minutes.

Aerobic training methods are: continuous, aerobic interval, fartlek and circuit.

Continuous training

Continuous training is uninterrupted, uniform effort sustained at an intensity level where the athlete’s heart rate will be maintained in the aerobic training zone for a minimum of 30 minutes (60–80%MHR). Cycling, running and swimming are the most commonly known forms of continuous training. They are also the easiest to implement. Increasing the intensity (%MHR) during continuous training up to the **anaerobic threshold** will assist the athlete’s body to manage lactic acid accumulation and, therefore, improve performance by increasing their lactate inflection point. This will require a working heart rate of approximately 80%MHR+. It will not prevent lactic acid accumulation and subsequent fatigue. However, it will delay the onset through the creation of protons that buffer the hydrogen ions (H⁺) present in the blood. Continuous training is highly beneficial for health and fitness but because of the sustained repetitive forces and stress placed on the body, if not monitored, it can lead to overuse injuries such as medial tibial stress syndrome (shin splints).

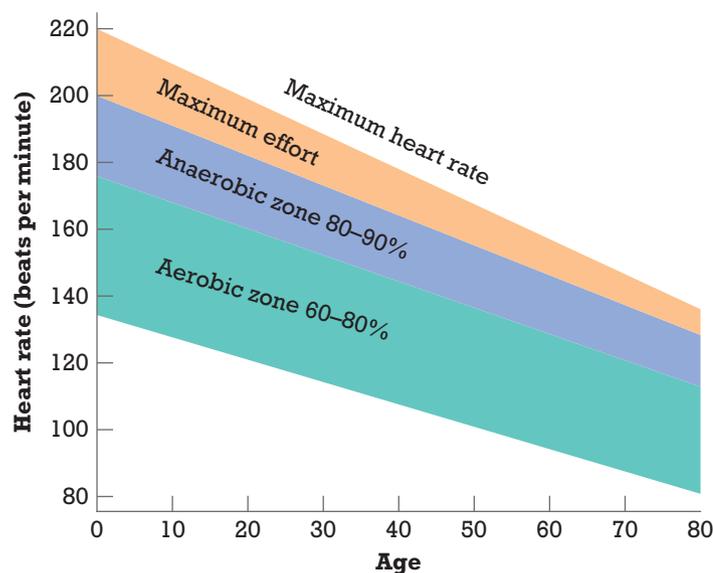


Figure 5.10 Training zones

Aerobic interval

This involves sustained efforts interspersed with periods of rest. It is important that the effort and rest ratio match the athlete's event or sport in order to provide the best possible results for the specific training. Aerobic interval training is popular in training programs because it allows for variances across the training session and assists in the management of fatigue, while allowing the athlete to maintain motivation and intensity. The variances include: duration, intensity, frequency and type. Applied correctly, it can target both aerobic and anaerobic energy pathways.

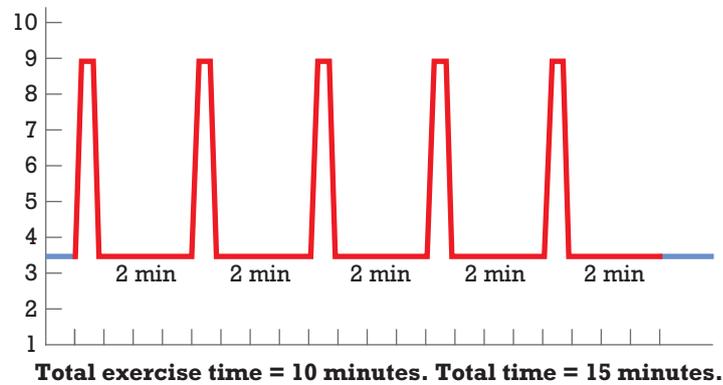


Figure 5.11 Aerobic interval example 1:3

Fartlek

Similar to aerobic interval, fartlek training (meaning 'speed play') involves sustained effort interspersed with 'active' rest. The main difference between interval and fartlek lies in the rest periods. In fartlek the rest periods are active, meaning the athlete is still completing activities at a moderate intensity. Fartlek also tends to be conducted on various terrains, making the sustained effort and intensity high. An example is hill sprints, where athletes sprint up a hilly terrain (working at a high intensity), then jog back down (working at a lower intensity but still working) and on reaching the bottom they immediately turn around and sprint back up the hill.

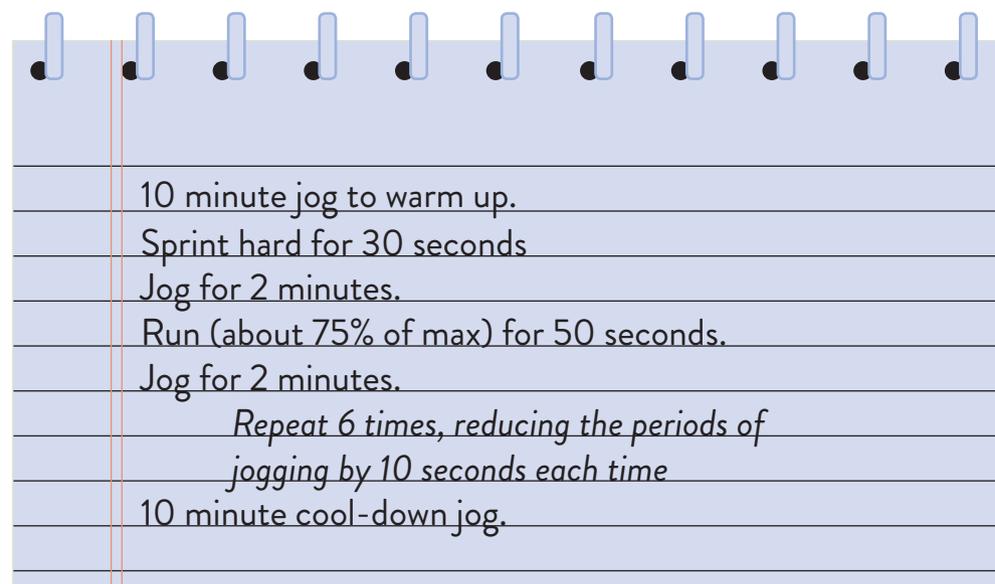


Figure 5.12 Example of a fartlek training session

This is then repeated with no stops. Fartlek training is an excellent example of a training method that applies **progressive overload** because it places greater stress on the body, therefore adapting the **anaerobic training threshold**.

Circuit

Circuit training is a form of interval training because the athlete moves from activity to activity with minimal rest periods in between. Circuits are popular because they can target the whole body and energy pathways. Circuits can be highly complex or simple in nature and they require little to no equipment.

To enable adaptation, the circuits need to increase in duration, intensity, sets and/or repeats progressively.

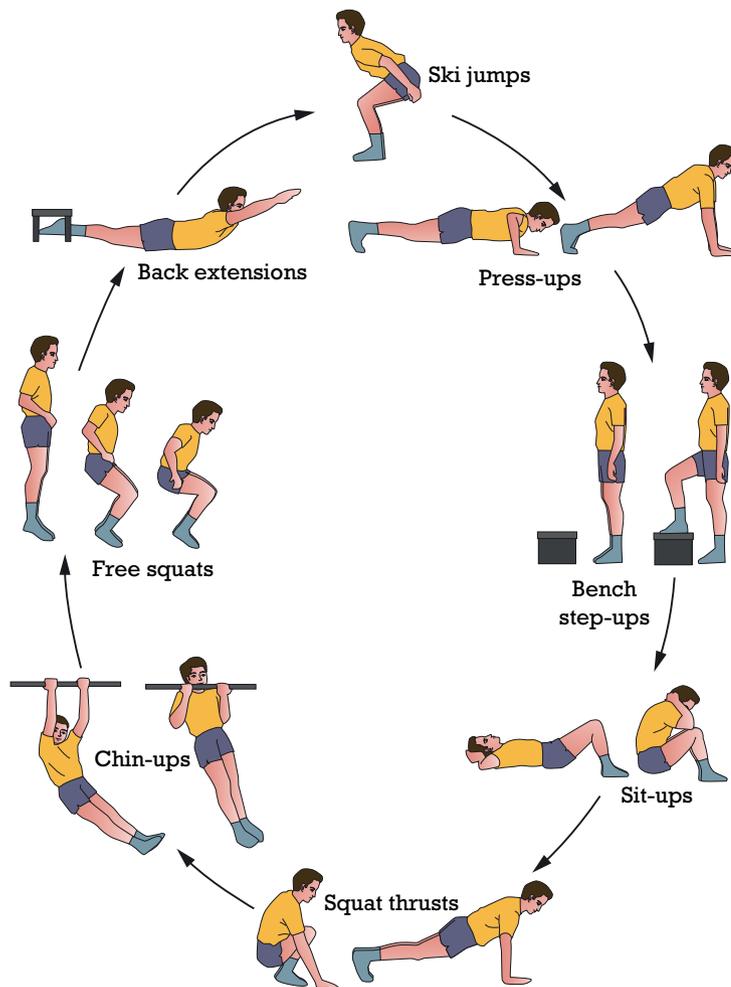


Figure 5.13 A sample circuit training session

Anaerobic training

Targeting the anaerobic energy pathways, anaerobic interval training is similar to aerobic interval training because it combines high-intensity activity with short periods of recovery (less than two minutes, which is the same time it takes the ATP/PCr system to recover).

By shortening the rest periods, athletes are forced to work closer to their anaerobic threshold. As stated earlier, the closer the athlete works to their anaerobic threshold, the better they adapt to lactic acid accumulation, therefore improving their cardiovascular system.

Flexibility

Flexibility is the range of motion (ROM) found at a joint or series of joints. It varies considerably between athletes due to a range of contributing factors: age, gender, genetics or previous injuries. The structural composition of the joint and connective tissue differs, impacting upon the degree of ROM achievable. As an athlete ages, flexibility can be inhibited by loss of elasticity in the connective tissue and reduced joint mobility due to bursa complications, cartilage issues and so on.

There are four main methods of training to increase flexibility. They are: static, dynamic, proprioceptive neuromuscular facilitation (PNF), and ballistic.

To comprehend flexibility training it is important to have a strong foundational understanding of the **stretch reflex** and muscle spindles and their involvement in movement. The *stretch reflex* is an automated, unconscious regulation that controls muscle length through sensory neurons called muscle spindles. Muscle spindles are small sensory receptors that surround skeletal muscle fibres and are responsible for resting muscle tone and contraction of the entire muscle. When a skeletal muscle is stretched the muscle spindle elongates and provides automated resistance that reduces the likelihood of muscle damage due to over exertion.

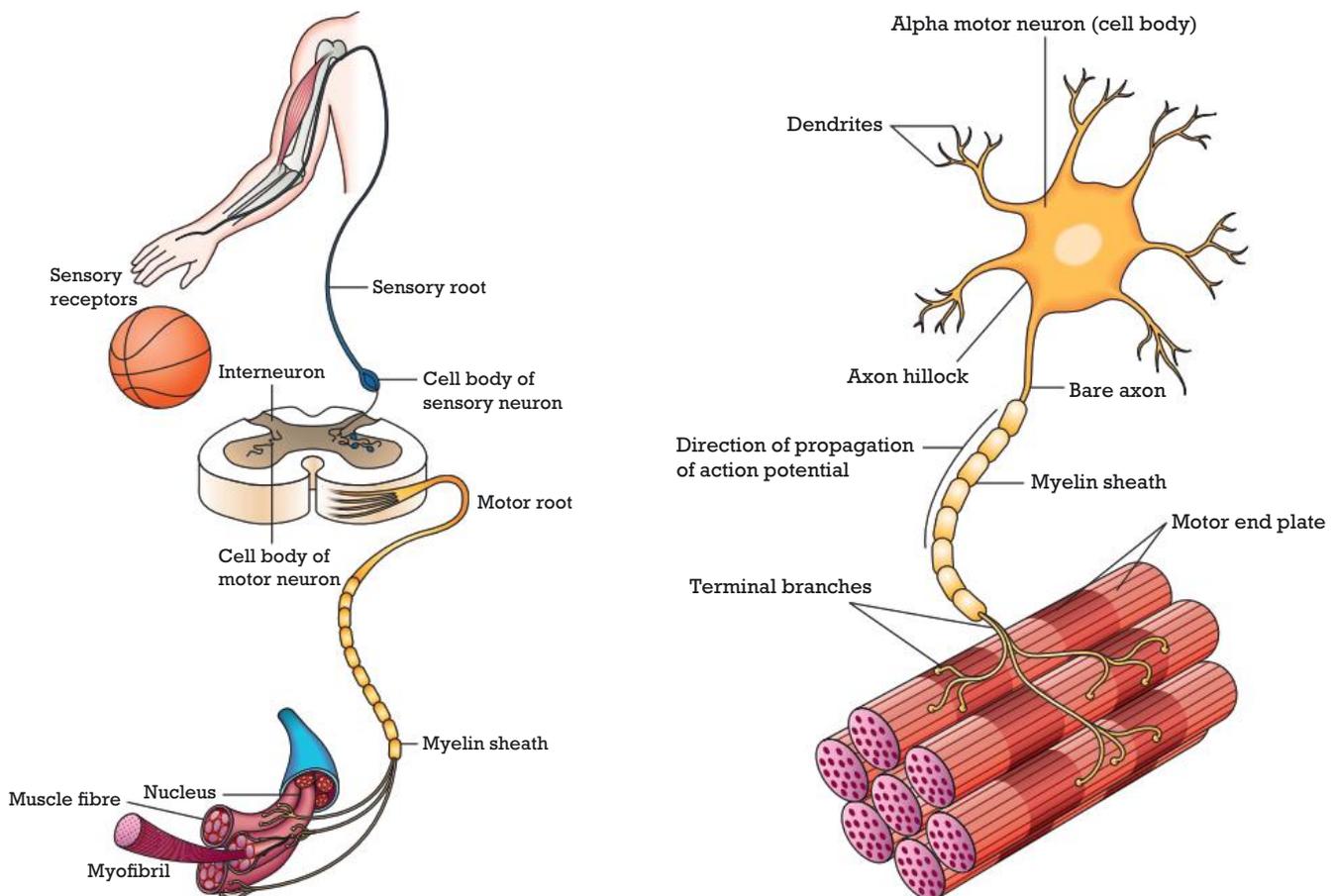


Figure 5.14 Nerve impulses are transmitted from the brain to the muscles via a spinal cord (left); a motor unit (right)

Static

This is the most common form of stretching used by all athletes. Static stretching consists of stretching a muscle to its limit in a controlled and smooth motion, and holding the stretch for approximately 10–30 seconds. As a safe and effective flexibility method, it can be adapted for beginners through to elite athletes.

Static stretching is crucial to athletes because it provides the following elements for improving performance:

- It is beneficial in activating the muscle spindles because it is conducted as a controlled movement.
- It is ideal for ageing athletes because it has a light loading and is self-controlled.
- It is of greatest benefit during cool-down to assist in excreting waste products built up during performance.
- Its simple movements result in fewer injuries.

Dynamic

Dynamic stretching is one of the most beneficial methods of flexibility training because it reduces the likelihood of injury. It does this through continuous and progressively faster movements that replicate the biomechanical movement conducted during the event or game situation. With vigorous movement the body temperature rises and blood flow to muscles increases, enabling greater elongation of the muscles. In addition, dynamic stretching enables the muscles and connective tissues of joints to move through the full range of motion. An example of dynamic stretching is the rotation of the shoulder for throwing sports such as baseball, softball or cricket. Dynamic training has the added benefit of stretching the entire joint used in movement rather than isolated muscles, as would happen in a static stretch.

Performance benefits of dynamic training include:

- increased stretching of the connective tissue at the joint leading to increased range of motion, resulting in reduced injuries
- increased agility of the joint made possible when the connective tissue increases its range of motion
- stimulation of muscle memory through well planned, regular practice prior to training
- activation of the stretch reflex and muscle spindles leading to reduced risk of injury during training and performance.

In summary, dynamic training is a highly effective method of training to be completed at the start of other training and game situations.

Proprioceptive neuromuscular facilitation (PNF)

Proprioceptive neuromuscular facilitation (PNF) stretching involves a combination of methods that have the greatest impact on increasing the muscle spindle receptors and stretch reflex. Most commonly achieved through collaboration with a partner, in the PNF sequence athletes perform a static stretch for 10–20 seconds, followed by an isometric contraction (assisted by a partner) to extend the muscle spindles for 5–10 seconds, followed by a brief relaxation before re-performing the static stretch. The aim is to achieve a greater range of motion on the second static stretch.

Benefits of PNF training include:

- greater range of motion resulting from increased tension on the muscle spindles
- tension developed and held through the isometric contraction, increasing muscle strength
- active and passive range of motion increased
- specific muscles or muscle groups targeted
- realignment of muscle fibres facilitated, resulting in less microscopic damage to connective tissue.



Scout Kozakiewicz

Figure 5.15 PNF stretching influencing stretch reflex

Ballistic

Ballistic stretching is a vigorous adaptation of dynamic stretching that uses more forceful movements and pushing the muscles and connective tissues to their maximum limit, or past their normal range of motion. It involves ‘bouncing’ movements that spring a muscle back to its original position without allowing the muscle to fully relax. Because these exercises stress the stretch reflex mechanism, they can cause injury if athletes practise them inappropriately. Ballistic stretching is mainly practised by elite athletes in sports where this type of movement is already used. These include gymnastics, Australian Rules football and mixed martial arts.

Ballistic stretching programs benefit athletes by:

- increasing the range of motion, specifically by hyperflexion or hyperextension of the joint
- increasing movement beyond the usual range of motion
- improving the stretch reflex mechanism resulting from the inability of the muscle to reduce tension or relax during the movement.

Strength training

Strength is a component of fitness that is required in almost all sports. Prior to the 1960s–70s trainers believed strength was only important in sports or events that relied solely on physical strength, such as weight lifting or athletic field events (for example, shot-put). The research and application of sports science has become increasingly sophisticated and it is now widely believed that all athletes benefit from strength training. The following key terms related to strength or resistance training need to be understood:

- Muscular strength: the force a muscle or muscle group can generate
- Absolute strength: the maximum force against a set resistance that a muscle can exert in a single effort, represented by 1RM
- Muscular power: the explosiveness of strength and the product of combining speed with strength. $\text{Power} = (\text{force} \times \text{distance}) / \text{time}$. For example, two athletes can bench press the same amount of resistance (80 kg) but athlete A can complete the repetitions in half the time of athlete B due to the contribution of muscular power.
- Muscular endurance: the capacity to repeatedly develop and sustain maximal or near-maximal resistance
- Repetition: the number of times an exercise is repeated (without rest)
- Repetition maximum: the value of resistance a person can lift in one effort. For example, 6RM represents the value of resistance that an individual can lift prior to absolute fatigue.
- Sets: the allocation of groups of repetitions
- Passive rest: the time allocated for rest or recovery between sets
- Resistance: weight or force (kg)
- Isotonic: where muscle fibres will shorten and lengthen and engage both agonist and antagonist muscles throughout the range of movement (ROM). Isotonic contractions are further categorised as eccentric (lengthening) and concentric (shortening). An example of an isotonic strength exercise is a bicep curl (free weight/barbell).
- Isometric: when a resistance is applied to the muscle but the muscle length and tension remain constant. An example of an isometric strength exercise is a plank using body weight as the resistance.
- Isokinetic: achieved with the use of machines that enable the muscle to remain at the same tension throughout the full ROM (hydraulic machine).

Resistance-training programs are designed to improve athletes’ muscular strength. Through a well-designed and appropriate program, athletes can make substantial gains and improve absolute strength by 25 per cent in three months. This adaptation occurs as a result of a number of factors. Strength training results in muscle hypertrophy. The increased gain in muscle size

correlates with the increase in strength and vice versa. An athlete who sustains an injury and is unable to train can experience muscle atrophy and loss of strength. However, the increase in muscle size is not the isolated explanation for increases in strength.

In addition to muscle hypertrophy, when athletes participate in strength training programs they stimulate neural adaptations and the recruitment of motor neurons. Gains in strength can be attributed to the increase of motor neurons and, thus, motor units acting synchronously and contributing to muscles' ability to generate force. It is widely believed that the early gains in muscular strength derive predominately from neural factors but long-term gains in strength are the result of muscular hypertrophy.

Strength-training programs vary in their planning and execution. Factors that need to be considered when designing a program are: training goals or aims, resources available, knowledge of techniques, age, gender, sport or event. There are three common methods of strength training: free or fixed weights, elastic and isokinetic.

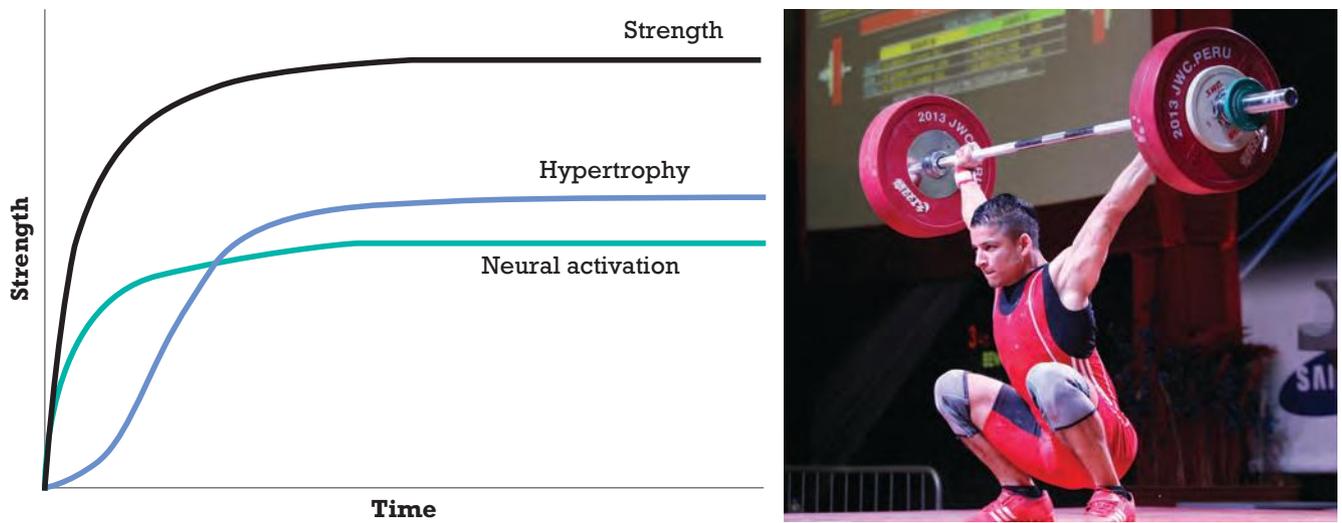


Figure 5.16 Neural and muscular adaptation

Table 5.1 Types of strength programs

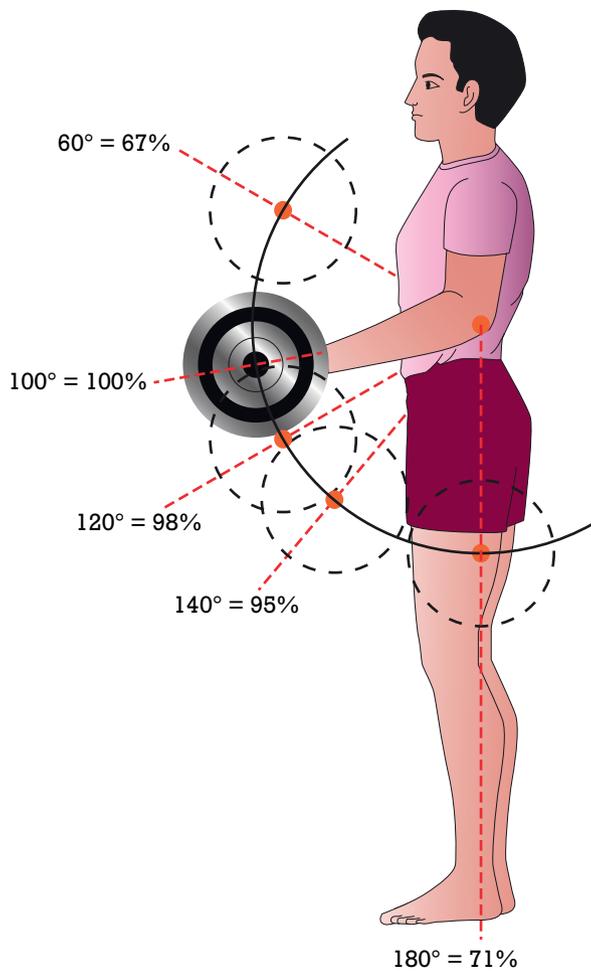
Type of strength	Resistance	Reps	Sets	Rest	Speed	Sports
Absolute	80–100% of 1RM	1–5	3–6	3–5 min	Fast	Olympic lifting, shot-put
Power	70–80% of 1RM	6–10		2–3 min	Fast	Sporting, long jump
Endurance	30–50% of 1RM	12+		1–3 min	Medium	Rowing, martial arts

Free or fixed weights

Free weights

Free weights involve lifting the resistance throughout a dynamic, isotonic movement. Equipment for this includes barbells, dumbbells and kettle balls. When using free weights, the athlete needs to control the lift by recruiting additional motor units while also maintaining stability and balance. This benefits the athlete because it develops core strength but it has to be practised in conjunction with other exercises. In an exercise such as the bicep curl, resistance will vary throughout the action and range of movement. For example, maximal strength is achieved at approximately 100° in the range of movement, whereas the muscular force is at its weakest at 60°.

The benefit of isotonic contractions in free-weight resistance training is that the agonist and antagonist muscles are exerted together. As a result, muscles, or muscle groups, develop



Adapted from *Physiology of Sport and Exercise*,
Wilmore and Costill, 1994

Figure 5.17 Variation in strength relative to angle of elbow flexors. Strength is optimal at 100°.

uniform strength. Also, when the movement is initiated, greater resistance is encountered and this promotes the response of motor units.

Another advantage of free-weights exercise is that the equipment needed is reasonably priced. It can be accessed easily, built upon and expanded once hypertrophy and strength gains are experienced. It is fairly easy to use and store and, due to the commodification of the fitness industry, it can be adapted to suit different lifestyles.

Strength-training programs using free weights do have disadvantages. Having to adjust the resistance constantly for different exercises can be time consuming and a barrier to use. It is also important to have good technique and form and perform the exercises correctly in order to avoid injury. Without correct instruction, athletes could be contributing to acute and chronic injuries.

Fixed weights

Fixed weights include the plated machines commonly found in fitness centres. Exercising with plated weights involves selecting a specific load or resistance and applying force to move them. The muscular contraction involved in using fixed weights is isotonic. The benefit to many athletes is that less technique is required when using fixed weight machines as compared with free weights. Fixed weights are designed to place the body in the correct position to minimise injury and improve form, so they are ideal for beginners, who will develop self-confidence as they gain technique and form, and maximise strength gains. Another advantage is the way they cause isolation of specific muscles or areas that require development. Most plated machines also develop both sides of the body in unison for a more uniform result.

Because of the need to minimise risk and injury, working with fixed weights prevents the engagement of core strength and the recruitment of motor units, so athletes need to engage in additional exercises in order to strengthen these areas. Plate machines can be complicated and although they reduce the risk of injury while improving form, using them without full understanding of how they work can contribute to injury. Athletes can also waste time if, through lack of understanding, they use the machines incorrectly and gain no strength. Fixed weight machines are expensive, so access to them is best achieved by visiting a fitness centre. They are not easily transported, so when an athlete is touring and unable to maintain their strength training, they may experience, atrophy.

Elastic bands

Elastic or resistance bands are beneficial to athletes of all sports as a way of developing strength. They provide a range of resistances, usually coded by the colour of the band. As adaptations occur, the athlete uses a different coloured band to achieve more resistance. The bands are beneficial in that they allow the user to apply the principle of progressive overload. Being light in weight, they are extremely portable, so athletes can maintain their strength training when travelling overseas or interstate for competitions. Elastic bands are more affordable than some other types of equipment, so athletes can easily purchase bands of different resistances. The exercises that have been developed to practise with the bands vary. Many are dynamic

and replicate the biomechanics of movement conducted in a sport or event, thus developing muscle fibre and connective tissue around joints. Developing strength through the full range of movement at a joint, as opposed to an isolated muscle or muscle group, is highly beneficial for reducing joint injuries (such as the rotator cuff).

Using the elastic band dynamically does have the disadvantage that most of the resistance can occur at the end of the movement, when the tension in the band is the greatest. Resistance bands also deteriorate rapidly if in constant use or exposed to heat (for example, when stored in a kit bag), but fortunately they are relatively inexpensive to replace. Another disadvantage is that resistance bands have a limited resistance and are not as expansive as plated or free weights.

Hydraulic

Hydraulic strength training uses isokinetic contractions, which means that tension is developed in the muscles and maintained throughout the full range of movement. Isokinetic contractions can only be achieved by using hydraulic exercise equipment. Hydraulic cylinders apply a constant opposing force as resistance. The benefit of this to the athlete is that it places the muscles or muscle groups under continuous tension and eliminates the effect of gravity. This is in contrast to free weights, where tension can be reduced. Greater resistance is achieved through increasing the speed at which the exercise is conducted. Hydraulic machines allow the athlete to contract muscles at maximal force at all points in the range of motion. Isokinetic training has the advantage of achieving the greatest long-term strength gains in the most efficient amount of time.

Hydraulic machines are very expensive and therefore less accessible, which can be a disadvantage if an athlete is relying on this form of exercise as the predominant form of strength training. These machines can only target muscle groups rather than isolate individualised muscles, resulting in athletes needing to complete alternative forms of strength training in order to target a specific muscle.

Training type

Select a sport of your choice and assess the training type and method most suitable.

Exchange your response with a colleague and peer mark, providing feedback on positives and areas for improvement. Give your colleague specific feedback on depth and accuracy of content, application of the verb (consistency) and the use of examples to support statements.

PRINCIPLES OF TRAINING

This section covers progressive overload, **specificity**, **reversibility**, variety, training thresholds, warm-up and cool-down. When you have read this section you should be able to analyse how the principles of training can be best applied, in both aerobic and resistance training.

Progressive overload

Overload and progression are crucial elements of all training programs. Adaptations are only possible through the exertion of increased loads or stress placed on the body to force it to operate beyond its normal range and become more efficient. To achieve progressive overload, additional stress or load is placed on connective tissue and muscle fibres, the cardiorespiratory system, energy systems and organs through various methods including altering the duration, intensity or frequency of training. To minimise harm, progressive overload should be carefully planned and monitored. Typically, changes are first made to the frequency of training, then to the duration and

LEARNING TIP

A phrase to help you recall the principles of training:

PE Students Remember Very Technical Warm-ups and Cool-downs

This stands for:

Progressive overload

Specificity

Reversibility

Variety

Training thresholds

Warm-ups and cool-downs

finally, the intensity. The progressive overload principle is applied differently for different types and methods of training because it needs to suit the specific athlete and/or sport/event.

In aerobic training, progressive overload can be adapted by increasing the frequency of training sessions. Once aerobic adaptations become evident, increasing the training frequency is essential to place the body systems under stress. In addition to increasing frequency of sessions, the duration of the sessions, intensity level and distance can also be increased. In aerobic training, modifying the terrain of a training session can be effective for overload; for example, by substituting continuous (road running) for fartlek (sand/beach surface or hill training). These environments place stress on the cardiovascular, respiratory and muscular systems, thus effecting change and adaptation.

Evidence of adaptation in aerobic training includes improved **stroke volume** and **cardiac output**, increased **lung capacity** at maximal intensity and a decreased **resting heart rate**.

Recovery is also improved with a reduction in delayed onset muscle soreness (DOMS).

When applied to resistance training, progressive overload is achieved through altering the resistance or weight, increasing the number of repetitions, increasing the number of sets and decreasing the passive rest or recovery time between sets. Adaptation is obvious when muscle hypertrophy occurs and/or an increase in strength is attained.

If a training program does not contain the principles of progressive overload the athlete's training and performance will stagnate and physical adaptations will be reversed. Likewise, when performed incorrectly, progressive overload can stress the body and because it does not allow for rest and recovery, it will increase the onset of acute and chronic injuries.

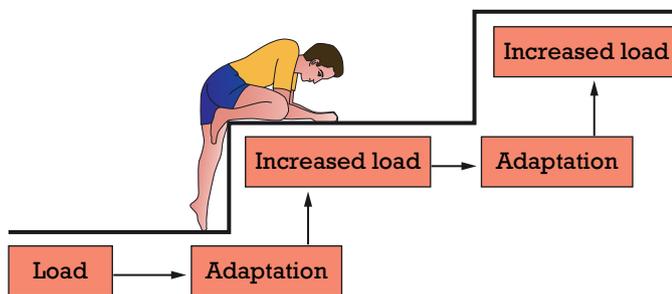


Figure 5.18 Progressive overload

be specific to the type of energy system/s used, the muscles and muscle groups engaged in movement, the skill execution required and the component of fitness predominant in the event. Training must stress the specific physiological system critical for improved performance. For example, a weight lifter would not place great emphasis on aerobic interval or continuous training methods, focusing more on resistance training. Likewise, training for speed, power and agility would benefit a softball player but is unlikely to be specific to a lawn bowler's requirements.

Reversibility

Regular exercise improves an athlete's performance, increases their muscles' ability to generate and withstand force, delays fatigue and improves their overall health and wellbeing. Athletes and trainers spend copious hours planning, implementing, analysing and evaluating training programs to maximise positive adaptations and improve performance. However, if a training program is ineffective because it fails to progressively overload, is not specific to the athlete's needs, is boring and mundane (reducing motivation and effort) and does not target the necessary thresholds, then reversibility is highly likely. Reversibility occurs when training is ineffective or stops, with the result that any training adaptations or gain achieved are lost ('use it or lose it').

Muscular atrophy occurs as a result of reversibility through an athlete being injured or not training. The reduction in the size and mass of the muscle produces a significant loss in muscle strength and power. This is a result of the reduction in neurological stimulation where fibre recruitment is diminished. Muscle atrophy does take a few months but athletes can lose

Specificity

A training program needs to be designed explicitly for the athlete and their sport or event. Training should

up to 45 per cent of their original strength gains if absent from training for an extended period of time.

In contrast, muscular endurance decreases after only two weeks of inactivity. Changes to oxidative enzymes (aerobic glycolysis) following detraining can decrease by 40–60 per cent, reducing the aerobic capacity of athletes. However, the glycolytic enzymes (anaerobic glycolysis) are unchanged, meaning that aerobic

capabilities decrease while anaerobic fitness can be maintained for longer without training, although it is affected by a reduction in muscle glycogen storage of up to 40 per cent.

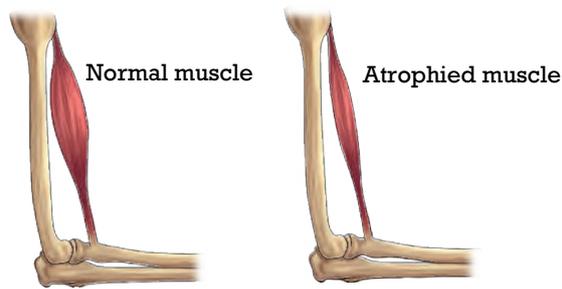


Figure 5.19 Muscle mass is reduced because muscles atrophy with disuse.

Variety

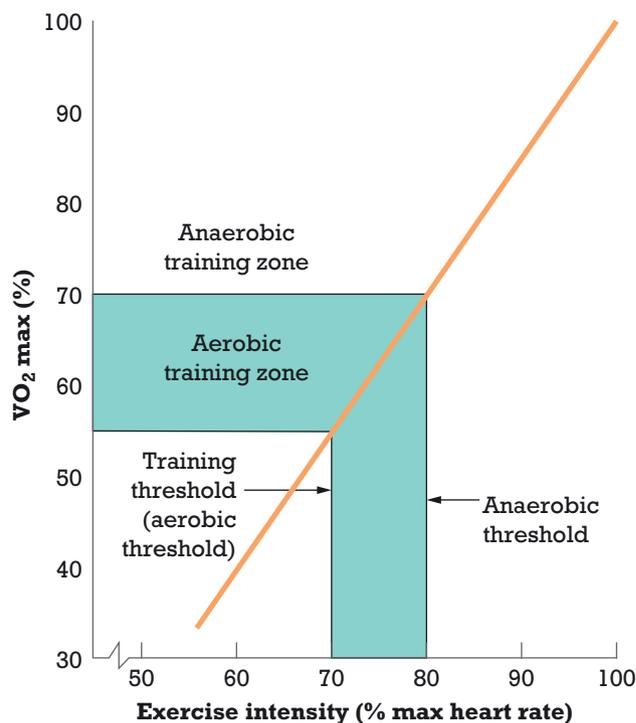
Variety in training is essential to maintain athletes' interest and motivation. While not an essential principle of training for physiological adaptation, in order to avoid **over-training** symptoms such as physical fatigue and psychological boredom, coaches should use a variety of training types and methods to engage and enthuse their athletes. To enhance skill development, variety can be introduced in warm-ups/cool-downs and during conditioning training. Examples include: a softball team playing a game of ultimate frisbee to warm up dynamically, football players using a variety of resources and equipment during strength training; for example, large tyres or towing a team-mate on a sled.

Training thresholds

To achieve adaptation and improvement in their performance, athletes must work at a minimum intensity level and duration. There are two training zones: aerobic and anaerobic. Thresholds are values determined using heart rates and VO_2 max readings that indicate the minimum work rate required to exercise in a specific training zone. The minimum heart rate for aerobic adaptations to occur is around 70 per cent and to calculate maximum heart rate the general guideline is $\text{MHR} = 220 - \text{age}$.

The aerobic threshold begins at approximately 70 per cent MHR and 55 per cent VO_2 max. Should an athlete fail to reach this minimum working rate there will be limited physiological gain or improvement. For an athlete to train above the aerobic threshold and within the aerobic training zone, their working heart rate would ideally be between 70 and 80 per cent of their MHR. Working aerobically within this zone would induce aerobic adaptations such as improved resting heart rate and cardiovascular and respiratory function, increased fat-burning potential and an increase in **haemoglobin**, to name a few.

Training above 80 per cent of the athlete's MHR means they are above the anaerobic threshold and working within the anaerobic training zone as well as using the alactacid (ATP/PCr) and anaerobic lactic acid (glycolytic) energy systems. This results in the accumulation of pyruvic acid and lactic acid hydrogen ions, which impacts on the athlete's lactate inflection point. It is advantageous for athletes competing in anaerobic sports to train as close as possible to the anaerobic training threshold in order to delay the onset of lactic acid and hydrogen ions (H^+). That would lead to long-term adaptation where the anaerobic threshold would be increased, resulting in the athlete being able to work for longer periods, accumulate hydrogen ions and delay fatigue.



Adapted from B Sharkey, *Fitness and Health*, Human Kinetics, 2006 (6th edn)

Figure 5.20 Training zones and thresholds

Warm-up and cool-down

A good warm-up is essential if an athlete's training adaptations are to be effective, performance improved and harmful injuries (acute or chronic) to be avoided. Generally, the warm-up should consist of three phases. The first is a general one where large muscle groups are targeted to increase vasodilation and increase blood flow to the muscle. This results in an increase in core body temperature, affecting the elasticity of the connective tissues and decreasing the risk of injury through sprains and strains. The second phase should include dynamic exercises that replicate the biomechanical movements involved in the sport or event. Dynamic exercises stimulate motor neurons, activate the stretch reflex and muscle spindles and initiate muscle memory. The final phase of warm-up should be specific to each individual athlete and target specific muscles using static stretches. This is vital for athletes who have pre-existing conditions or who experience DOMS in particular areas, such as the gastrocnemius or soleus muscles.

Cool-downs are crucial to restore the body to its normal pre-exercise state and are effective in the prevention of muscle soreness. Cool-downs should consist of light workloads where the intensity is slowly reduced to prevent blood pooling in the lower extremities, and be followed by static stretching to elongate the muscle fibres and assist with the removal of waste products, relieving DOMS. Stopping abruptly or neglecting to complete an effective cool-down can cause blood to pool in the extremities, resulting in high levels of catecholamine (dopamine and adrenaline) remaining in the bloodstream which, in the worst-case scenario, can cause heart arrhythmia.

Warm-ups

- 1 Explain the benefits (both acute and chronic) of a thorough warm-up and cool-down as part of a training session.
- 2 Select three principles of training and identify their relationship to improved performance.

PHYSIOLOGICAL ADAPTATIONS IN RESPONSE TO TRAINING

This section covers resting heart rate, stroke volume and cardiac output, oxygen uptake and lung capacity, haemoglobin level, muscle hypertrophy and the effect on fast/slow-twitch muscle fibres. When you have read this section you should understand the relationship between the training principles, physiological adaptations in the body, and improved performance.

The basis of training is to elicit adaptations within the body to increase and improve on performance. These adaptations require specific training regimes using the principles of training to effect enhancement in a range of areas.

Resting heart rate

An average resting heart rate (RHR) is between 60 and 80 beats per minute. Aerobic training can significantly reduce the RHR of an athlete. An RHR of 28 is the lowest reported measurement. This reduced RHR is a result of the growth of the cardiac muscle and, thus, cardiac hypertrophy. RHR is also decreased as a result of increased venous return, thus improving systolic volume (Starling's law). This law states that as an increased volume of blood flows into the ventricle, the blood volume stretches the cardiac muscle fibres, resulting in an increase in the force of the ventricular contraction leading to improved cardiac contractibility. Endurance training also influences the parasympathetic nervous system responsible for conserving energy, rest and recovery. The parasympathetic nervous system lowers heart rate and makes changes to the vasodilation and vasoconstriction of blood vessels. Training also affects the cardiac cycle, prolonging the diastole phase. A contributing factor is the improvement to stroke volume and cardiac output that contributes to the decreased RHR of athletes.

Stroke volume and cardiac output

Stroke volume (SV) is the volume of blood that the heart ejects in each contraction. It is influenced by the volume of venous blood returned to the heart, the capacity of the ventricular wall to expand, the contractibility of the ventricular wall and aortic artery pressure. Stroke volume increases with increased physical activity, although not beyond approximately 60 per cent of maximum capacity. At sub-maximal effort, SV will plateau and remain constant until the point of exhaustion. While engaging in supine aerobic training (swimming), SV increases by approximately 20–40 per cent, resulting from the elimination of the effects of blood pooling and more efficient venous return. When training aerobically in an upright position (running), SV will almost double from the resting values to maximal values. For example, in highly trained athletes SV can increase from 90–110 mL at rest to 180–200 mL at maximal exercise after upright training. Therefore, for increased adaptation in SV from aerobic training programs, completing sessions in an upright position (running, cycling) will have a greater effect on SV. The increase of SV can be attributed to Starling's law where the contractibility of the ventricles has a direct correlation with the amount of force they can generate to expel blood volume, as well as the increased venous return. Increased venous return results from the redistribution of blood from inactive arterioles and arteries. As a result of these factors during training sessions and in competitions – the venous return and contractibility and extensibility of the ventricles – the SV is improved and the heart can function with greater efficiency.

Cardiac output

Cardiac output (CO) is the amount of blood ejected by the left ventricle per minute. This is an important factor in assessing ventricular efficiency over time. CO is the product of both the heart rate (HR) and SV and therefore increases with training ($CO = SV \times HR$). CO at rest or

at sub-maximal effort will show very little change. However, maximal effort is where adaptation from training has its greatest influence. An untrained athlete has CO ranging from 14–16 L min⁻¹ compared to a highly trained athlete whose CO can range from 20–25 L min⁻¹. As discussed previously, there are a number of factors that influence CO. It is affected specifically by SV with a rise correlating directly to an increase in CO.

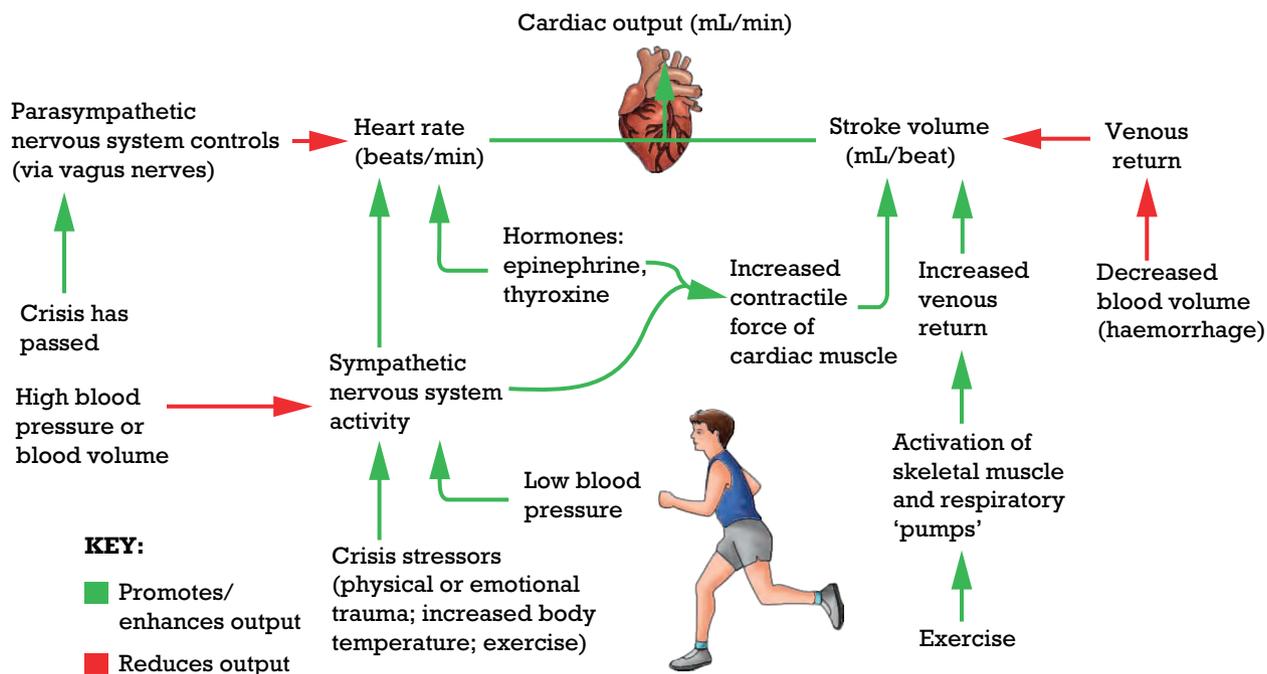


Figure 5.21 Influences on cardiac output

Oxygen uptake and lung capacity

Regardless of any improvement or adaptations being made to the cardiovascular system, if there is no improvement in the oxygen transport system to supply, transport and distribute oxygen, adaptations are irrelevant.

Oxygen uptake

Oxygen uptake refers to the volume of oxygen used by the body per minute and is commonly termed $\dot{V}O_2$. With maximum or exhaustive exercise, $\dot{V}O_{2\max}$ is used as a measure to assess the transportation and usage of oxygen. $\dot{V}O_{2\max}$ is expressed in millilitres of oxygen, per kilogram of body weight, per minute. With training lasting six months or more, $\dot{V}O_{2\max}$ can increase by approximately 20 per cent, resulting in an athlete being able to perform more efficiently and at a higher work rate. Contributing to oxygen uptake are the adaptations evident in the number and size of **mitochondria** within the muscle fibres. Endurance training can result in a 15 per cent increase in the number, and a 25 per cent increase in the size, of mitochondria. A higher number of mitochondria leads to an increase in the volume of oxygen being transported by the myoglobin to the mitochondria for ATP, or energy production. In addition, the increased number and size of mitochondria improves efficiency of the oxidative enzymes within the mitochondria, which directly increase as a result of aerobic training.

Lung capacity

Lung capacity refers to the sum of one or more lung volumes. Lung volumes measure the amount of air in a specific function such as tidal volume or inspiratory reserve volume.

Training results in a slight increase in vital capacity (the volume of air expelled after maximal inspiration), while residual volume (the volume of air that cannot be moved out of the lungs) shows a slight decrease. Therefore lung capacity, as a result of training, remains essentially unchanged. However, tidal volume (the amount of air breathed in and out during respiration) does increase at maximal effort during training, leading to an increase in volume of oxygen and removal of carbon dioxide during this state. An adaptation of exercise is a reduced respiration rate at rest that results from an increase in pulmonary efficiency. This can be attributed to the hypertrophy of the diaphragm and muscles surrounding the lungs. An increase in the volume of capillaries in the lungs leads to increased gaseous exchange.

Haemoglobin level

Red blood cells (RBC) transport oxygen via haemoglobin. Haemoglobin is composed of a pigment (haem) and a protein (globin). Haem comprises iron and is responsible for the oxygen binding to the haemoglobin. A single haemoglobin molecule can carry four oxygen molecules. An individual RBC contains approximately 250 million haemoglobin molecules and therefore can bind with over a billion molecules of oxygen. For every 100 mL of blood, up to 20 mL of oxygen can be found. The glycoprotein hormone erythropoietin (EPO) is responsible for RBC synthesis and an increased stimulation can occur in trained athletes. An increase in EPO and the synthesis of new, younger RBC leads to improved metabolic activity. The increase in RBC correlates with the increase in haemoglobin levels and improved aerobic capabilities resulting from aerobic training. Haemoglobin efficiency is also improved through training as a result of the increased demand for oxygen, which triggers improved unloading of oxygen from the haemoglobin molecules.

Muscle hypertrophy

An increase in muscle size is referred to as muscle hypertrophy. There are two forms of hypertrophy: transient and chronic. As the term implies, transient hypertrophy occurs in the short term due to the adaptation to resistance training where edema (fluid retention) occurs in the intracellular and interstitial spaces within the muscle. The fluid is usually sourced from blood plasma. Chronic hypertrophy is the more commonly known adaptation of growth in muscle cells due to structural changes involving hyperplasia (increased number of muscle fibres) and hypertrophy (increase in the size of existing muscle fibres). Resistance training leads to muscle fibre hypertrophy due to an increase in protein synthesis. Protein synthesis is where cells produce new proteins due to the degeneration of old cells and this influences the hypertrophy of muscles.

Repeated activation of muscle fibres stimulates functional and structural adaptations affecting other elements of performance such as: an increase in the myofibrils (the part of muscle that contracts), muscle fibre type, mitochondrial functions, increase in glycogen stores, myoglobin content, supply of capillaries and oxidative enzyme.

Effect on fast-/slow-twitch muscle fibres

Slow-twitch muscle fibres (ST) are effective for endurance sports because their contractions are longer and slower, whereas fast-twitch muscle fibres (FT) are used predominately in power sports that require explosive movements.

Aerobic activities that are of low to moderate intensity rely heavily upon the ST muscle fibres. In response to endurance training the ST muscle fibres can become 5–20 per cent larger than their FT counterparts, although this will differ significantly between athletes. Studies have claimed that muscle fibre size, specifically ST fibre size, has little to no impact on aerobic performance or capacity. Fibre size is more crucial in power sports and events that rely on the

rapid generation of strength. Aerobic training does not change the fibre percentage although studies have indicated that athletes who have trained aerobically for a number of years have altered the FT characteristics by becoming more oxidative.

Through endurance training, muscle fibres adapt by increasing the volume of capillaries that surround each muscle fibre, as well as the number of capillaries for a given cross-sectional area of the muscle. Aerobically trained athletes can have 5–10 per cent more capillaries in their quadriceps than an untrained athlete, enabling greater exchange of gases, delivery of nutrients, removal of waste products and so on. The number of capillaries directly relates to the efficiency and delivery of oxygen to ST muscle fibres.

When oxygen enters the muscle fibre it binds directly to the myoglobin, which then transports it to the mitochondria. ST fibres contain large quantities of myoglobin, which creates the red appearance of the muscle fibres (myoglobin has a pigment that turns red when bound to oxygen), whereas FT fibres are glycolytic and have little myoglobin, making them paler/white in appearance. Myoglobin stores oxygen and transfers it to the mitochondria to be used when oxygen is depleted. Aerobic training has been identified to increase muscle myoglobin stores in ST fibres by up to 75 per cent.

FT muscle fibres benefit from anaerobic training methods. Because FT muscle fibres contract quickly and release energy with explosive actions, they fatigue rapidly. Adaptations to FT muscle fibres include the increased storage of ATP and PCr, resulting in an increased fuel supply to improve efficiency. Training close to the anaerobic threshold improves an athlete's lactic acid tolerance and delays fatigue. An increase in glycogen storage (as a result of training) improves the efficiency and effectiveness of the anaerobic glycolysis energy system's fuel supply and the duration capability of FT muscle fibres. Lastly, athletes benefit from muscle hypertrophy increasing the size and generation of force in FT muscle fibres.



Adaptations in the body

Create the following table and summarise the information. There is a digital copy of the table on your student website.

Component	Definition	Change	Adaptation (due to)	Principle of training plus type of training
Resting heart rate				
Stroke volume				
Cardiac output				
Oxygen uptake				
Lung capacity				
Haemoglobin level				
Muscle hypertrophy				
Effect on fast- and slow-twitch muscle fibres				

CHAPTER SUMMARY

- Both anaerobic and aerobic energy systems contribute to energy pathways and it is the intensity of an activity that determines the dominant energy system.
- The breakdown of glucose is called glycolysis and can occur aerobically and anaerobically.
- The breakdown of triglycerides is called lipolysis and this creates free fatty acids (FFAs).
- Adenosine triphosphate (ATP) consists of adenosine and three phosphate molecules.
- The ATP/PCr (or alactacid) system is used for explosive, powerful short duration activities (10–20 seconds at high intensity).
- The lactic acid, or anaerobic glycolytic energy system, uses glycolysis (without oxygen) and lasts between one to three minutes depending on intensity. It can produce 1 glucose: 2 ATP or 1 glucose: 3 ATP.
- The aerobic glycolysis energy system is the most productive of ATP, generating 38 ATP molecules, although at a slower rate. It is therefore used in endurance activities such as marathons.
- Aerobic training consists of continuous, aerobic interval, circuit and fartlek. The main aim of aerobic training is to make the cardiorespiratory system as efficient as possible.
- Anaerobic training consists of anaerobic intervals and aims to develop cardiorespiratory endurance in conjunction with the development of higher tolerance for lactate and hydrogen ion build-up in muscles.
- Flexibility training consists of static, dynamic, ballistic and PNF with the aim of improving the range of motion at a joint, resulting from the increase in elasticity of the connective tissue and development of the stretch reflex mechanism.
- Strength training involves free or fixed weights, elastic and hydraulic. The aim is to improve the force the muscle can generate within both a singular and repeated effort.
- To maximise training for improved performance, certain training principles should be applied, such as: progressive overload, specificity, reversibility, variety, training thresholds, warm-ups and cool-downs.
- As a result of training, an athlete can anticipate physiological adaptations to occur, including: decreased resting heart rate, increased stroke volume and cardiac output, increased VO_2 max and improved lung capacity at maximal effort, increased muscle hypertrophy and alterations to fast-twitch and slow-twitch muscle fibres.

CHAPTER REVIEW ACTIVITIES

- 1 **Compare** the aerobic and anaerobic energy systems.
- 2 **Identify** the advantages and disadvantages of the different types and methods of training.
- 3 **Analyse** how the principles of training are applied to the different types of training.
- 4 **Explain** the physiological adaptations to training.
- 5 **Explain** the relationship between the physiological adaptations and the principles of training.



CHAPTER 6

Psychology and performance

IN THIS CHAPTER

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MOTIVATION

Effective use of psychology can give an athlete an advantage over their competitors. Many factors affect an athlete's psychological state, readiness and ability to manage their performance. This section looks at positive and negative, intrinsic and extrinsic forms of motivation. When you have read this section, you should be able to look at different performance scenarios and decide the most appropriate forms of motivation to be used.

Motivation, also termed incentive, can be a powerful driver to either improve or impact negatively on an athlete's performance. With increasing use of technology to improve an athlete's training and equipment, much of the difference between two competitors can be related to psychology. Motivation is essential in initiating a task and persisting with it. In a training situation, it is crucial to accomplish the physiological adaptations for improved performance. To achieve this, the athlete needs to maintain their interest in training because any decrease in motivation can lead to a decrease in effort, which affects conditioning gains, skill development, and the intensity applied in both training and events. All of this has a positive or negative impact on performance. Since athletes differ in their attitude to training, a range of motivational methods can be applied to maintain their drive and interest.

Positive and negative motivation

Positive motivation

Positive motivation can be seen as rewarding an athlete for performance. Positive motivation often evokes a desired response from an athlete and encourages them to behave, train and perform in a particular manner, typically resulting from previous positive reinforcing behaviours by the coach, spectators or media.

Positive motivation is continual reinforcement through positive praise, or external rewards such as sponsorship deals, trophies or recognition. The athlete strives in performance to achieve the same, similar or even better positive reinforcement. Positive motivation can be both internally and externally based. This form of motivation is effective with cognitive or beginner athletes, or athletes who suffer from **anxiety** where it can be used to boost self-confidence and self-esteem.

Negative motivation

Negative motivation is driven by applying a consequence or an adverse reinforcement for poor performance.

The athlete is aware that a poor effort or performance will result in negative feedback (or actions) from coaches, possible removal from a team, loss of fan base or even sponsorship deals. Negative motivation derives from fear of the consequence. Negative motivation in sport psychology is disadvantageous for cognitive athletes and most effective with autonomous athletes who can be motivated by poor performance.



Shutterstock.com/Melissa King

Figure 6.1 Positive motivation

Intrinsic and extrinsic motivation

Intrinsic motivation

The athlete must find his or her own intrinsic motivation in their person. Intrinsic motivation is commonly termed 'drive or initiative'. It can be defined as 'performing an action or engaging in a behaviour because of the enjoyment and satisfaction derived from the activity itself'. The athlete finds inspiration and reward just by completing the task, without the need for external validation. Intrinsically motivated athletes possess a psychological ability to achieve competence and they have the self-determination to improve. They are driven internally by a range of factors that can include: sensory pleasure and excitement (such as positive aesthetic interaction), fun and engagement, mastery of **skill acquisition**, and the ability to surpass personal achievements. Intrinsic motivation has been proven to extend an athlete's career because the enjoyment they experience contributes positively to their success.

**Surpassing my achievements feels incredible;
I want to replicate that again and again.**

Figure 6.2 Quote by Katherine Reutter, US silver medallist in speed skating, 2010

Extrinsic motivation

Extrinsic motivation in an athlete comes from external sources or outcomes. It can be positive (such as materialistic rewards) or negative (such as punishments or negative consequences). Extrinsic motivation plays an important role in sports psychology because it often supports the development of intrinsic motivation. For cognitive learners, extrinsic motivation can be a powerful driver in skill accomplishment, engagement in tasks and repeating certain behaviours. It can also be a deterrent because some learners rely on external validation, such as money and fame. Negative extrinsic motivation can be harmful because athletes are fearful of the consequences of poor performance and this can manifest into anxiety.

JELENA DOKIC BOOK: YEARS OF HARROWING ABUSE ULTIMATELY A STORY OF SURVIVAL

Scott Spits

Jelena Dokic says the decision to turn her back on Australia and play for Yugoslavia remains the biggest regret of her life and her tennis career.

Suffering extreme emotional and physical abuse at the hands of her father Damir Dokic, the tennis star 16 years ago was forced to publicly defend the move because of the fear of repercussions if she contradicted her father.

Dokic returned to represent Australia once again and famously received enormous overwhelming public support when she reached the quarter-finals at the 2009 Australian Open.

Dokic has released a book about her extraordinary experiences in which she says she emerged as a survivor from years of horrendous abuse, including once being beaten so badly she was left unconscious, regular beatings with a leather belt, emotional manipulation and vile verbal harassment in which she was described as a 'slut' and a 'whore'.

The book details Dokic's fruitless attempt to mend her relationship with her father in 2011 after he was imprisoned in Serbia but she also revealed to Fairfax Media that other attempts to achieve a form of reconciliation had ultimately failed.

'I've tried to reconcile with him over the years, and I tried to kind of – almost say – fix things between us, but I think, you know, I've gotten to realise he's who he is,' Dokic said.

In the book, Dokic detailed her decision to visit her father at his home on the outskirts of Belgrade six years ago when she was sidelined with injury and she was in the latter stages of her career.

'After some amicable chat, I tell him he went overboard, that he mistreated me not just with physical but with verbal abuse, like the phone calls, and by freezing out my brother and mother from my life. Once my tears start, they fall thick and fast,' Dokic writes.

Source: *Sydney Morning Herald*, 13 November 2017

Questions

- 1 If Mr Dokic was trying to motivate his daughter, what type of motivation was he using?
- 2 What kind of behaviours did this motivation lead Jelena to engage in?
- 3 How did Mr Dokic's behaviour affect the tennis star, both at the time and now (since her retirement from tennis)?

ANXIETY AND AROUSAL

This section looks at trait and **state anxiety**, sources of stress and **optimal arousal**. When you have read this section you should be able to explain the differences between anxiety and arousal, and their effects on performance.

Physical ability and prowess is only one element of successful sports performance. A truly talented athlete can recognise different factors impacting on their performance and successfully acknowledge, deal with and use those influences to their advantage. An elite athlete needs to develop a mental framework and the ability to deal with the environmental and psychological variables required by participation in high-level sport.

Anxiety

Anxiety is a multidimensional, negative reaction experienced in response to a perceived threat. It can encompass somatic (physical) reactions such as sweating and trembling, and cognitive (mental) feelings of worry, unease, nervousness, apprehension and powerlessness. There are two commonly termed classifications of anxiety in sport: trait and state.

Trait anxiety

As the name implies, **trait anxiety** is derived from the athlete's innate **personality**. It is a chronic, non-psychotic condition experienced by the athlete in multiple situations. It may also affect them away from the sporting arena. An athlete who experiences trait anxiety will most likely suffer a degree of anxiety prior to all competitions and have an increased predisposition to suffer from anxiety in major events.

State anxiety

Athletes can experience state anxiety in high-pressure events such as a grand final, an Olympic trial or taking the deciding penalty shot. They may only experience state anxiety sporadically, meaning that it may manifest in one high-pressure situation and not the next. Factors that can cause state anxiety include the athlete's internal motivation for success (pressure to win), external pressure to succeed (sponsors, media, spectators), and audience (family, scouts).

Anxiety, both trait and state, can manifest with somatic and/or cognitive symptoms. Athletes describe common somatic symptoms as stomach disruptions (cramps, butterflies), profuse perspiration, increased respiratory rate, elevated resting heart rate, fine motor tremors and headaches. Cognitive symptoms include feelings of apprehension about a competition, increased nervousness, negative thoughts about poor performance or failure, and difficulty in concentrating. It is crucial to understand that whether an athlete suffers multiple or singular symptoms of anxiety, its impact on performance is still significant.

Stress

The term stress is often confused with anxiety. However, sports psychologists and researchers have identified a distinct difference between the somatic, cognitive and emotional symptoms of stress and anxiety and their influence on performance. Anxiety is an emotional reaction, whereas stress refers to a broader range of emotional responses derived from the physical reactions of the body. These can be either eustress (positive) or distress (negative) depending on the initial cause of the stress. The responses to stress are believed to encompass three dimensions: somatic (increased heart rates when resting or working, increased perspiration, increased tension in the muscle fibres), cognitive (changes to perception and/or awareness, decreased memory capabilities, decline in decision-making skills which affects the selection of appropriate responses in performance) and emotional (withdrawal from training, decreased motivation, increased frustration manifested through anger and violence and increased introvert behaviour).

Sources of stress

The source of the stressors can be both internal and external influences, as well as the sporting arena or the athlete's environment and daily life. Stressors affecting athletes can include:

- competitive stressors: mastery of skill acquisition, training schedules and preparation, injury, opponents and pressure to perform
- organisational stressors: position insecurity, career progression, travel and accommodation, conflicts in roles within a team, income, cultural or political issues and a lack of social support
- personal stressors: family issues, balancing career and family roles, financial concerns, personal issues and relationships.

Researchers have found that athletes from a magnitude of sports report similar competition stressors across all three domains; however, variety and difference were most commonly reported as organisational stressors, and the least mentioned category was personal. This could confirm that while competition stressors are homogenous between athletes, their individualised sports or events have a greater impact on their exposure, experience and management of stressors. For example, Michael Jordan undoubtedly experienced eustress and distress throughout his career but he became one of the greatest players of all time. This could be attributed, in part, to the personal support he received from his team-mates, family and support team (manager, personal assistants coaches, who performed organisational duties on his behalf).

On the other hand, stress can destroy a sporting career. Sally Robbins, a member of the Australian women's eight rowing team at the 2004 Olympics in Athens, 'laid down' during the last 400 metres of the race, claiming exhaustion. The media storm that followed, including public ridicule for Robbins, led her to leave the sport in 2007, citing 'motivational problems'. In the years that followed, Robbins' team-mates cited 'a defeatist behaviour' and 'a history of choking at critical moments' as the reasons for her response to the incident.



AAP Image/Julian Smith

Figure 6.3 Sally Robbins (centre) breaks down during the women's eight final as team-mate Julia Wilson encourages her to start rowing on their way to finishing last in the event at the 2004 Olympic Games.

Optimal arousal

Arousal, in isolation, is not an emotion but a physiological state characterised by stimulation and a general excitement or preparedness. Arousal is initiated by the autonomic nervous system increasing: muscle fibre tension, secretion of catecholamines (noradrenaline and adrenaline), thermoregulation mechanisms such as evaporation, heart rate and the release of glucose. Arousal also increases alertness and the readiness to respond to stimuli.

A well-known theory explaining the influence of arousal on performance is the Yerkes-Dodson Law, more commonly known as the inverted U theory. Yerkes and Dodson proposed that an athlete's arousal level has a direct correlation with improvement in performance. They proposed that if an athlete is not aroused enough (too little) then their performance will suffer due to them lacking motivation and being sluggish when responding to a stimulus, demonstrating uncontrolled movements that affect skill execution and being easily distracted. When an athlete is over-aroused, anxiety is believed to contribute to poor performance and feelings of apprehension and nervousness. These then impact on their motor control and cognitive functioning, causing a deficiency in skill execution and an overall dysfunctional performance. When positioned acutely with optimal arousal levels, the theory states that this will invoke a

highly successful performance where the athlete has optimum physical and cognitive capabilities to execute skills. The athlete is highly engaged in the task, intrinsically motivated to perform and achieves a finely tuned balance of motor control so that they perform at their best.

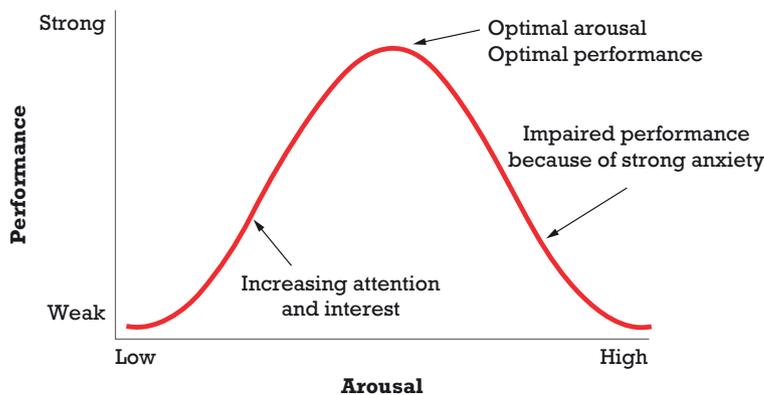


Figure 6.4 Inverted U theory for optimal arousal, the Yerkes-Dodson Law

Yerkes and Dodson believed that there was an ‘optimal’ state of arousal for every athlete that would invoke ‘Individual Zones of Optimal Functioning’ (IZOF). This theory accounts for the individualistic nature of the sport or event, the competition level, the individualism of the athlete and their capabilities to deal with performance pressures. They believed that some athletes performed optimally with low levels of arousal, while others required a higher degree of arousal to complete the same task.

While the inverted U theory does explain many performance elements displayed by athletes, it is highly simplistic and too limited to account for the intricacies of skill acquisition and the difficulties involved in sports performance. However, applying the IZOF does account somewhat for the complexity of the stages of skill acquisition and individualised sporting mechanics. Cognitive (beginner) learners require a significant level of attention to execute a skill and rely heavily on external cues from their environment. A cognitive learner will often perform better with lower arousal levels than an autonomous athlete because a high level of arousal could lead to distraction and spoil the performance. In addition, ‘optimal’ levels of arousal will vary for different sports and sporting pursuits. Sports using large muscle groups and gross motor skills (such as rugby union, weightlifting and boxing) may benefit more from higher rates of arousal levels than more intricate, finer skills requiring a high degree of coordination (such as archery, shooting or darts). Moreover, the complexity of the skill will require varying levels of arousal. A highly simplistic skill will require a higher level of arousal to prevent boredom, whereas a highly technical skill will require a lower level of arousal to maintain focus and concentration. Different skills within one sport are also required. In cricket, for example, a batsman requires a different level of arousal compared to a bowler. It is essential for the athlete and the coach to communicate regularly and identify the highly individualistic optimal level of arousal required by the athlete. Certain circumstances and situations – especially team sports – require different echelons.

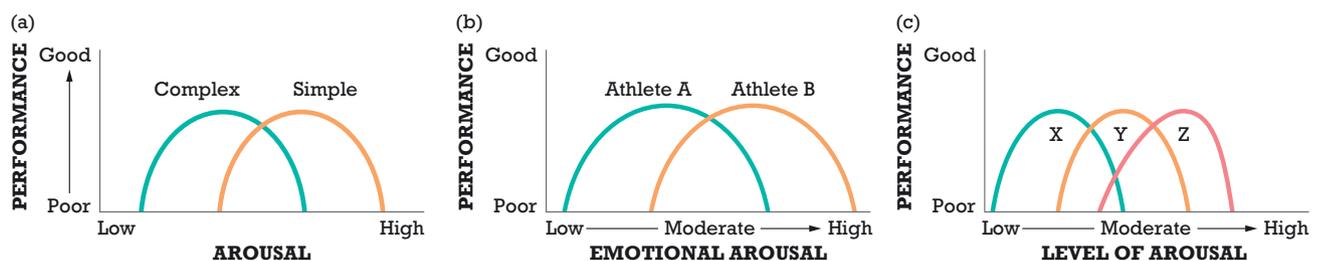


Figure 6.5 Differences in optimal arousal for effective performance

Optimal arousal

- 1 Using the following list of eight sports, identify where on the inverted U each one would be placed in regard to optimal arousal (X, Y or Z). Use figure 6.5 (c) on page 103.
pistol shooting, ice hockey, basketball, darts, rugby union, soccer, boxing, cricket
- 2 Explain the different arousal levels required for two of these sports.

PSYCHOLOGICAL STRATEGIES TO ENHANCE MOTIVATION AND MANAGE ANXIETY

This section is concerned with concentration/attention skills (focusing), **mental rehearsal/visualisation**/imagery, relaxation techniques and goal setting. When you have read this section, you should be able to look at athletes from different sports and work out their likely motivation, and the psychological strategies they might employ.

The athlete who trains psychologically, as well as physically, will have a distinct advantage during performance. Their ability to recognise and manage anxiety, stress and arousal can ultimately make the difference between having a professional or amateur career, winning or losing a grand final, or being selected for an Olympic team. This is a component that needs to be managed within the macrocycle and mesocycles of a schedule to ensure that adequate time and application are devoted to both training and performance.

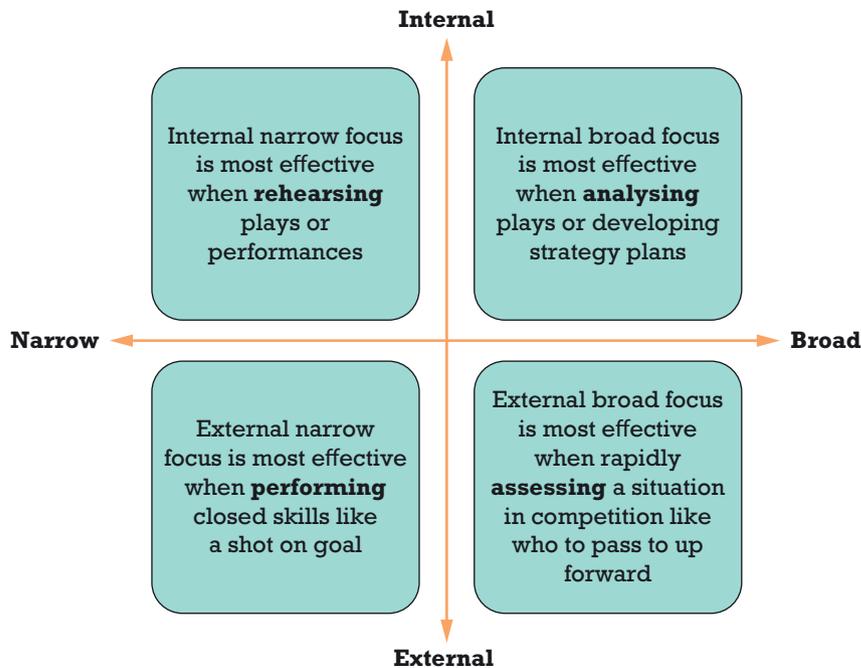
Concentration/attention skills (focusing)

Each athlete has different cues and stimuli that require their concentration and focus during an event or performance. Athletes and coaches often make the mistake of interpreting concentration as ‘focusing on one thing for an extended period of time’. When athletes are developing concentration skills, they must identify where their focus needs to be, and learn strategies to manage and minimise any distractions. It is vital for an athlete to be present mentally (be ‘in the zone’) and concentrate on immediate movements. Athletes who find themselves thinking about previous performances are distracted from the task at hand and this can affect the execution of immediate tasks. For example, an athlete thinking ‘How did I miss that last shot?’ will be distracted from immediate cues and this may impact on their next attempt at a goal. As the competition pressure increases, or the stage of skill execution progresses, so do the distractions, making it more difficult to remain focused. Concentration and focus can therefore be thought of as ‘directional’ – internal, external, broad and narrow.

Athletes can find it difficult to concentrate and focus on appropriate cues due to internal and external distractions, which can be negative or positive. Internal distractions are thoughts, sensations and emotions. They include thoughts about past performances (focusing on errors or successful skill executions), future outcomes (concerned with the outcome of the performance or self-efficacy), fatigue (worrying about lack of energy), arousal (high arousal causes ‘tunnel vision’, whereas low arousal may result in focusing on inappropriate cues) and many more. External distractions include auditory distractors (crowd, spectators, mobile phones, announcers), visual distractors (movement in crowd, scoreboards, cameras, environmental influences) and competition distractors (sledding, strategies or tactics, individual players).

To improve performance, an athlete needs to develop both narrow and broad focusing skills. When athletes engage in narrow focus they concentrate on just one or two cues. When they engage in broad focus they attend to several stimuli simultaneously. It is important for athletes to develop the ability to ‘switch’ between narrow and broad focus and apply the relevant type

for each situation. For example, it is crucial for a baseball batter to have narrow focus during the delivery of the pitch and concentrate on the ball meeting the bat head. However, in between pitches the batter's focus can broaden to include the fielding positions of other players, the coach's signals, and players' body language and non-verbal cues. A rugby union player needs to broaden their focus during a kicking option opportunity during play. However, they need to narrow their focus during a penalty kick. Athletes typically use the same combination of foci when performing similar tasks. It is important for coaches to be aware of the relevant type of concentration a player requires in specific situations and simulate each type in training situations.



Source: Australian Sports Commission

Figure 6.6 Concentration framework

A coach can use a number of strategies to improve their athletes' concentration and focus. A very important strategy is to simulate game-like situations during training sessions. These need to include distractions that will be present during competition so that athletes can systematically incorporate into their training the different techniques that will be effective. Coaches can introduce mantras or key terms to assist concentration and distract their athletes from inappropriate cues. An example is Muhammad Ali's famous 'float like a butterfly and sting like a bee' image that he used in order to focus on his opponent and ignore external factors that could have distracted him from high performance. Athletes can use a hard focus/soft focus concentration technique during training to imitate times when transitioning between narrow and broad focus will be required during performance. They can also develop a 'routine' to complete before skill execution; for example, kicking for goal is an effective strategy for inducing concentration.



Shutterstock.com/wavebreakmedia

Figure 6.7 Developing a routine is an important strategy for many athletes.



Weblink

Watch

Follow the weblink to watch 'How to use visualisation to reach your goals', from 10 November 2017, by Olympian luger Ruben Gonzalez. He explains how this has contributed to his success as an athlete.

FYI

The difference between *visualisation* and *mental rehearsal* is that visualisation can be done without the athlete having experienced the movement, whereas mental rehearsal requires the athlete to have practised the motor skill for it to be effective.



Weblink

For Love of the Game

Follow the weblink to watch a short clip from the film *For Love of the Game* (1999) and then complete the following activities.

- 1 Identify any distractions that could affect the pitcher, Billy Chapel.
- 2 Describe the routine Billy Chapel uses to enable narrow focus and concentration when pitching.
- 3 Justify the use of concentration skills in athletic performances.

Visualisation/imagery

When an athlete uses mental rehearsal and visualisation to prepare for skill execution or performance, they incorporate imagery into their thought processes. When they use visualisation, they form a mental picture of what a specific component of the skill (or part of the skill) will look like during execution. Performing repeated imagery prior to execution can improve their performance. It involves the athlete developing strong imagination and memory skills so that their visualisations are realistic and use all of the senses. Footballer Wayne Rooney was cited as saying that during his visualisations he could 'feel his foot hitting the ball, smell the grass and hear the hum of the crowd'. This extremely vivid image helped Rooney improve his confidence, focus and clarity. Visualisation can also be used to reduce anxiety prior to competition. Athletes can visualise success; for example, picturing themselves holding an Olympic medal and feeling the elation of being the victor.

Mental rehearsal

Mental rehearsal involves the athlete creating a visual image of the entire skill or sports performance in full execution. It is basically training for a sport or event without movement. It can involve two types:

- internal imaging – meaning that the athlete visualises the skill or event as they might experience it in real life
- external imaging – meaning they create images of themselves completing the skill from an observer's view (as if watching video analysis).

It is crucial that the athlete includes all the senses when they attempt to recreate the environment. Mental rehearsal has the performance benefits of activating and increasing the neuromuscular pathways required for successful completion of the skill, as well as improving the cognitive elements required for skill performance. It can enable athletes to train without risk of injury and also assists with the development of optimal arousal levels and coping strategies to manage any state or trait anxiety issues. Coaches can assist athletes to develop mental rehearsal skills through the introduction of relevant activities early in their career. They can encourage athletes to perform the activities in a relaxed and safe environment where they can experiment and gain confidence in using the technique. Encouraging athletes to visit the physical sites of their events or matches will make the images more realistic and significant. Coaches should also embed in their training schedule the development of mental rehearsal skills as part of the annual training program.

Mental rehearsal

Watch how Olympian Amy Williams mentally rehearses her 113 kilometres per hour, face-first attempt downhill on a skeleton bob, compared with James May's preparation. Find this on *Top Gear* Series 17, Episode 1 (published 30 June 2011) or follow the link.

- 1 How does the mental rehearsal of Amy and James differ?
- 2 What did you notice about Amy's technique when mentally rehearsing her run?
- 3 Which element of Amy's performance is crucial for overall success?
- 4 How could she mentally rehearse this individual element?

Visualisation

- 1 Find an example of how visualisation has mentally prepared athletes for elite performance.
- 2 Identify the different approaches in visualisation used by two athletes in different sports.
- 3 Discuss with a classmate how visualisation could be used to effect anxiety, arousal and/or stress in an athlete?

Relaxation techniques

It is important for athletes to develop the ability to control their emotions both during performance and away from competition to enable adequate physical and psychological recovery. To achieve this, coaches and athletes need to recognise the complex interactions between physiological responses and psychological states. The broad term encompassing a range of relaxation techniques – such as progressive muscle relaxation, **meditation**, relaxation, autogenic training and breathing exercise – is called psycho-regulatory training (PRT).

Relaxation techniques are developed specifically to assist athletes to manage and deal with anxiety, stress and over-arousal. These techniques should never be practised immediately prior to competition because they will have a negative effect on arousal levels and this may result in under-arousal, ultimately affecting performance.

Progressive muscle relaxation

One of the most common forms of relaxation for athletes is the use of progressive muscle relaxation, which can be practised prior to going to sleep or on completion of training. The technique involves systematic and progressive tightening of the muscles followed by slowly relaxing them in a controlled manner. It can be guided and can target specific muscle groups in a designated pattern. Progressive muscle relaxation aids performance through relieving muscle tension, lowering cortisol (stress hormone), improving immunity, decreasing heart rate and lowering blood pressure, and has been shown to positively reduce the inflammation process.

Autogenic training

In autogenic training, an athlete is provided with a series of repetitive visualisations and uses self-regulation to passively produce similar sensations within the muscle fibres as progressive muscle relaxation. The aim is to achieve a sense of warmth and heaviness and develop the athlete's ability to communicate with their own body by removing environmental distractions that can cause stress. The athlete should become an observer and allow sensations to flow without manipulating their movement.

Breathing techniques

Learning specific breathing techniques can be highly beneficial in managing stress and anxiety or lowering arousal levels. Breathing exercises are used in many sports for both training and competition. Controlled breathing enables an athlete to focus and concentrate. It can also assist with relaxing tense muscles and improving flexibility in connective tissue when stretching.

Meditation

When athletes practise meditation they relax by controlling the parasympathetic nervous system through the reduction of external or environmental distractions. When practised correctly, meditation (or mindfulness) can lower heart rate and blood pressure, reduce respiratory rates, release tense muscle fibres and suppress the sympathetic nervous system. This is significantly useful after training where there were stressful situations, high levels of arousal or tension.

MINDFULNESS, MEDITATION HELPING ELITE ATHLETES ON AND OFF THE FIELD

Clint Thomas

In the world of elite sport, athletes are always looking for that special something that can help them gain a winning edge over their opponents and cope with extreme pressure.

Mindfulness and meditation techniques have been around for centuries, but increasingly some of Australia's high-profile athletes are using the tools to help them deal with life on and off the playing field.

Sydney Swans assistant coach Brett Kirk was one of sport's fearless competitors during his playing career with the AFL club.

But his ferocity on the field belies his thoughtfulness off it, and he believes it was his daily meditation practice that helped him reach the pinnacle of the sport.

'It gives you great clarity. Footy is like life. It is a game of crazy chaos,' he said.

Kirk said he started practising mindfulness and meditation while at the Swans in his early 20s following the death of a close mate.

'Like a lot of young men you get tipped upside down and turned inside out and I didn't really know which [way] was up,' he said.

'I found it was really comforting for me and also allowed me to deal with some anger and different other stuff that was going on inside me.'

Up and coming Australian cricketer Cam Bancroft's journey to meditation was similar.

'I know that at times I have got some personality traits of being really intense, being really focused,' he said.

'And while they are strengths of mine ... being able to tailor that back to a really relaxed, passive approach is something that I have had to learn and develop.'

Bancroft's Perth Scorchers coach and former Australian opening batsman Justin Langer describes his meditation routine as the most important part of his day.

And now at the age of just 24 Bancroft has become a meditation teacher.

'I think it is a really important part of your life. It's amazing what you can come to in your own mind when you have a really passive attitude in the way you think,' the West Australian batsman said.

Science backs theory

Sandy Gordon, an associate professor at the University of Western Australia's



ABC News: David Mark

Figure 6.8 Brett Kirk says meditation gives him great clarity.

School of Sport Science Exercise and Health, said research showed there were countless benefits to athletes who practised mindfulness and meditation including stress and anxiety reduction, and greater creativity. He cited the brain's ability to adapt as a key factor.

'The neuroplasticity in our brain has been recognised as promoting greatest wellbeing of all in terms of forgiveness, self compassion, enhancing performance of people in leadership positions in highly volatile circumstances,' he said.

'So there's quite a robust literature now on the benefits of mindful practices.'

Kirk said athletes were using meditation in the same way they had embraced yoga and ice-baths in the past.

'I can understand why as a coach you are now looking at why there are fluctuations in individual and team performances,' he said.

'I actually find if I don't do it from day to day it is like brushing your teeth. I actually feel a bit furry. I feel like I'm missing something,' he added.

Source: ABC News online 5 March 2017 . <http://www.abc.net.au/news/2017-03-05/athletes-use-meditation-and-mindfulness-to-give-them-edge/8326004>

Questions

- 1 Describe how athletes from different sports have used mindfulness.
- 2 How can this strategy be used to improve performance?
- 3 Identify the most appropriate time to implement mindfulness training.

Goal setting

Goal setting is an indispensable part of an athlete's development. Goals should be divided into process goals, performance goals and outcome goals. Process goals are those identified targets to use in training, eating and recovering to improve performance. Performance goals relate to specific identifiable improvements in skill execution. Outcome goals are the result of process and performance goals, usually the reason for participation in the initial stages.

Process goals

Examples of process goals include fitting in three additional individualised training sessions prior to team practice per week; increasing complex carbohydrates to 7 g/kg; applying appropriate recovery techniques such as adequate cool-down.

Performance goals

Examples of performance goals include improving free throw percentage at training; increasing range of motion in shoulder through flexibility training; reducing weight by 2 kg prior to state titles in three months' time.

Outcome goals

Examples of outcome goals include finishing ranked number one in the state titles; improving personal best time; winning Olympic gold.

If athletes are to successfully achieve these goals they need to plan carefully, develop a program and evaluate themselves on completion. Goals should be short- and long-term if motivation is to be maintained. By dividing them into achievable increments, athletes can be rewarded with a sense of achievement and become further driven to achieve the next goal. Goal setting allows the athlete to achieve improvements such as increased pride and self-confidence, improved performance, and reduced stress and anxiety. Good goal setting also prevents boredom. Whenever an athlete or a sports coach sets a goal it should be done using the SMART method.

- **Specific and exact:** a goal should be significant and strategic if it is to achieve improved performance. For example: reduce 10 km race time by one minute within four months.
- **Measurable:** the athlete should clearly define how they will meet the goal by placing an **objective measurement** on it. For example: attain a minimum .300 batting average for the pre-season. If a goal is long-term, such as Olympic selection, then smaller short-term goals should be developed to maintain motivation; for example, selection in state team, then selection to national team within two years. Progress should be focused on the achievement of smaller goals that will improve the chance of reaching the final goal.
- **Adjustable:** an important aspect of goal setting is that if the goal is not going to be achieved, then it should be reset or adjusted as necessary. This involves focusing on the process or performance rather than the outcome. For example, goals may need to be adjusted due to an acute injury.
- **Realistic:** the goal should be realistic but still challenging enough to motivate the athlete. Goals need to be specific and achievable while also meeting the needs of the sport. As the athlete improves, the goals can be adjusted to reflect improvement in performance.
- **Timed:** a timeline needs to be set for meeting the goal. The athlete will monitor this and if the goal is likely to be met early then it needs to be re-evaluated. Also, if the goal is not going to be met on time, the athlete should evaluate why this is and (if time permits) change the timeline to be more realistic. Without a specific timeframe, there is a tendency for the athlete to procrastinate or get bored. In general, goals of more than six months are too long



Weblink

Investigate

To further develop your understanding of psychology in sport, enrol in and complete the free Australian Sports Commission Sports Psychology online courses. You can follow the link.

CHAPTER SUMMARY

- Motivation can be positive or negative, intrinsic or extrinsic. Different levels of sport require different forms of motivation.
- Positive motivation comes when an athlete derives enjoyment and interest in completing a task. An athlete is driven by negative motivation when they fear the consequences of a poor performance.
- Intrinsic motivation comes from within the athlete whereas extrinsic motivation is external to the athlete.
- Arousal is a physiological state characterised by stimulation and a general excitement or preparedness, whereas anxiety is a psychological response to a perceived threat. Anxiety can be either trait (personality type) or state (occurring only in certain situations).
- There is an optimal level of arousal for every individual athlete, as well as recommended levels of arousal for particular sports. With too little arousal, athletes are unmotivated. With too much arousal, their performance is hindered. This is commonly known as the inverted U theory.
- Stress on an athlete can affect performance, manifesting as an emotional response to either eustress (positive) or distress (negative). Sources of stress can come from within the athlete (internal pressures) or externally from coaches, spectators, media, etc.
- Athletes use a variety of methods to manage anxiety, arousal and stress including: concentration/focus skills, mental rehearsal/visualisation and imagery, relaxation techniques and goal setting.
- Each individual athlete should carefully consider the choice of strategies available and the most appropriate time to implement them. For example, using relaxation strategies immediately prior to a grand final would result in the athlete being under-aroused and this could adversely affect their performance.

CHAPTER REVIEW ACTIVITIES

WS

Extra
exam-style
questions

- 1 Describe the different types of motivation available to athletes and state which one would be most suitable for beginner, intermediate and advanced athletes.
- 2 'Playing professionally or playing for your country'. Identify the type of motivation involved in both of these scenarios and justify an athlete's decision to place their country above their club.
- 3 Explain the difference between arousal and anxiety and the effect of each on sports performance.
- 4 Explain how eustress can have a positive effect on performance.
- 5 Justify psychological strategies that could be used to manage the following athletes: Athlete A displays trait anxiety, is very nervous the evening before any competition so that sleep is poor, is often distracted by the crowd and noises around them; Athlete B is a seasoned athlete, unmotivated at training, and often under-aroused at the start of events.



Getty Images/iStock/OSTILL

CHAPTER 7

Nutrition and recovery strategies and performance

IN THIS CHAPTER

Nutritional considerations

111

Supplementation

118

Recovery strategies

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NUTRITIONAL CONSIDERATIONS

This section covers nutrition pre-performance, during performance and post-performance. When you have read this section, you should be able to list the dietary requirements of athletes in specific sports, for each of these stages.

It is essential that athletes consume a varied, highly nutritious diet to maximise physiological adaptations, metabolic processes and nervous system functions. Individual athletes' diets will vary due to a range of factors including age, gender, sport/event, competition schedule, metabolic processes required to produce energy, temperature and environment. Specialist dietitians create specialised meal plans and nutritional programs to suit the individual needs of many athletes. Because it is rare for dietitians to travel with competing athletes, it is imperative that the athletes and their trainer/coach have a good understanding of performance nutrition and how to manage it while competing.

To understand the complexities of nutrition and how it affects performance, it is important to have a good knowledge of basic nutrition. All foods contain nutrients: carbohydrates (CHO), fat, protein, vitamins, minerals and water. Macronutrients are the CHO, fats and proteins, while micronutrients are the vitamins, minerals and water. Athletes require different combinations of nutrients but every athlete should consume a well-balanced, nutritious and varied diet to meet performance needs. They should not rely on **supplementation** unless it is for a specific reason or deficit.

Carbohydrates

Carbohydrates (CHOs) are classified as monosaccharide (simple carbohydrates or one-unit sugars, such as glucose and fructose), disaccharide (composed of two monosaccharides, such as sucrose and lactose) or polysaccharide (more than two monosaccharides, such as glycogen and starch). Large polysaccharides are commonly referred to as complex carbohydrates; however, they are all broken down into monosaccharides prior to being used by the body. The body needs CHO because it is a major energy source (refer to critical question one). Muscle and liver glycogen are synthesised from CHO; it regulates fat and protein metabolism and it is the dominant energy source for the nervous system. Major sources of CHO include grains, fruits, vegetables and milk. The body stores excess CHO as glycogen in the muscle and liver. During physical exertion, the body breaks down the stored glycogen and uses it as glucose, which provides fuel for muscle contractions.

Fats

Fats, or lipids, exist in the body in many forms: triglycerides, free fatty acids (FFAs), sterol and phospholipids. The body stores lipids as triglycerides and this is the most concentrated source of energy. Lipids are an essential component of the cell membranes and nerve fibres and they are a primary energy source. Cholesterol produces steroid hormones and subcutaneous thermal insulation; it provides cushioned protection for vital organs and carries fat-soluble vitamins. Fatty acids are the most important form of energy production and they occur in two forms: saturated and unsaturated. Saturated fats (which are in a solid form at room temperature) are sourced from animal-based products such as meat, poultry and dairy foods. These fats should be limited in an athlete's diet. Unsaturated fats (which take a liquid form at room temperature) – also called monounsaturated and polyunsaturated fats – are sourced from plant products such as olives, avocados, nuts and seeds, or fish such as salmon and tuna. Unsaturated fats should make up the majority of an athlete's diet and lipids should contribute less than 30 per cent of energy consumed to prevent the storage of glycogen.

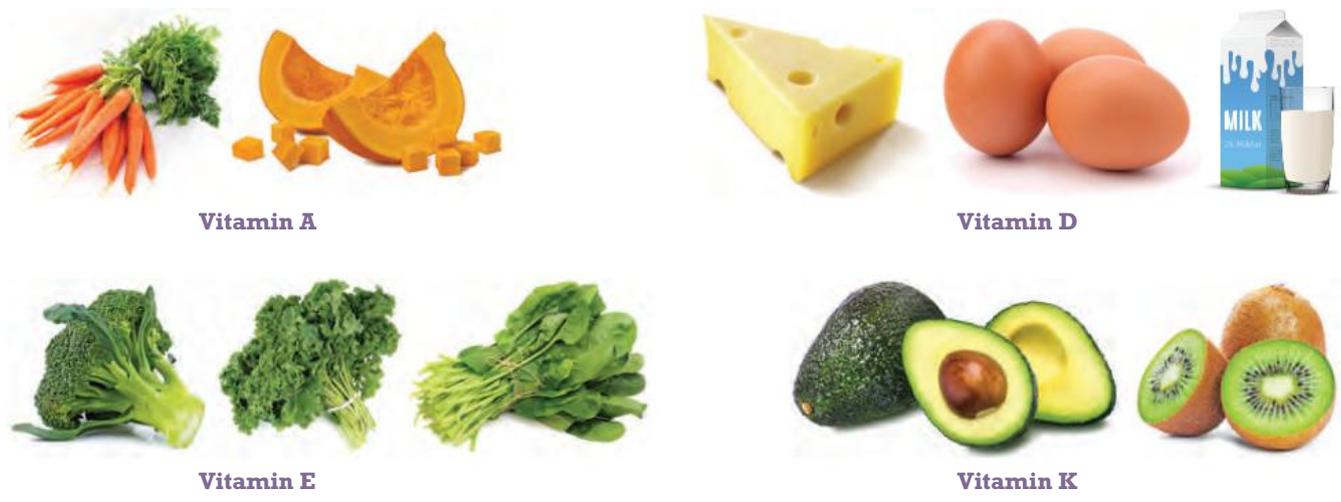
Protein

There are twenty types of amino acids (protein), nine of which are essential to an athlete's diet for optimal performance. Amino acids play a vital role in muscle tissue structure, are a key component of blood, fluid balance, hormone and enzyme production and cell repair, and assist metabolic processes such as the immune system. Proteins have two classifications: complete proteins and incomplete proteins. Complete proteins contain all nine essential amino acids and are found in animal products such as red meat, fish, poultry and dairy foods. Incomplete proteins are found in plant products such as nuts, legumes and soybeans. They are deficient in one or more of the essential amino acids. Strength and endurance athletes require more protein to increase muscle hypertrophy and for use as a fuel. A deficient intake of protein could result in athletes experiencing early onset fatigue, loss of muscle strength and power, reduced recovery time and possible increase in infections due to a compromised immune system. Athletes who consume excessive amounts of protein can also experience detrimental effects, such as kidney problems, atherogenic issues (increased formation of fatty deposits in the arterial walls), and increased dehydration. Milk is an excellent source of protein because it contains two proteins: whey and casein.

Vitamins

The body is unable to manufacture vitamins; therefore athletes must absorb them from the foods they eat. Vitamins provide no energy but they have other significantly important roles in an athlete's diet, such as the formation of skeletal and soft tissue, reducing the risk of fractures,

and contributing collagen to strengthen tendons and ligaments. There are two types of vitamins: fat- and water-soluble. Fat-soluble vitamins (A, D, E and K) are absorbed in the digestive tracts and bind to lipids before being stored in the liver; therefore excessive amounts can be disadvantageous to the athlete.



Clockwise from top left (all Shutterstock.com): Dulce Rubia; Kovaleva, Ka; crisp; Nattika; Kulyk; Binh Thanh Bui; Chiyacat; zcw; Peter; Kotof; Kyselova Inna

Figure 7.1 Fat-soluble vitamin sources

Vitamin A forms and maintains bones and soft tissue (including skin) and promotes good vision. Vitamin D helps to absorb calcium for strong bones. Vitamin E protects all cells from damage. Vitamin K helps to prevent blood clotting.



Left to right (all Shutterstock.com): wheatley; eife45; Keivin Wong; Evgeny Karandaev; Diana Taliun

Figure 7.2 Water-soluble vitamin sources

Water-soluble vitamins (B and C) are absorbed in the digestive tract with water. Any excess is excreted through urination. Vitamin B converts food into fuel. Vitamin C makes collagen for forming ligaments, tendons and blood vessels.

Minerals

Minerals facilitate cellular, organ and tissue functions. There are two forms: major minerals and trace minerals. Major minerals include those that an athlete requires 100 mg or more of each day, such as sodium and potassium. Trace minerals include those that an athlete requires less than 100 mg of each day, such as iron and zinc. Sodium (Na) and potassium (K) are essential in an athlete's diet; they reduce the risk of muscle cramping by assisting in the retention of water, nerve function and the absorption of other nutrients.

Water

Water is essential to athletes because it facilitates the lubrication of joints, removes waste products, aids thermoregulation, increases blood flow and delivery of nutrients to cells and prevents the negative effects of dehydration – an athlete's worst enemy in performance.

The volume of water required varies between athletes but there are certain circumstances that always require an increase in water consumption: increased intensity of training, intensity and climatic conditions (heat, humidity). Good hydration is essential during performance; drinking water prevents a reduced mental function and increased heart rate; it wards off nausea, muscle cramps, intestinal issues and much more.

Glycaemic index

Finally, it is important to understand the **glycaemic index (GI)** and its importance for athletes. The GI is an index that rates the impact of CHO on blood glucose levels. Foods with CHOs that break down quickly during digestion, releasing glucose quickly into the bloodstream have a high GI. Conversely, foods that break down slowly and release glucose less rapidly have a low GI. Foods with a high GI give an immediate release of energy for a short duration. A GI index of <55 indicates a slow release; 55–70 is moderate and >70 is high.

Activity

Investigate different forms of CHO on the glycaemic index and explain their relationship to sports performance.

Pre-performance

Pre-performance nutrition plays a vital role in optimising fuel and hydration before an important event. Pre-performance meal planning should occur several days prior to competition. The aim of pre-performance nutrition is to optimise the glycogen stored in the muscle and liver. This is achieved through the consumption of quality CHOs, commonly referred to as **carbohydrate loading** (or glycogen loading). CHO or glycogen loading involves the consumption of high volumes of CHO meals (10–12 g/1 kg of body mass) that are low GI two to three days prior to competition. At this time, training is tapered to reduce the consumption of the stored glycogen as fuel, leaving it in reserve for the competition. **Tapering** is vital because an athlete's liver glycogen stores can decrease rapidly (by almost 55 per cent) after one hour of strenuous exercise.

The aim of pre-performance nutrition is to supplement glycogen stores, ensure adequate hydration and assist the athlete psychologically by providing a consistent routine to manage performance anxiety. The timing of this meal is highly dependent on the athlete, the event and

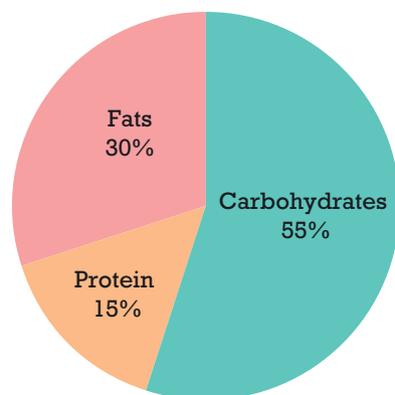


Figure 7.3 Proportions of an athlete's diet

the time of the competition, although a meal should be consumed no less than two hours prior to competition to enable the foods to be processed by the stomach and small intestine. High-CHO, low-fat foods are processed faster but anxiety can affect digestion, so it is important for athletes to identify the kind of foods they can tolerate during training to avoid discomfort in a major performance or event. Gastric emptying is also significantly affected by intense physical activity, reducing the process by working at or above 70 per cent VO_2 max. Food remaining in the stomach during performance can cause cramping and discomfort and therefore be a hindrance to performance. For example, an athlete whose event is scheduled for mid-morning

would eat their breakfast two to three hours prior to the event, whereas an athlete who has an early start may have a late supper the night before and then a light snack one to two hours prior to the event. As a general guideline, an athlete should eat three to four hours prior to competition and the meal should be dense in CHO with 7 g CHO/kg of low GI, low in fat with moderate protein.

Athletes who have difficulty tolerating food on competition day may benefit from liquid meals since they are less likely to induce stomach cramping, nausea and vomiting. One to two hours prior to the event an athlete should consume a light snack that is high GI (for rapid release of energy), such as a smoothie, cereal bar, yoghurt or fruit.

3–4 hours before exercise	1–2 hours before exercise	<1 hour before exercise
<ul style="list-style-type: none"> • crumpets with jam or honey + flavoured milk • baked potato + cottage cheese filling + glass of milk • baked beans on toast • breakfast cereal with milk • bread roll with cheese/meat filling + banana • fruit salad with fruit-flavoured yoghurt • pasta or rice with a sauce based on low-fat ingredients (e.g. tomato, vegetables, lean meat) 	<ul style="list-style-type: none"> • liquid meal supplement • milkshake or fruit smoothie • sports bars (check labels for carbohydrate and protein content) • breakfast cereal with milk • cereal bars • fruit-flavoured yoghurt • fruit 	<ul style="list-style-type: none"> • sports drink • carbohydrate gel • cordial • sports bars • jelly lollies

In addition to planning food, it is essential to also plan and consume hydration prior to an event. Dehydration can affect performance by decreasing the digestive process and/or increasing the rate of fatigue, heart rate, risk of cramping, heat stress and heat stroke. Consumption of water should begin several hours prior to competition. Sports Medicine Australia recommends drinking a minimum of 500 mL one hour prior to commencement of event and 150 mL every 15 minutes thereafter. Athletes should also be consuming water during their pre-competition meal to aid digestion.

Drink up

Investigate the Smartplay ‘DRINK UP’ fact sheet for athletes and complete the following activities:

- 1 Identify and rewrite in your own words five essential points of information that all athletes should adhere to in regards to hydration preparation and application in sport.
- 2 Describe the psychological effects of dehydration on an athlete and state how that could impact on their performance.



During performance

Nutrition during competition is highly dependent on the duration of the activity or event. Athletes competing in events that last for more than 60 minutes may require additional CHO to maintain or replenish blood glucose levels. In events or activities that last for more than two hours, they will generally use fat stores as an energy supply (such as in a marathon). As a general guideline, the athlete should consume approximately 30–60 g/h of CHO. Types of foods depend on the sport or event and the practicalities involved in consuming them. For example, a tennis player can sit and eat, whereas a marathon runner has to consume while running. Competitions lasting less than 60 minutes usually do not require CHO intake during performance and the focus is solely on hydration. For events using the ATP-PCr and glycolytic systems, hydration has minimal effect on performance.

Water loss is accelerated during physical activity due to the body's need to produce sweat, which is brought about by environmental conditions and the athlete's metabolic processes. An athlete's physicality also affects sweat rates including: size of sweat glands, body size (larger skin surfaces sweat more), fitness levels, and work rate (intensity). As a general guide, athletes should aim to consume 150 mL every 15 minutes. It is advisable to consume fluids in small bouts because an athlete can tolerate this better than flooding the body with fluid all at once, resulting in discomfort and negatively impacting on performance. According to the Australian Institute of Sport (AIS), research has shown that athletes can consume greater volumes of fluid when it is chilled (to 15 °C), flavoured and contains electrolytes. Sports drinks are advantageous to performance because in addition to replacing water content, they have the added benefit of providing CHO, sodium and potassium to enable refuelling and assist with muscle contractions. It is recommended that athletes select a sports drink with 4–8 per cent CHO content and 10–20 mmol/L of sodium. The sodium will assist with the absorption of CHO and potassium is important in muscle fibre contraction. Drinks with >8 per cent CHO can affect digestion and cause discomfort.



Weblink

Investigate

Investigate the Gatorade Australia and Powerade Australia websites or follow the link. Identify the products best suited to different sports or events.

- 1 Given what you have learnt about electrolytes, CHO and sugars, **justify** whether or not these sports drinks should replace water as the preferred hydration fuel.
- 2 Explain when it would be appropriate to use sports drinks for hydration.

Post-performance

The post-performance diet for an athlete has four main aims:

- 1 restore muscle and liver glycogen stores
- 2 repair and regenerate protein and red blood cells
- 3 replace lost fluid and electrolytes
- 4 revitalise the immune system.

Athletes and coaches need to be highly proactive about their recovery nutrition, ensuring the consumption of high GI CHO foods as soon as possible (within two hours) after a performance or event because this is when insulin levels will rise dramatically, maximising glycogen synthesis. CHO should be high GI, aiming to restore muscle and liver glycogen stores and should equate to approximately 1–1.2 g CHO/kg of body mass.

During the recovery phase of competition and training and for approximately 24 hours, the anabolic process (building) occurs. During this time, athletes should aim to consume essential amino acids from quality protein products to assist protein synthesis. Both endurance and

LEARNING TIP

Post-performance =
4Rs:
restore
repair
replace
revitalise

resistance athletes should aim to consume 15–25 g of high-quality protein within one hour of ceasing performance. Combining this with CHO will increase the effects on the anabolic process by reducing the breakdown of muscle protein.

Most athletes will have a fluid deficiency after an event, training or performance, regardless of how well they tried to remain hydrated. All athletes should aim to consume 150 per cent of their fluid loss within four hours of ceasing performance. If fluids consumed do not contain electrolytes, athletes may be wasting their time and contributing mostly to urination volumes rather than hydration. While sports drinks are ideal during performance, in post-performance athletes require approximately 50–80 mmol/L of sodium; therefore they need to consume foods containing sodium.

The immune system is suppressed during physical activity so it is important to address post-performance nutrition to avoid infections or illness that may affect future training schedules and/or performances. While vitamins are essential in all athletes' diets, post-performance immune assistance will come from ensuring adequate CHO intake pre-, during and post-exercise. CHOs supply glucose necessary to fuel productivity of the white blood cells. They also reduce the stress hormones during exercise and this can affect immunity.

Below are examples of snacks that provide carbohydrates and protein for recovery.

Figure 7.4 Examples of carbohydrate-rich recovery snacks (50 g CHO portions)



Clockwise from top left (all Shutterstock.com): Evgeny Karandaev; h4httt bj; CKP1001; Hong Vo; beboy; Roman Samokhin

Figure 7.5 Examples of carbohydrate-protein recovery snacks (contain 50 g CHO + valuable source of protein and micronutrients)



Clockwise from top left (all Shutterstock.com): Sari Oneal; caidix; balbaz; jocic; graletta; sia

Figure 7.6 Examples of foods providing approximately 10 g of protein

Animal foods



Left to right (all Shutterstock.com):
spaxiax; MRAORAOR; Yellow Cat;
Suphaksorn Thongwongboot

Plant-based foods



Left to right (all Shutterstock.com):
Focort; Hong Vo; YUTIFANA SAMOL;
MaraZe



Weblink

Different diets

Compare the diets of an endurance athlete and a power athlete using the AIS website.

SUPPLEMENTATION

This section covers vitamins and minerals, protein, caffeine and creatine products. When you have read this section you should be able to weigh up the evidence for and against supplementation for improving sporting performance.

Supplementation is classified as an *ergogenic aid*, or something that gives an athlete an advantage or edge when training or performing. As discussed in the nutrition section, an athlete's diet should contain a variety of nutritional sources of foods to meet their daily performance requirements without supplementation (unless there are specific reasons for the use of supplements). Athletes tend to use supplements such as sports drinks as a source of nutrients that cannot be consumed through everyday food. They also use supplements to manage nutrient deficiencies or clinical issues such as lactose or gluten intolerance. In doing this they hope to achieve optimal performance through the intake of additional nutritional substances. As a general guideline, supplementation should not replace a well-balanced, appropriately tailored nutritional eating plan.

Vitamins and minerals

As discussed previously, vitamins and minerals play important and specific roles in improving the performance of athletes.

Vitamins

Vitamins are either fat-soluble or water-soluble. Fat-soluble vitamins (A, D, E and K) are absorbed in the digestive tract and bind to fat to be stored in the liver. They are then distributed throughout the body via the body's fatty tissue. Athletes who suffer from medical disorders affecting the absorption of fat, such as coeliac disease, can experience a deficiency in these vitamins. Because these vitamins are fat-soluble they can cause toxicity if consumed in high doses.

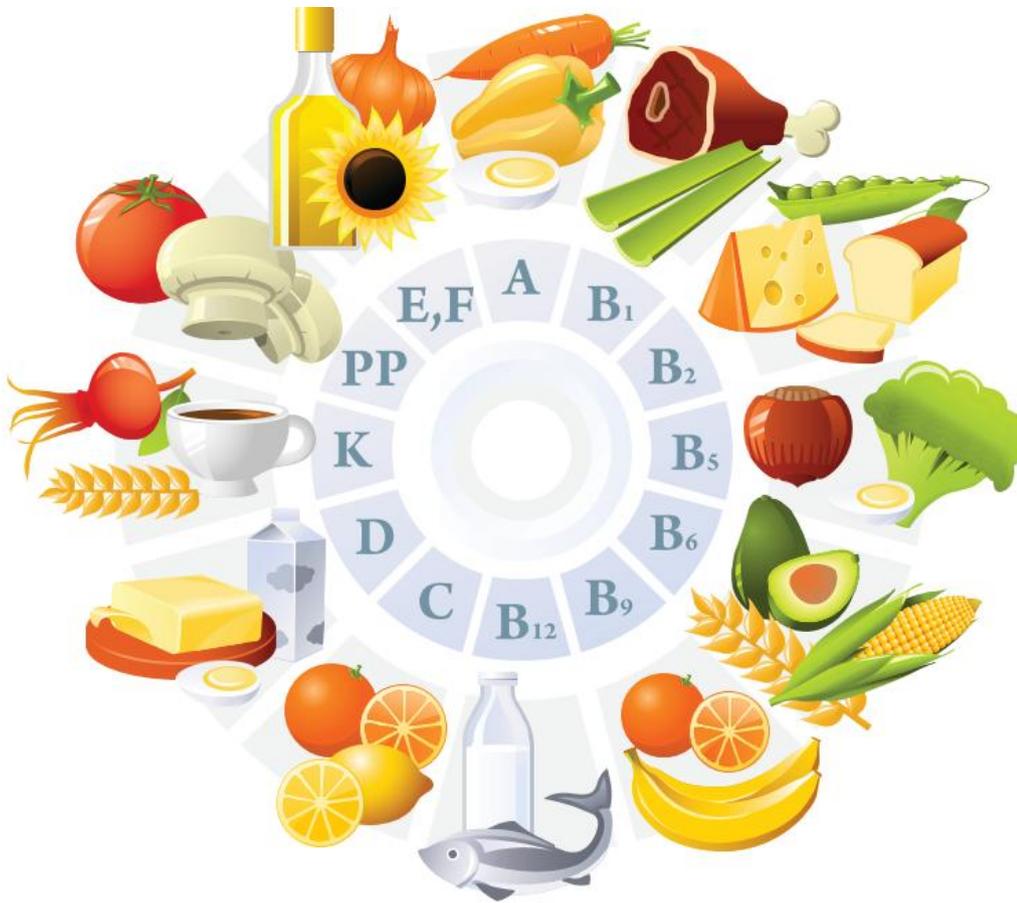


Figure 7.7 Vitamin sources

Table 7.1 Fat-soluble vitamins and their contribution in athletic performance

Vitamin	Role in athletic performance
Vitamin A	Forms and maintains skeletal and soft tissue, mucus membranes and skin.
Vitamin D	Aids in the absorption of calcium, leading to increased bone density and a reduction in fractures.
Vitamin E	Provides vital protection to cells and organs.
Vitamin K	Essential to clot blood.

Water-soluble vitamins (B and C) are stored in the body for a short period of time and then excreted through urination. Vitamin B aids performance by helping to metabolise food into fuel. Vitamin C assists in the development of collagen that is essential in ligaments, tendons and blood vessels.

Consuming a multivitamin supplement could prove effective for an athlete whose diet may be deficient. Another reason for athletes to require supplementation for a brief period is when they are competing in foreign countries or travelling and do not have access to their usual diet. Pregnant and older athletes can also benefit from vitamin supplementation due to changes in metabolic processes. One of the greatest influences on performance is the placebo effect where athletes gain a psychological advantage due to thinking that the increased consumption of vitamins will have a positive influence on their sporting outcome.

A disadvantage of vitamin supplements is that they are manufactured and therefore not as effective or potent as the natural vitamins that are derived from food. Whereas natural foods work in unison, supplements work in isolation. Being synthetic, vitamin supplements do not contain phytochemicals, which assist in the reduction of heart disease. As mentioned previously, excessive intake of fat-soluble vitamins can be toxic and excessive water-soluble vitamins can cause digestive issues such as diarrhoea. Because it is difficult to prove that vitamins are beneficial to athletes, it is possible that money is being wasted on their purchase.

Minerals

Minerals are essential micronutrients with specific roles to play in athletic performance. Some of the most common minerals are sodium, potassium, iron and magnesium. Minerals are essential in nerve transmission, muscle contraction and oxygen transportation (haemoglobin), and they contribute to bone density.

Iron

Iron is an essential component of haemoglobin and is important for the transportation and delivery of oxygen. Deficiency in haemoglobin levels can specifically affect energy supply during endurance activities. Sports anaemia (deficiency in red blood cells (RBC)) is common among athletes who have intense training schedules, who are vegetarian (reduced iron consumption) and who are menstruating.

Calcium

Calcium is vital for the formation of bone and teeth. It contributes to bone density, which is important in pregnant and older athletes. Other minerals are involved in the conduction of electrical impulses. Athletes may be enticed to supplement their diet with minerals if they have a medical condition such as anaemia or lactose intolerance. Females training at high intensity, athletes who have suffered a recent injury where there was excessive blood loss, and menstruating women may also wish to take mineral supplements. The disadvantage of supplementing minerals is that excessive amounts of iron can cause digestive damage. The majority of supplements contain four times the recommended dietary intake (RDI) and athletes can typically meet their RDIs through a normal dietary intake.

Protein

Proteins, or amino acids, are essential for sports performance, especially post-performance recovery nutrition. Amino acids assist in the building and repairing of cell tissue, assist muscle contraction and provide a minor source of energy in extreme endurance events. Protein

Smart Media CSI Australia



Figure 7.8 Marketed protein powder

supplementation for athletes typically comes from powders, shakes and bars. Supplementation of protein would be advantageous if an athlete's diet could not provide the necessary amino acids; vegetarians may fall into this category. When an athlete is competing or training overseas and suffers digestive problems from the local cuisine, a protein shake or bar could serve as a necessary supplement. When training intensity is extreme and an athlete cannot meet their required RDI through their food, this would be another valid reason for supplementation. Some athletes claim that protein supplementation reduces muscle fatigue, enables faster recovery and increases muscle hypertrophy but there is little scientific evidence to prove that protein supplements achieve this. Disadvantages include the fact that excess protein products consumed will be converted to fat if not used.

Caffeine

The effect of caffeine on performance has been debated for years. Some athletes claim that caffeine can stimulate concentration and awareness, increasing their ability to respond with rapid movements and thought processes and decreasing the perception of fatigue. Caffeine has been thought to contribute to **glycogen sparing**; that is, it assists the body to burn fat prior to using CHO as a fuel source, delaying the use of muscle glycogen.

Advantages of supplementing an athlete's diet with caffeine include improvements in aerobic performance (glycogen sparing), stimulating the secretion of adrenaline and being psychologically beneficial. Disadvantages include the fact that caffeine is unsuitable for certain sports requiring fine motor movements, such as snooker, darts and shooting. The physiological responses related to caffeine – muscle tightness, jittery movements, headaches, increased urination contributing to dehydration, insomnia – all contribute negatively to performance.

Creatine products

Creatine monohydrate is essential in athletic performance because it contributes to the phosphate groups by creating **creatine phosphate**, which resynthesises ATP. It is consumed in an athlete's diet through animal muscle. Creatine supplementation is commonly used by athletes in ATP energy system sports to creatine load. Creatine loading requires the additional consumption of 20–30 g per day, taken in conjunction with CHO for five days prior to an event. Creatine loading is claimed to increase creatine stores by 25–50 per cent.

Reasons why athletes could use creatine supplementation include taking advantage of creatine loading to improve creatine stores accelerating muscle hypertrophy (important in power sports such as sprinting) and increasing anaerobic capacity by approximately 5 per cent (critical in interval sports such as football and soccer). Disadvantages of creatine supplementation include weight gain due to the retention of water, expense (if not used effectively since creatine cannot be stored) and the fact that marketed products contain inferior types of creatine (creatine malate).

RECOVERY STRATEGIES

This section covers physiological strategies, neural strategies, tissue damage strategies, and psychological strategies. When you have read this section you should know the main features and benefits of each of these recovery strategies.

Enormous amounts of time and effort go into planning training schedules, analysing players' performances, developing psychological strategies to maximise optimal arousal, and fine-tuning nutritional diets to the needs of individual athletes. It therefore stands to reason that the recovery strategies used by athletes should reduce the negative effects of training and performance and enhance recovery time, so that they return to training and competition in an improved state.

Physiological strategies

Physiological strategies include cool-down and hydration. These are common and widely used recovery strategies that should be embedded in all athletes' training regimes. The main aims of physiological strategies are to restore depleted fluids and nutrients used up in physical activity and to remove metabolic waste products from the muscles and blood system.

Cool-down

Cool-down is the easiest and most effective form of player recovery. When carried out at the end of a training session or performance, the cool-down helps the athlete reduce core body temperature; the blood pressure and heart rate return to pre-exercise state; waste products and toxins generated during physical activity (creatine kinase, myoglobin and lactic acid) are removed; and the effects of delayed onset muscle soreness are reduced. Cool-down has the benefit of reducing blood pooling when performed correctly. During physical activity, the body releases adrenaline and endorphins. By completing a gentle exercise regime after activity, hormones are released to counteract this and enable better sleep and recovery. Without an effective cool-down the athlete can be hyperactive, restless and sleep poorly because of the circulating adrenaline and endorphins. Due to the raised temperature of cell tissue following physical activity, post-performance is the ideal time to complete static stretching flexibility training to improve the range of motion (ROM) at joints.

Hydration

Hydration is imperative as a recovery strategy, as already pointed out in the section on nutrition. An effective means to monitor hydration is to weigh an athlete prior to commencing training or performance, then weigh again following the completion of the session and include the weight of food or fluid consumed during the event. For example, an athlete who weighs 1 kg less than when they started and who consumed 1 L of fluids during the event has a fluid deficit of 2 L. Athletes should aim to restore 150 per cent of fluid loss within four hours. Fluids should contain electrolytes such as sodium. Certain fluids should be avoided after physical activity; they include alcohol due to its diuretic properties and high CHO content. Milk, specifically chocolate milk, is a recommended post-performance recovery fluid because it has a beneficial ratio of CHO to protein for muscle repair and recovery.

Neural strategies

Hydrotherapy and massage are proven as being effective in minimising delayed onset muscle soreness, removing waste products produced during physical activity, stimulating the nervous system and increasing blood flow, thereby improving venous return. The main aims of neural strategies are to assist the central and peripheral nervous system to return to pre-exercise state after an energetic workload, relax fatigued and possibly damaged muscle fibres after strenuous activity or damage from contact, and reduce cardiac responses to exercise.

Hydrotherapy

Hydrotherapy involves a variety of techniques including contrast-water therapy (CWT), cold-water immersion, and hot-water immersion. Typically, the athlete's body will respond to water immersion by changes to heart rate, blood pressure and blood flow. Cold-water immersion (CWI) causes the athlete's core body temperature to decline, which reduces the tissue temperature, resulting in vasoconstriction to the athlete's extremities as the body attempts to conserve energy and leading to a reduction in heart rate. The AIS has its cold-water immersion pools set between 10–15 degrees. Athletes find CWI effective in reducing pain, muscle inflammation and cramping. Warm-water immersion (WWI) exposes the body to heat (resulting in vasodilation) and redirects blood flow to the surface of the epidermis. The results of vasodilation enable greater blood flow throughout the body, reducing blood pressure. WWI is rarely used at the AIS, with sports scientists preferring CWT. CWT involves alternating between cold and hot water in a cyclical process. CWT enables both vasoconstriction and vasodilation, creating a rhythmic process that flushes the waste products from the muscles in a highly effective manner. CWT is more effective than individualised

water immersions because it enables repetitive changes in tissue cell temperatures, blood flow distribution and viscosity; it reduces muscle cramps, decreases inflammation and improves ROM and flexibility during recovery.

Massage

Massage is an effective recovery strategy for managing micro-tears in muscles, resulting in an increased inflammatory response that impedes the athlete's muscular functions from manifesting because diminished power and constrained movement make training or performance less effective. Adrenaline and cortisol are released when athletes exercise, placing the body in a constant state of readiness. Massage has the benefit of allowing the athlete to relax, reducing inflammation and improving mitochondrial biogenesis. Massage stimulates the body's circulation as well as lymphatic circulation, aiding the removal of waste products and the delivery of oxygen and nutrient-rich blood to damaged muscles. Massage interrupts the formation of scar tissue or adhesions, alleviates muscle cramping and reduces nerve irritation, as well as providing an overall feeling of wellbeing and calm.

Many athletes use foam rollers to 'self-massage' both prior to performance and on completion of physical activity. Foam rollers enable athletes to target specific muscles and muscle groups that may need additional manipulation. Foam rolling increases blood flow, resulting in improved circulation and greater efficiency in delivering nutrients. Massage increases the elasticity of connective tissues, leading to reduced injuries and delayed onset muscle soreness (DOMS), and manipulates the muscle fascia in a way that static stretching cannot achieve.

Compression garments

A neural strategy being widely used by professional teams and athletes is the wearing of compression garments to improve athletic performance and accelerate recovery. Manufacturers adopted this concept from the medical profession where compression garments (or stockings) following surgical procedures have been recommended for more than 50 years. The logic behind the use of compression stockings in the medical world is to create a controlled, gradient compressive force on the limb, improving and promoting venous blood flow, which results in decreased venous stasis and reduces the complication of thrombosis in post-operative patients.

Athletic compression garments claim to enhance lactate removal, decrease muscle oscillation and provide a powerful placebo or psychological benefit. According to the literature and scientific research conducted on compression garments, both during and post-performance, they may offer ergogenic benefits to a range of athletes. Compression garments may enhance recovery by increasing the removal of blood lactate, reduce DOMS and decrease 'heavy leg' syndrome, which is often experienced by athletes after strenuous activity. It is important to recognise that the compression used is a major factor in the benefits experienced both during and post-performance. Researchers indicate that a minimum of 18 mm Hg at the ankle and 8 mm Hg at the mid-thigh is necessary to mimic the haemodynamic effect and improve venous return.

Tissue damage (repair) strategies

Cryotherapy

The main aim of tissue damage strategies is to alleviate delayed onset muscle soreness and repair any muscle damage sustained during training or performance. The most common method is the ice bath where athletes immerse themselves in a bath ranging between 10 and 15 °C. It is important that athletes submerge no deeper than the level of their heart in order to prevent cardiovascular complications. **Cryotherapy** reduces inflammation and muscle cramping and acts as an analgesic by decreasing nerve conduction speeds, thereby reducing pain. After submersion, the blood vessels vasoconstrict around the damaged tissue, narrowing the force and flow of

blood away from the muscle, reducing the possibility of oedemas (bleeding from the capillaries). The cold temperatures activate the nociceptors (thermal nerve cells) resulting in a response by the parasympathetic nervous system responsible for reducing the blood flow. Once the body reheats, it floods the blood vessels and muscles with fresh haemoglobin, myoglobin, oxygen and nutrients required for muscle repair. With the advancements in technology, sporting teams are now using cryogenic chambers, or whole-body cryotherapy (WBC) where the athlete is enclosed in a chamber cooled by liquid nitrogen. Time spent in the chamber varies depending on the type of sport, **somatotype** and scientific research but the most consistent use of cryogenic chambers

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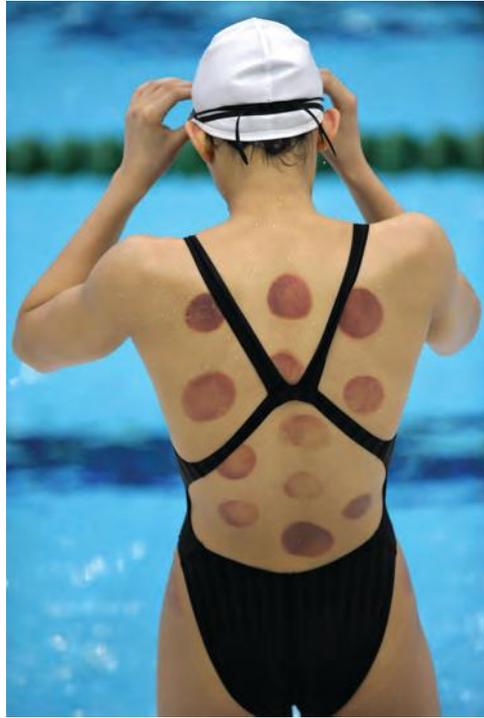


Figure 7.9 Cupping therapy is used by athletes as part of their recovery regimes. The welts are the result of the vacuum formed when the cups are applied to the skin.

in sports medicine indicates that two minutes' exposure at $-135\text{ }^{\circ}\text{C}$ is optimal. National Basketball League players, the Welsh Rugby Union National team, World Series champions and the Kansas City Royals all use WBC. Their players benefit from holistic and consistent peripheral vasoconstriction, improving muscle oxygenation. Post-WBC performance factors include lowering the heart rate, increasing the stroke volume, increasing the release of norepinephrine (neurotransmitter for sympathetic neurons) and reducing the use of analgesics among players.

Cupping

Cupping is an ancient Chinese therapy used to facilitate connective tissue repair after sprains and strains. The technique draws blood away from the injured area, altering the tone and tension of the tissue, and promoting lymphatic drainage; all contributing to increased recovery time. Studies are limited on the effects of cupping on sports performance but some indicate positive results in tissue problems, such as iliotibial band syndrome and plantar fasciitis.

Research

Conduct research into studies on:

- compression garments
- whole-body cryotherapy
- cupping.

Compare tissue damage strategies for recovery from athletic performance.

Psychological strategies

Psychological strategies focus on the mental and emotional recovery of the athlete by targeting the brain and the body in unison. Psychological recovery is vital because it affects the athlete's physiological functioning and recovery mechanisms.

Sleep

Good quality sleep is crucial for any athlete following strenuous training or performance. Sleep is the body's natural state for repair and recovery. Without quality sleep, the secretion of cortisol (stress hormone) is increased and there is a decrease in the metabolism of glycogen. Sleep improves protein synthesis and parasympathetic activity, which aids digestion and reduces anxiety. During the REM cycle of sleep, the brain's neurons repeatedly fire, generating new patterns and pathways of learning that positively affect muscle memory.

Relaxation

Using relaxation techniques after a strenuous or high-adrenaline performance can assist the athlete both psychologically and physiologically. A variety of relaxation techniques can be used but progressive muscle relaxation is common in the athletic domain. Progressive muscle relaxation has a direct effect on the reduced production of cortisol: it reduces hypertension (both systolic and diastolic pressures), decreases heart rate, increases the production of dopamine (neurotransmitter), and helps with reducing anxiety, insomnia and cytokines, which trigger inflammation.

Relax

Participate in a progressive muscle relaxation exercise. First, assess your heart rate, blood pressure and respiration rate and observe your emotional wellbeing.

Compare any physiological and psychological changes that occur after the session.

CHAPTER SUMMARY

- A carefully thought-out and well-implemented nutritional plan can make an effective contribution to the improved performance of an athlete.
- Athletes in different sports require different quantities and varieties of fuel sources and these should be tailored individually to maximise performance. An endurance athlete will benefit from carbohydrate loading, whereas an explosive-power athlete will not.
- Hydration is an essential component of the nutritional plan and liquids should be consumed well in advance of performance, as well as during and after performance.
- Foods have different effects on glycaemic metabolism and should be calculated and mapped to identify the appropriate time for their consumption (high GI, low GI).
- There are macronutrients (carbohydrates, fats and proteins) and micronutrients (vitamins, minerals and water).
- The aim of a pre-performance nutritional eating plan is to optimise glycogen stores.
- Timing of a meal is highly dependent on a number of factors, including the athlete and time of the event, but it should be consumed no less than two hours prior to the start of a competition.
- Between three and four hours prior to an event, an athlete should consume a carbohydrate-rich meal (7g /kg) of food that is low glycaemic index, low in fat and moderate in protein.
- Between one and two hours prior to an event, an athlete should consume a light, high glycaemic index snack.
- Hydration is an essential element pre-performance and should consist of 500 mL one hour prior to an event (or more if it is humid) and then 150 mL every 15 minutes thereafter.
- Activities lasting longer than 60 minutes require an athlete to refuel blood glucose with approximately 30–60 g per hour of carbohydrates. The type of fuel will depend on the sport and convenience of consumption.
- Hydration is vital during performance. Athletes should consume a minimum of 150 mL every 15 minutes. If it is particularly humid or if duration is extended, then sports drinks containing electrolytes and potassium may be beneficial to performance.
- Post-performance nutrition should have four aims: restore glycogen stores, repair and regenerate protein and RBCs, replace lost fluid and revitalise the immune system. This is achieved through the consumption of high glycaemic index foods with approximately 1 g CHO/kg, 20 g of high-quality protein and adequate fluids.
- Supplementation should never replace a nutritional, well-balanced diet.
- Supplements may be beneficial for athletes with dietary issues (such as allergies and intolerances) or medical conditions (including coeliac disease). They may also be beneficial when travelling in foreign countries where consumption of the local cuisine could cause digestive discomfort.
- Disadvantages of supplements are that they are: synthetic and do not replicate the natural form, costly, ineffective and sometimes potentially harmful due to toxicity.
- Recovery strategies include physiological (cool-down and hydration), neural (hydrotherapy and massage), tissue damage (cryotherapy) and psychological (relaxation

CHAPTER REVIEW ACTIVITIES

WS

Extra
exam-style
questions

- 1 **Compare** the dietary requirements of an aerobic athlete to an anaerobic athlete.
- 2 **Describe** how hydration is important for athletes and their performance.
- 3 **Justify** the importance of post-performance nutrition.
- 4 **Analyse** the advantages and disadvantages of supplementation.
- 5 **Explain** the benefits of different recovery strategies to improve performance.

CHAPTER 8

Skill and performance

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STAGES OF SKILL ACQUISITION

When learning a new skill, a learner will progress through three distinct stages: first, cognitive; then, associative; and finally, autonomous. When you have read this section, you are encouraged to learn a new skill (for example, juggling) and observe yourself going through these three stages.

All learners will display similar characteristics during the learning process for a new skill. While all learners will make progress, not all of them will achieve the three stages of skill acquisition. Some athletes will remain in the cognitive stage; most will achieve the **associative stage**; and elite athletes will progress to an autonomous mastery of a skill, or series of skills. One way to remember these three stages is to consider cognitive athletes as being new to a sport, associative learners being those who have progressed to representation level, and autonomous learners as Olympians and professional athletes. Skill acquisition can be influenced by several factors, including exposure to similar sports or skills, the quality of the instruction and feedback received, the frequency of training and development, motivation to succeed, and much more.

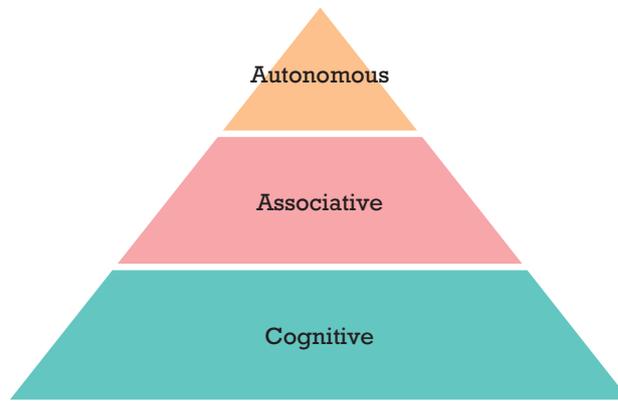


Figure 8.1 Stages of skill acquisition

Cognitive stage

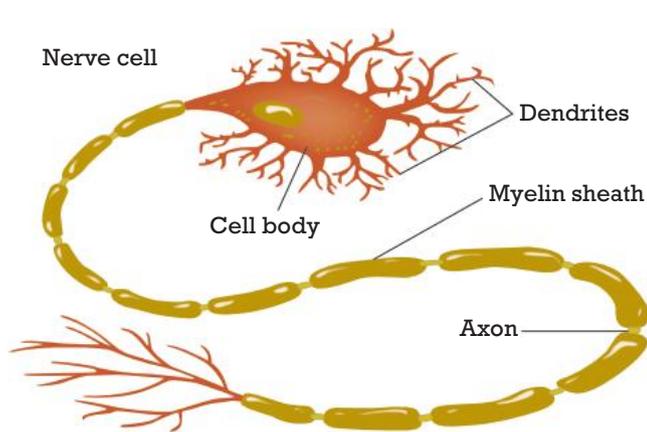
In the **cognitive stage** of skill acquisition the performer is introduced to the skill or activity and achieves some learning or understanding of the skill's mechanics. In this stage it is normal for the learner to make copious errors and experience confusion about the execution of the skill. Continuous, positive feedback from the coach is essential to facilitate both confidence and understanding of the skill. Coaches should also introduce activities that guarantee success in order to develop the learner's confidence and motivation to continue the learning process. This may require breaking the skill down into smaller, manageable elements. Physical demonstrations are crucial to help the performer understand the skill – both aesthetically and cognitively. Teaching cognitive learners basic, specific sport drills where the skill is embedded can help them understand how the skill contributes to the greater performance.

Some learners will always remain in the cognitive stage; others – especially athletes from multidisciplinary sports – progress through the cognitive stage quickly.

Associative stage

During the **associative stage**, emphasis should be on practice. The learner should have acquired a strong understanding of the skill (or skills) required to be successful in execution and be able to repeatedly perform them with increased confidence and capability. This biomechanical success can be attributed to the development of the myelin sheath that encases the nerve axon. The more repeated a movement is, the more the brain and that body part communicate, contributing to the increased thickness of the myelin sheath. The greater the thickness of the myelin sheath, the more rapidly an impulse can travel from the brain to the muscle fibre, thus increasing efficiency and effectiveness. This process is known as myelination. Errors are still present in this stage but much less frequent. Effective feedback is still essential for development, although it is now more of a discussion between coach and learner about performance and identifying positive and negative aspects that can lead to improvement.

During the associative stage, the learner should be developing self-reflection skills and a greater **kinaesthetic sense**. Feedback should be specific and detailed enough to allow the athlete to focus on the different components of a skill. Training needs to involve **drills** that develop a range of sport-specific skills used in specific games and competitions. In addition, strategies and tactics should be introduced to begin development of the metacognitive component of the sport. Many solid athletes remain at the associative stage, performing skills with increased proficiency and fluency but still making errors in the execution.



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Figure 8.2 A nerve cell, showing the protective myelin sheath

Autonomous stage

The autonomous stage is the most prestigious stage of athletic performance. The autonomous athlete has refined all the necessary skills to complete execution with a high degree of aesthetically pleasing fluency and precision. Very few errors are made and even when they are present, they are unnoticeable to the spectator and possibly have little impact on the athlete's overall performance. Physical performance is automated and completed unconsciously. Concentration is on higher order elements of performance such as anticipation, tactical strategies, spatial awareness and invasive tactics. Training for autonomous athletes is typically focused on the refinement of skills or an individual element within a skill to improve the consistency of the entire performance. Because of the focus and precision required at this level, training needs to keep the athlete motivated and on task and it requires variety. Feedback is a collaborative process between coach and athlete; it can be both positive and negative and relies on their mutual knowledge of performance in the sport.



Getty Images/Icon Sportswire

Figure 8.3 Roger Federer is an example of an athlete who has reached the autonomous stage.

CHARACTERISTICS OF THE LEARNER

Factors that contribute to the progression of skill acquisition and success in sporting performance include the athlete's innate characteristics, such as personality, genetics, confidence, prior experience in different sports and natural sporting ability.

Personality

Personality is commonly defined as a set of habitual behaviours, cognitions and emotional patterns that evolve from biological and environmental factors. An athlete's natural personality can make a positive contribution to their performance (such as dedication to mastering a skill) or a negative contribution (such as trait anxiety). In 1992 researchers identified specific personality traits that athletes should have in order to maximise performance. Openness was identified as essential because athletes need to be confident to try new experiences or concepts and accept new ideas. This is imperative when being trained by new coaches or trainers.

Confidence

Being extroverted also assists with confidence, especially later in the skill acquisition stage when an athlete may take on a leadership role. Conscientiousness rates highly as one of the personality traits essential for success because it forms the basis for being vigilant and dedicated to training and personal performance. Low inclination towards neuroticism is also beneficial for maintaining positivity and diligence, especially in the cognitive stage when copious errors are made, or later in the autonomous stage when working on refining minute elements in technique.

Prior experience and ability

Skill acquisition can be highly dependent on, and influenced by, an athlete's prior experience in a sport or skill. Much research has been completed on the positive effects of athletes having a multisport disciplinary focus during their formative years, showing that this makes a positive contribution to their professional sporting career. Having already learnt and practised similar skills enhances the athlete's ability to learn and master a new skill faster than if they were to begin from scratch. The fundamental motor skills required in similar sports are transferrable. Consider baseball and softball. The fundamentals of tracking, catching and throwing the ball are the same; the adjustment needs to be made in the dimensions of the ball (grip) and distance. Even without competing in a similar sport, athletes who have played another sport tend to progress faster through the cognitive stage of skill acquisition. Many famous athletes have shown autonomous acquisition in multiple sports. Tom Brady excelled in the National Football League (NFL) and baseball. Before winning five Super Bowls with the New England Patriots, the quarterback had to choose between a professional career in baseball or NFL. Also, Russell Wilson, the quarterback for the Seattle Seahawks, had to make a similar decision. Most notably, Deion Sanders, a US athlete, played in two professional sports in the one year. He was contracted as a professional baseball player to the Atlanta Braves and straight after a play-off game he was on a flight to compete with the Atlanta Falcons in the NFL.

Heredity

Inherited genes also contribute to an athlete's level of skill acquisition and success in sport. Muscle fibre types, height, arm span, foot size, somatotype and other physiological structures can contribute to the acquisition of skill. In addition, a person's physiology can also determine their receptiveness to the responses to training, meaning that genes can influence oxygen uptake and aerobic capacity. An athlete's ethnicity can also influence the sport in which they have the potential to excel. For example, Europeans make successful swimmers, West Africa produces exceptional sprinters and a high proportion of elite marathon runners come from east

African countries. A study observed that 75 per cent of elite distance runners originated from the Kalenjin tribe in Kenya, alluding to the genetic abilities of these people. However, genetics alone cannot make an elite athlete. Ethiopians, who can be exceptional long-distance runners, have significantly different genes from the Kalenjin tribe. The elite marathon runners have similar upbringings and they are required to run several kilometres to and from school each day, which emphasises the environmental impact upon their sports performance. Therefore, it is important to consider the 'nature vs nurture' factors in the development of an athlete.

LEARNING ENVIRONMENT

Current studies in sport science conclude that an elite performer requires a favourable genetic profile. However, it is essential that this be combined with appropriate training, analysis, evaluation and feedback. The training environment is crucial to the success of skill acquisition and the role of the coach and/or trainer is to create a learning environment that is both stimulating and appropriate for the needs of the athlete. This encompasses a variety of elements, including the nature of the skill/s, the contribution of the performance elements, a variety of practice methods, and specifically, quality feedback.

Nature of skill

Skills are categorised into nine different types: open, closed, gross, fine, discrete, serial, continuous, self-paced and externally paced. It is important for the coach to understand the category of the skill in order to design effective training programs. It is also important to understand that skills are a combination of types and that they can fluctuate.

Closed

A closed skill is where the execution of the skill is predictable and controlled by the athlete performing it. An example of a closed skill is an athlete hitting balls off a tee. The athlete determines the timing and pace, the ball is stationary so there are no external factors influencing its movement, and success or failure to hit the ball is entirely up to the athlete. The athlete has time to consider the movement, control the timing and not be externally pressured. Precision focus can be applied to completing the individualised skill. Most closed skills performed in competition or events are self-paced skills where the performer controls the rate at which the skill is performed. However, there can still be a time variable such as a penalty kick in soccer or a shot-put. Closed skills are highly effective when cognitive learners are in training.

Open

An open skill is practised in an environment that is unpredictable and out of the athlete's control, the variables changing with each training or competition. For example, receiving a tennis serve cannot be controlled (timing, pace, ball direction, spin) and wind speed and crowds can also affect the player. Most sports involving opponents also involve open skills. Cognitive learners are easily distracted by external forces; associative and autonomous athletes possess greater metacognitive capabilities to cope with them. Changing environments in training enables athletes to adapt to the stimulus of open skills.

Gross

Gross motor skills involve major muscle groups for movement and include the major fundamental movement skills such as running, jumping and striking. These movements are typically learnt early in life because they form the basis for all physical movement. The higher the acquisition of these fundamental motor skills is, the greater the likelihood is of an athlete achieving success in the cognitive stage of learning a skill or sport.

Fine

Fine movements involve precision and accuracy and use isolated muscles to control movement. Sports reliant on fine motor movements include darts, as well as sports where the bowler or pitcher uses specific finger positioning and force as they let go of the ball to control spin or movement on the seams (cricket, baseball and softball).

Discrete

Discrete motor movements have a defined start and end point. The performer can complete the whole skill in one smooth action, such as throwing a ball.

Continuous

A continuous skill is one that is repeated in a cyclical process where the end of one movement forms the start of the next. The athlete determines the end point of the skill. Examples of continuous skills include swimming or running.

Serial

This is a combination of separate discrete skills, performed in a designated sequence to form a whole movement pattern. Examples include performing a lay-up in basketball, throwing a javelin and bowling in cricket. All these serial skills require a run-up, release and follow-through.

In the learning environment, continuous skills are understood at a faster rate, usually due to being gross motor movements (prior experience). Discrete skills take time, especially in cognitive athletes with little experience. Serial skills are the most difficult to learn and are usually introduced in the associative stage where success is more likely.

Self-paced

Self-**acing** is where the athletes are in control of the timing and execution of the skill; for example, kicking a penalty goal in rugby union.

Externally paced

External pacing is where the athlete has little or no control over the timing and they must respond to the external stimulus; for example, a goalie in soccer, receiving a tennis serve or performing a dance routine.

Performance elements

Performance elements are introduced in the associative learning stage and mastered in the autonomous stage. Decision-making, strategic manoeuvres and tactics are all essential components in competition and need to be developed during training. They are typically taught to athletes in training sessions that mimic competition; for example, mini-games or friendly trials against other teams. Coaches need to be able to stop play, discuss and analyse decisions made by the players, and help them develop their understanding of these elements in a controlled environment. Also, altering the conditions or situations is an important way to place increased pressure on decision-making. An example is starting the scrum with the scores tied or placing players in pressure situations. Including athletes in the process of making decisions and tactical strategies can heighten their engagement and motivation.

Decision-making

This is an essential element of training if an athlete is going to succeed and progress to the autonomous stage of learning. It is important that athletes learn to make successful decisions efficiently and effectively, especially in high-pressure situations. This skill is best taught during

training where an athlete is placed in situations that require decisions to be made, followed by athlete and coach deconstructing the decisions.

Strategic/tactical

Sports vary in the degree to which strategies or tactics are used. Athletes need to learn the strategies and tactics of their individual sport early so that they can improve their capabilities to read the game and respond. The most effective method for teaching strategy and tactical development is for athletes to practise in game-like situations (specificity) with each side having specific goals and analysing how they react and respond to challenges. Although associative and autonomous athletes are more likely to work on strategic/tactical skills, cognitive learners can be introduced to them in a non-threatening manner. A good way to do this is by playing modified games that concentrate on game sense approaches. Examples include piggy in the middle, pac man tag and tail tag because they develop the skills of reading player position, using spatial awareness and evasion tactics. Once an athlete is confident and understands the game and skills required, they can be introduced to the specifics of tactics and strategy.

Practice methods

To effectively instruct an athlete, a coach must have a strong understanding of how to teach a skill in its entirety, as well as breaking it down to the individual elements. A skill can be taught in different ways: massed, distributed, whole or part. Effective coaches combine methods and use a range of strategies to ensure that learners experience success and remain motivated and keen to learn.

Massed practice

This involves the teaching and learning of a skill in a continuous, consistent and repeated manner, in its entirety, until the skill is mastered. The skill is continually performed throughout training sessions with little rest and minimal breaks. This type of training is best suited to highly motivated and engaged athletes such as associative or autonomous learners. This is because a high level of concentration and determination is required.

Distributed practice

This involves short periods of training interspersed with rest or alternating different skills or game components. The periods are usually short to maximise engagement and reduce fatigue, which affects the development and execution of the skill. Distributed practice is highly suited to cognitive learners because it allows for breaks, maintains motivation and enthusiasm and enables time for feedback. Distributed practice could be used by associative or autonomous learners when the skill complexity requires time for the athlete to mentally process the movements or refine technique.

Whole practice

This is where the whole skill is learnt or practised in its entirety. This practice method is used when the skill is easy to perform and the athlete would benefit from the whole practice method.

Part practice

This is where the skill is broken down into smaller elements because the whole skill would be complex. Individual elements can be taught and learnt and then combined to develop the whole skill. If the athlete is to understand what they are attempting to achieve, it is important that they understand how the elements contribute to the whole. Cognitive learners are often taught a skill using part practice because the complete skill would be unattainable at that stage. Autonomous athletes also use part practice when refining one element of the skill to improve overall performance.

Feedback

Effective feedback is a vital component of learning or refining a skill. It involves performers receiving information from internal and external sources about their execution and performance. Feedback provides guidance and is important for motivation and reinforcement. It is an important method for athletes to learn how to correct errors during performance. Learning from feedback is achieved predominately in the autonomous stage of learning because by then athletes have developed kinaesthetic awareness and can recognise errors and self-correct. In the early stages, coaches should give a large amount of positive feedback, and then decrease it as the learner perfects the skill and becomes more self-sufficient. The timing of feedback is important. It can be concurrent – that is, during performance – or delayed until after the performance. Feedback should be constructive and accurate, timely, given without delay and positive. Feedback will only be effective if it is aimed at the ability of the performer and their stage of development.

Internal/external feedback

Feedback can be internal or external. Internal feedback is derived from the senses within the athlete and is known as ‘kinaesthetic sense or awareness’. The athlete’s neurological mechanisms provide feedback on the performance and execution of skills, and the result of the performance. For example, once a basketball player releases the ball, they can instinctively know if it will go in the basket. External feedback (also known as ‘augmented feedback’) refers to information about performance given from an outsider’s perspective. This can be in the form of video analysis, advice from a coach, spectators or the media, and it contributes to the athlete’s improvement and learning about a skill.

Concurrent/delayed feedback

Concurrent feedback is given during the performance and prior to completion of the skill or event. Concurrent feedback can be in the form of a coach giving advice on lap times or a marathon runner using the pace time on their watch to make a strategic move. Delayed feedback is given after the completion of the performance. Delayed feedback can be in the form of a coach discussing the performance with the athlete after the event or when the finishing positions are announced after a race.

Knowledge of results

Knowledge of results (KoR) concerns the outcome of a task. If the result of a performance was successful (for example, a swimmer’s time at the end of a race) it can be used to motivate the athlete further in the learning process. KoR is always an external form of feedback and can come from scoreboards or coaches. It can provide information on the way the skill was completed and, to achieve a different result, the athlete will need to make changes to their skill execution. KoR is usually measured objectively – an impartial measurement such as time or position. KoR is most critical, and easier to implement, at the cognitive and associative stages. Providing awareness about the result of a performance is an effective way to motivate players towards improvement. Coaches should give KoR more frequently in the cognitive stage. As the athlete’s skills develop and they progress into the associative stage, the frequency of KoR feedback should decline. By reducing this frequency, the athlete is forced into learning and reading their kinaesthetic awareness in order to improve.

Knowledge of performance

Knowledge of performance (KoP) is information given directly about the execution of the skill or performance. It can be provided both internally and externally. Externally, a coach can give verbal feedback or show a video. A video of performance is an excellent tool but it is only effective if the coach draws attention to specific aspects of performance that affected

the athlete's overall result. The same type of feedback should not always be given because the athlete can come to rely on that method and find it hard to perform without it. The athlete then starts to rely on the KoR at the expense of developing kinaesthetic awareness. KoP can come internally from the athlete's kinaesthetic sense. It is important because it is concerned with the quality of performance and is good for activities where there is a set way of doing something, such as vaulting in gymnastics. By developing kinaesthetic awareness the athlete can self-correct and then achieve a good KoR without the coach intervening.

Teach a skill

Design a suitable plan for teaching beginners to acquire a skill through to mastery. The plan should reflect:

- a appropriate practice methods for the learners
- b integration of relevant performance elements
- c awareness of how instruction may vary according to characteristics of the learner
- d knowledge of how feedback will be used as learners progress through the stages of skill acquisition.

Source: Personal Development, Health and Physical Education Stage 6 Syllabus © NSW Educational Standards Authority for and on behalf of the Crown in right of the State of New South Wales, 2012

ASSESSMENT OF SKILL AND PERFORMANCE

Characteristics of a skilled performer

Watching elite athletes play in a professional sport is a joy. Spectators are inspired by their movements, their skill execution, and the way they can read the game and their opposition and make tactical decisions very quickly. There have been many studies that identify which characteristics of elite athletes set them apart from their competitors. Results of these studies show that successful performers are usually more physiologically advanced than unskilled performers because of their experience and heightened perceptive abilities.

Technique

Elite athletes have a higher level of autonomy over their movements and their physicality seems effortless. A highly skilled performer can select the appropriate tactical response, react quickly but be unhurried, and use movements that are always smooth and efficient.

A skilled performer has the composure under pressure to respond with a positive result, but demonstrates resilience to deal with the negative consequences of performance. Their coordination is better because the neuromuscular pathways have been trained. A skilled performer will use less energy doing a given task because they have learnt to work more efficiently and know how to delay fatigue.

Kinaesthetic sense and anticipation

Skilled athletes possess a higher level of kinaesthetic sense, or body awareness. A skilled performer can read a game and use various cues to anticipate that a certain action will take place. An example is a soccer player intercepting a pass and getting into the right position at the right time. Anticipation leads to better timing in reacting and performing during a competition or event.

Objective and subjective performance measures

In order to make improvements it is vital that coaches, trainers and athletes analyse and evaluate performance. This can be done using both objective and subjective measures. Both are essential to providing a holistic analysis of performance and identifying elements where improvements can be made.

Objective performance measures

An **objective performance measure** is something that can be made independently of an observer and it must be impartial to the result; for example, a stopwatch or tape measure. The success or failure of performance is indisputable when decided by a measurement of this type because it involves facts about the performance rather than opinions; it also reduces bias that can result from judging. Objective measurement determines the result but not necessarily the best skill execution. For example, when Usain Bolt finishes with the fastest time in the 100-metre sprint, placing him first, the result is indisputable but he may not have had the best form or technique.

Subjective performance measures

Subjective performance measures are based on personal opinions, ideas and feelings of the observer, who determines the value of the performance based on their own set of ideals and opinions. An example of subjective assessment is when a player is named 'player of the match'. The coach, media or spectators use their opinions of the player's performance to decide on this outcome. Because opinions and personal feelings are used to measure performance, this form of assessment is not very accurate or reliable.

Validity and reliability of tests

When using data to analyse, evaluate and provide feedback to performers it is vital that the information is valid and reliable. This is also true of the measures used to assess the performance.

Validity

Validity is the degree to which a test measures what it is designed to measure. For example, the Illinois agility test was designed specifically to measure agility. Validity is reinforced by comparing the measurements with expected values. This can be done by referring to a set of criteria or percentile bands for the particular test and athlete being tested.

Reliability

Reliability is the ability of the test, and the test results, to be consistently repeated. A test is reliable if it is always completed using similar conditions, equipment and procedures. It is deemed reliable if each time the test is given to an individual, the results are approximately the same for all subsequent people of that skill level in the future, and the results are within the expected range and not drastically different. For example, performing the Illinois agility test multiple times over the season on the same surface would make the test reliable. Attempting the Illinois agility test on grass one month, then indoors on wooden floors the next would make the test unreliable because the environmental conditions would have altered. This would probably produce varied results.

A test can be reliable without being valid; for example, when it gives consistent results but does not measure what it claims, or was intended, to measure. A test cannot be valid if it is unreliable and in this case any other information becomes meaningless.

Personal versus prescribed judging criteria

Personal judging criteria

Personal judging criteria are used when a judge gives their personalised impression, opinion or judgement of what they have seen. Assessment is not based on any data other than the judge's impression. It is subjective because it represents an opinion and is not based on any objective measures. Rating scales or checklists can make personal criteria more credible because they provide some guidance about the opinion given; however, they may only consist of a personal checklist of what the judge was looking for. As an example, when a team chooses the player of the match, their decision may be based on one element of performance such as a goal scored at a crucial time, or it could be based on a player's contribution to team spirit; whereas basing their decision on points scored or good tackling techniques would be an objective measurement.

Prescribed judging criteria

To improve the objectivity of subjective performance assessment, **prescribed judging criteria** are developed by the governing body of each sport or event in order to remove as much bias as possible. These criteria can include checklists, rating scales and scoring systems that judges must subjectively assess against. This is important in many sports where competitors perform very differently, yet equally well. Sports such as equestrian, surfing, diving and gymnastics use this method of assessing performance. In each routine, the judges look for certain components worth a certain amount of points. Judges may deduct a set amount of points if the skill was executed poorly. Sports using this system also employ several judges rather than relying on a singular judge's subjective assessment. For example, at the Olympic diving event there are seven judges who score the dive out of 10 points. The two highest scores and two lowest scores are discarded and the remaining three scores are added together, then multiplied by the degree of difficulty to give a final score.

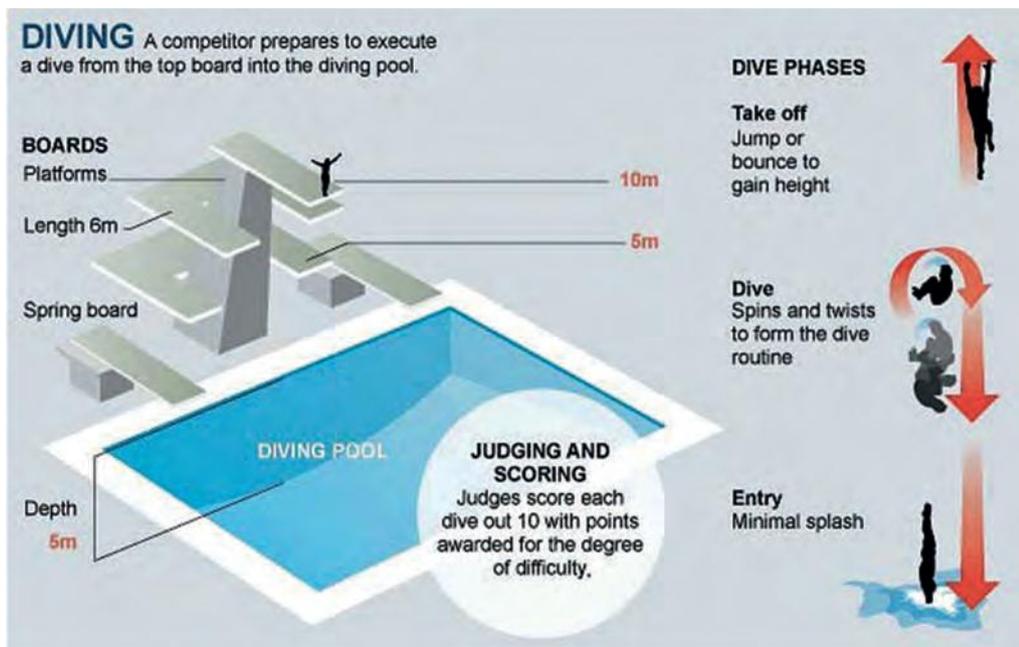


Figure 8.4 Elements of Olympic diving prescribed criteria

CHAPTER SUMMARY

- There are three stages of skill acquisition: cognitive (beginners), associative (intermediate) and autonomous (advanced). Progression is not guaranteed and most athletes remain in the associative stage.
- Athletes bring their own characteristics to the learning process and these can determine the success and/or failure of skill acquisition. These characteristics include personality, genetics, confidence, prior experience and natural ability.
- For an athlete to acquire a skill, the learning environment should be adapted to the stage of the learner and coaches must provide motivation and effective feedback.
- Skills can be classified as open, closed, gross, fine, discrete, continuous, serial, self-paced or externally paced. It is important for coaches to understand the differences so that training can meet the specific needs of the athlete.
- As an athlete progresses with their skill acquisition, higher-order performance elements should be introduced, such as decision-making and strategies and tactics relevant to their sport. These should not be introduced until the athlete has advanced from the cognitive stage.
- A variety of practice methods are available to athletes as they reach each stage of skill acquisition. These include: massed and distributed, whole and part. Depending on the complexity of the skill, the stage of the learner and the learning environment will influence the practice method used.
- Feedback is essential for improvement and can be applied in different forms. Athletes can use internal feedback to self-reflect; this is also known as kinaesthetic feedback. Coaches, spectators and the media can provide an athlete with external feedback on their performance.
- Feedback can be concurrent (immediate and provided during performance) or delayed (provided after the performance). It can cover knowledge of performance (quality of skill and technique) or knowledge of results (concerned with task outcome).
- Assessing a skilled performance occurs subjectively (based on personal opinions) or objectively (impartial measurement). Specific criteria used by judges can be personal or prescribed (checklists/ratings, etc.).
- Assessment of performance needs to be valid (measures what it intends to measure) and reliable, meaning that it can be consistently repeated.
- A test can be reliable without being valid; for example, if it gives consistent results but does not measure what it claims, or was intended, to measure. It cannot be valid if the test is unreliable.

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CHAPTER REVIEW ACTIVITIES

WS

Extra exam-style questions
Assessment tasks for Core 2

- 1 Select a skill and **describe** the stages of skill acquisition a player would move through to acquire the skill.
- 2 **Analyse** how the nature of skill can affect skill acquisition.
- 3 **Describe** how the characteristics of the learner can influence skill acquisition.
- 4 **Identify** the practice methods and types of feedback that are effective in the various stages of skill acquisition.
- 5 **Evaluate** the assessment measures for performance.



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OPTION 1: THE HEALTH OF YOUNG PEOPLE

CRITICAL QUESTIONS

What is good health for young people?	140
To what extent do Australia's young people enjoy good health?	160
What skills and actions enable young people to attain better health?	178

Source: Personal Development, Health and Physical Education Stage 6 Syllabus © NSW Educational Standards Authority for and on behalf of the Crown in right of the State of New South Wales, 2012

OUTCOMES

When you have read this section you should be able to:

- 1 outline the characteristics of Australians' health status looking at groups at risk and the current trends
- 2 understand how individuals, communities and governments address health priorities
- 3 show how they maintain and promote health within a range of health skills
- 4 argue ways in which social justice is impacted by health promotion actions
- 5 propose ways in which everyone can work towards better health for Australians
- 6 use a range of strategies to gather health information.

KEY TERMS

coping	resilience
epidemiology	risk factors
determinants	sociocultural factors
health literacy	socioeconomic factors
morbidity	self-concept
mortality	
motivation	
perinatal	
protective factors	



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CHAPTER 9

Defining good health for young people

IN THIS CHAPTER

Nature of young people's lives	140
Epidemiology of young people's health	144
Effects of determinants of health on young people	149
Developmental aspects that affect the health of young people	154

NATURE OF YOUNG PEOPLE'S LIVES

Young people are considered to be individuals between the ages of 12 and 24 years. This is where children are transitioning into adults in all areas of their lives: physical, social and emotional. It is during this period that individuals begin to move from a world influenced by family to one influenced by peers, and they experience a growing need to be independent.

How the developmental stage can vary

Young people grow and develop at different rates, not only physically but also mentally, due to their motivation levels, values and sociocultural backgrounds.

The rate at which young people progress through the physical development stage varies, with some adolescents experiencing changes in their body earlier than others; for example, breast development, hair growth, muscle or fat development, voice deepening. Some young people's physical growth happens at a different rate to their mental and emotional development, so they may look older but not have the same level of maturity.

Motivation

Motivation varies widely among young people. An individual's level of motivation can be closely linked to their values, family and self-esteem. Young people with high motivation levels are able to set themselves goals and remain self-driven and motivated to achieve these goals – both in the short- and long-term. Since these individuals are more likely to have succeeded, experienced

failure and redirected themselves to take on new challenges, they will have become **resilient**. Unfortunately, not all young people experience high levels of motivation; this can be linked to the fear of failure and unwillingness to try. Young people need to be encouraged to take on small challenges, build their resilience and experience success in order to increase their levels of motivation.

Influence of family and peers

As young children our family is our major (if not only) influence. The majority of a young child's life is spent under the supervision of family or close relatives. This is where they develop their values.

When children move into adolescence the importance of peers outweighs that of the family. Young people are regularly looking for acceptance from their peers in relation to their clothes, food and behaviours. The influence of both family and peers can be both positive and negative. For example, when a young person lives in a family where they are not encouraged to be physically active and they are continually served processed or fast foods, this can have a negative impact on their physical, social and emotional health, with devastating consequences as they move into adulthood.

As a positive influence, a young person who has strong values instilled in them from their family may be less likely to get involved with peer groups who undertake risk-taking behaviours and, instead, choose to socialise with peers who prefer physical activity and protective health behaviours. This positive influence can have a beneficial effect on the young person and reinforce their positive health behaviours well into adulthood.

Influence of prevailing youth cultures

Youth cultures are viewed as subcultures along with any norms or values unique to a group. In this 21st century, there are a variety of youth cultures where it is acceptable to be different from the norm. Young people are experimenting with their appearance and their interests. However, at the same time adolescents want that sense of belonging and fitting in with their peers or group. As a result, they generally gravitate towards individuals with similar interests to their own – hobbies, fashion, clothing or hairstyles.

Young people who are interested in sports generally spend large amounts of time training as part of a team or club. Away from the sporting club, they tend to socialise with the same people because they feel accepted by them due to their common interest. These individuals generally dress in a similar way and can be identified through their appearance; for example, wearing joggers or slides. Similarly, a group of young people who like body piercing or tattooing will stick together because the group support is equally important as the interest that brought them together. Without this sense of belonging, young people could look for attention and acceptance through risk-taking behaviours. They might also change their values or appearance in order to be accepted.

Youth cultures

- 1 Identify a variety of youth cultures present today.
- 2 Identify youth cultures from the 1960s and 1970s that no longer exist today.
- 3 What do young people do for entertainment today that differs from past generations?
- 4 What are the expectations of young people in the home today compared to past generations?
- 5 Distinguish between two youth cultures from different points in time.



Figure 9.1 Young people bond through a common interest in sport

Influence of global events and trends

Young people have an increased knowledge of the world and global events. The introduction of social media and smart technologies has seen young people's knowledge and awareness of the world around them increase.

Previous generations of young people connected with the world through sport during international competitions such as the Olympics, World Cup Soccer and World Series Cricket and these days the world is even closer with the ability to watch and connect with global events on YouTube and social media. With this increase in world knowledge, young people develop a sense of maturity and understanding about the world that can lead to a greater empathy for others. In the Australian Marriage Law Postal Survey, carried out by the Australian Bureau of Statistics (ABS) in 2017, 61.6 per cent of the 79.5 per cent of Australians who voted agreed the law should be changed to allow same-sex couples to marry. The positive impact of this on young people who are struggling to feel accepted due to their sexual preferences is that they will hopefully experience a greater sense of belonging, knowing that there is general support for diversity within Australia.

Influence of technology

Technology can have a positive or negative impact on young people. Due to the fact that it is rapidly changing and improving in this fast-paced society, there is increasing pressure on young people to keep up. According to the Sensis Social Media Report 2017, 84 per cent of Australians access the Internet daily and smartphones are now used by more than eight in 10 adults, with almost all people under the age of 40 owning one.

While a positive outcome of this is easy access to information, a negative impact is the apparent need to have access to instant knowledge at every minute of the day and night. There seems to be no escape from technology and this is affecting our mental health.

The way we use devices, particularly smartphones and tablets, varies greatly across the generations. On smartphones and tablets, social media apps are the most popular and are used on at least a weekly basis, as reported by 58 per cent of respondents to the Sensis survey.

The use of social networking sites continues to increase with Facebook being the most dominant platform (accessed by 90 per cent of users across all genders and ages). Other popular platforms include YouTube, Instagram, Snapchat, Twitter and LinkedIn. In fact, social networking sites are overtaking face-to-face conversation among young people. The research found that 68 per cent of millennials actively avoid conversations and 80 per cent of young people surveyed reported feeling more comfortable having a conversation via text message or online.

Manufacturers of computer games have moved on from the more sedentary style to active games that aim to increase physical activity levels; for example, PlayStation and Xbox. However, there is a tendency for young people to use online gaming in the comfort of their own home rather than socialise with peers face-to-face. This can have both positive and negative impacts. While online gaming is a great platform to develop and build friendships based on common interests, it can also increase sedentary behaviour, which leads to a negative lifestyle and health complaints.



Weblink

RSPH

Go to the Royal Society for Public Health (RSPH) website to watch a short video about the #StatusofMind survey of 1479 young people. (Or follow the link above.)

Discussion

What could be the contributing factors to Instagram's negative impact on young people's mental health?



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Figure 9.2 Social interactions of young people

Influencers

Complete the following table for each influence on young people's lives:

- 1 Family and peers
- 2 Youth cultures
- 3 Global events and trends
- 4 Technology



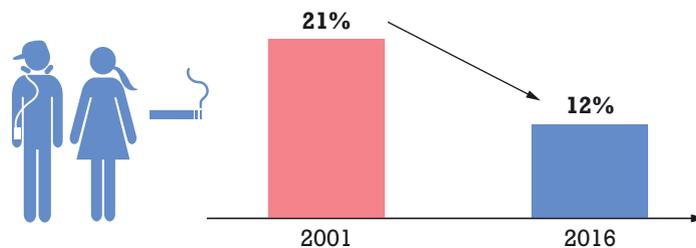
Scaffold

Influence of family and peers		
Positive examples	Negative examples	How this is different or similar to what other generations experienced
e.g Good communication	e.g Older parents can cause difficulties in communication	

EPIDEMIOLOGY OF YOUNG PEOPLE'S HEALTH

Patterns of morbidity and mortality

According to the Australian Institute of Health and Welfare (AIHW) report *Australia's Health 2014*, 91 per cent of young people rated their own health as good, very good or excellent. According to the ABS National Health Survey (2014–15), 57 per cent of young people are within a healthy weight range and 52 per cent of young people reported engaging in sufficient physical activity of 150 minutes over five or more sessions per week. Improvements can be made in relation to nutrition and diet; however, only 3.3 per cent of young people reported eating the recommended amount of fruit and vegetables (as recommended by the Australian Dietary Guidelines). A positive factor is the reduction in the number of young people aged 15–24 who smoke cigarettes. The number of young people who are daily smokers has almost halved, from 21 per cent in 2001 to 12 per cent in 2013 (see figure 9.3).



Source: *Australia's health 2018*, AIHW, p. 200 © Australian Institute of Health and Welfare 2017. CC-BY 3.0 licence.

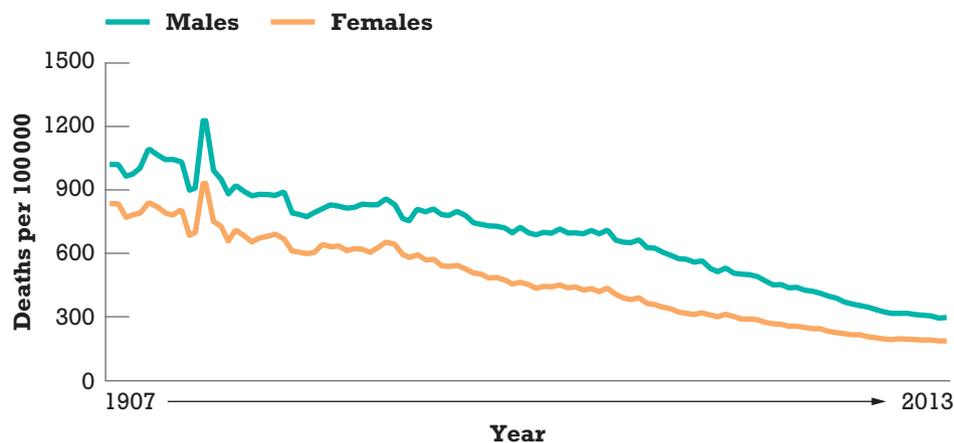
Figure 9.3 Number of daily smokers

While young people are reported as experiencing overall good health, adolescence is still characterised by risk-taking behaviours that can have a significant impact on the health of young people.

Mortality rates in young people are more likely to be from preventable causes than from disease. Overall, the death rate for young males is higher than for young females, which can be attributed to risk-taking behaviours both in social and work settings. The major causes of death for young people aged 1–14 is land transport accidents, which is the leading underlying cause of death among all people, at 14 per cent. The leading underlying cause of death among people aged 15–24 is suicide, contributing to 28 per cent of deaths in young people (*Australia's health in brief: 2016*, AIHW, p. 9).

There was a steady decline in preventable deaths and premature mortality in Australia between 1907 and 2013 (see figure 9.4). The control of infectious disease and improved hygiene and nutrition contributed to the decline in premature deaths in the first half of the last century. The focus is now on improvements to road safety measures, which have led to a decline in deaths in this century, along with prevention, detection and treatment of diseases such as cardiovascular disease (CVD) and other chronic diseases.

Improvements have also occurred through behavioural and policy changes to reduce the effect of 'modifiable' risk factors; for example, smoking, physical inactivity, poor nutrition and excessive consumption of alcohol. Advertising campaigns and legislations implemented around road safety and tobacco have increased young people's knowledge and understanding and positively impacted on their perception and value of their own health.



Source: *Australia's health 2016*, AIHW, p. 70 © Australian Institute of Health and Welfare 2017. CC-BY 3.0 licence.

Figure 9.4 Premature mortality rates, by sex, 1907–2013

Morbidity refers to rate or incidence of an illness or sickness within a population. With this comes a loss of 'healthy' life, which can be calculated as the Disability Adjusted Life Years (DALY). Children under 15 years and young people aged 15–24 years experienced a similar number of DALY in 2011 but the sources of this burden were quite different. In adolescents and young adults, ill health accounted for more burden than dying prematurely (AIHW, 2016).

The leading cause of morbidity in young people is associated with mental health (see table 9.1). The leading cause of total burden for females is anxiety and suicide, and for males, intentional self-harm. In 2013–14, there were more than 80 000 hospitalisations (2572 per 100 000) of young people due to injury and poisoning. For females aged 15–24 the most common cause of hospitalisation was intentional self-harm, with 410 per 100 000 admissions. While self-harm is high for males, young males were most likely to be hospitalised as a result of transport accidents, with 613 per 100 000.

Table 9.1 Most common selected chronic diseases, by age, 2014–15

	Age group		
	0–44	45–64	65+
1	Mental health conditions	Cardiovascular disease (CVD)	CVD
2	Asthma	Arthritis	Arthritis
3	Back pain and problems	Back pain and problems	Back pain and problems
4	CVD	Mental health conditions	Mental health conditions
5	Arthritis	Asthma	Diabetes

Source: National Health Survey, first results 2014–15. © Commonwealth of Australia. Australian Bureau of Statistics cat. no. 4364.0.55.001. CC BY 2.5 Australia licence.

Comparisons of health status with other age groups

It is evident that during the course of life, a change occurs in the burden of mortality and morbidity.

In 2011, the diseases and injuries causing the greatest burden were generally similar for males and females, although there were some differences in specific age groups (see table 9.2). Infant and congenital conditions accounted for a large proportion of the burden in children under five years. In males and females aged 5–14 years, asthma was the main cause of burden in boys, followed by anxiety disorders; whereas in girls, anxiety disorders were the main cause of burden and this was followed by asthma.

When young males moved into the 15–24 years bracket, asthma dropped from being the leading cause to the fifth cause of burden. Suicide and self-inflicted injuries were the main causes of health loss for males (15–44 years) with alcohol use disorders the second highest. For females the leading cause continued to be anxiety disorders.

The leading cause of total burden for males aged 45 and over moved from self-harm and injuries to preventable chronic disease, with coronary heart disease as the leading cause of burden, followed by lung cancer for those aged 45–74 years. Females were similar, with a move from anxiety to musculoskeletal disorders as the leading cause of burden in women aged 45–64 years, while coronary heart disease was the leading cause of burden in women aged 65–84. Dementia was the leading cause of burden of disease (BOD) in women aged 85 and over.

Table 9.2 Leading causes of total burden of disease, by age and sex, 2011

	Under 5	5–14	15–24	25–44	45–64	65–74	75–84	85+
Males								
1	Birth complications	Asthma	Suicide/self harm	Suicide/self harm	Coronary heart disease	Coronary heart disease	Coronary heart disease	Coronary heart disease
2	Birth trauma/asphyxia	Anxiety disorders	Alcohol use disorders	Back problems	Lung cancer	Lung cancer	Chronic obstructive pulmonary disease (COPD)	Dementia
3	Other infancy disorders	Autism spectrum disorders	Road traffic injury	Alcohol use disorders	Other musculoskeletal	COPD	Dementia	Stroke



>>	Under 5	5–14	15–24	25–44	45–64	65–74	75–84	85+
Males								
4	Sudden infant death syndrome (SIDS)	Conduct disorder	Depressive disorder	Poisoning	Back problems	Diabetes	Stroke	COPD
5	Other congenital conditions	Depressive disorder	Asthma	Depressive disorder	Suicide/self harm	Bowel cancer	Lung cancer	Prostate cancer
Females								
	Under 5	5–14	15–24	25–44	45–64	65–74	75–84	85+
1	Birth trauma/asphyxia	Anxiety disorder	Anxiety disorder	Anxiety disorder	Other musculoskeletal	Coronary heart disease	Coronary heart disease	Dementia
2	Birth complications	Asthma	Depressive disorder	Depressive disorder	Breast cancer	Lung cancer	Dementia	Coronary heart disease
3	Other infancy disorders	Depressive disorder	Asthma	Back problems	Back problems	COPD	COPD	Stroke
4	SIDS	Dental caries	Suicide/self harm	Other musculoskeletal	Anxiety disorder	Other musculoskeletal	Stroke	COPD
5	Cardiovascular defects	Upper respiratory problems	Bipolar affective disorder	Asthma	Lung cancer	Breast cancer	Lung cancer	Diabetes

Source: *Australia's Health 2016: in brief*, p. 56, © Australian Institute of Health and Welfare 2017. CC-BY 3.0 licence.

The leading cause of mortality differs for both gender and age. The leading causes of premature death 2011–13 across the population for all age groups and gender was coronary heart disease, contributing to 10 per cent of deaths among people aged under 75 years. Lung cancer was second with 8.9 per cent and suicide was the third leading cause of premature death with 4.6 per cent (see table 9.3).

Table 9.3 Top 10 leading causes of premature death by sex, 2011–13

Males				Females			All people		
	Cause of death	No. of deaths	%	Cause of death	No. of deaths	%	Cause of death	No. of deaths	%
1	Coronary heart disease	11887	12.7	Lung cancer	5336	9.3	Coronary heart disease	15223	10.1
2	Lung cancer	8141	8.7	Breast cancer	5259	9.2	Lung cancer	13477	8.9
3	Suicide	5161	5.5	Coronary heart disease	3336	5.8	Suicide	6881	4.6
4	Colorectal cancer	3572	3.8	COPD	2303	4.0	Colorectal cancer	5867	3.9
5	COPD	3003	3.2	Colorectal cancer	2295	4.0	COPD	5306	3.5
6	CVD	2995	3.2	CVD	2268	4.0	Breast cancer	5296	3.5
7	Land transport accidents	2672	2.9	Cancer	1770	3.1	CVC	5263	3.5
8	Liver disease	2665	2.8	Suicide	1720	3.0	Cancer	4346	2.9
9	Cancer	2576	2.8	Ovarian cancer	1600	2.8	Liver disease	3836	2.5
10	Diabetes	2425	2.6	Pancreatic cancer	1589	2.8	Pancreatic cancer	3826	2.5

Note: '%' refers to the percentage of all deaths.

Source: *Australia's Health 2016: in brief*, p.64, © Australian Institute of Health and Welfare 2017. CC-BY 3.0 licence.

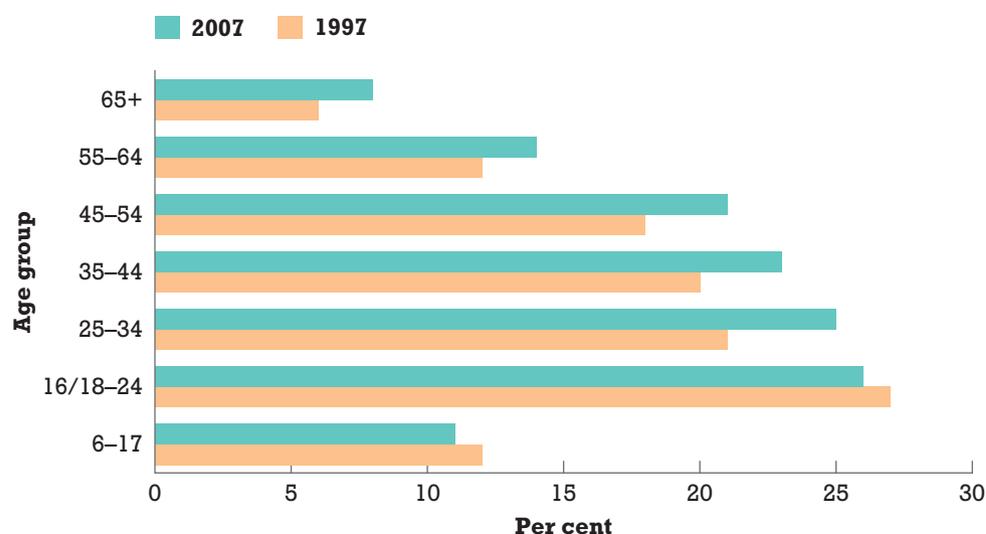
The top 10 causes of premature death together contributed 46 per cent to the total causes of premature death. When leading causes of premature death in 2011–13 are separated into age (see table 9.4) it is clear that the reasons differ. Overall, for people aged 45 and over, deaths from chronic disease and cancer were more common, while land transport accidents, suicide and accidental poisoning were more common among people aged 1–44. Conditions originating in the **perinatal** period and congenital conditions were responsible for most deaths among infants.

Table 9.4 Top five leading causes of premature death, by age, 2011–13

	Age group					
	Under 1	1–14	15–24	25–44	45–64	65–74
1	Perinatal, congenital	Land transport accidents	Suicide	Suicide	Coronary heart disease	Coronary heart disease
2	SIDS	Perinatal, congenital	Land transport accidents	Accidental poisoning	Lung cancer	Lung cancer
3	Unknown	Brain cancer	Accidental poisoning	Land transport accidents	Breast cancer	COPD
4	Accidental breathing threats	Accidental poisoning	Assault	Coronary heart disease	Colorectal cancer	CVD
5	Some metabolic disorders	Cerebral palsy	Unknown	Breast cancer	Suicide	Colorectal cancer

Note: Cancers are also chronic diseases

Source: *Australia's Health 2016: in brief*, p.65, © Australian Institute of Health and Welfare 2017. CC-BY 3.0 licence.



Source: *Australia's health 2016*, AIHW, p. 106 CC-BY 3.0 licence

Notes

- For the 6–17 age group, the data are for 1998 and 2014–14.
- For the 16/18–24 age group, the 1997 data relate to people aged 18–24 and the 2007 data to people aged 16–24.
- Prevalence data from the National Survey of People with Psychotic illness are not included in this figure.
- Some caution should be exercised in comparing findings from the two adult surveys because they sampled from slightly different age ranges and used somewhat different approaches to gauge the presence of mental illness in the past 12 months. It may be the case that these methodological differences account for the small increase in overall prevalence over time.

Figure 9.5 Percentage of Australians with high-prevalence mental disorders, by age, 1997 and 2007

While severe and persistent mental illness is relatively uncommon in Australia, it contributes substantially to the impact of mental illness on society. Poor mental health may also be associated with the increase in the suicide rate as shown in table 9.4 but is not confined solely to this group. Figure 9.5 indicates that a significant number of individuals aged 16–24 years have a mental disorder, with a reduction from 1997 to 2007 for individuals aged 24 years and under.

EFFECTS OF DETERMINANTS OF HEALTH ON YOUNG PEOPLE

Individual factors

Individual factors that can impact a young person's health include non-modifiable factors (age, gender and genetics) as well as modifiable factors including a young person's skills, knowledge and attitude.

Non-modifiable factors

Non-modifiable factors can either protect or increase the risk of certain illness or disease. A young person's life expectancy, when born in Australia, differs between males and females. While life expectancy for both genders has increased in the last century, with boys and girls born in 2013–15 expected to live 33 and 34 years longer than their parents, there is still a gender difference. A young male born in Australia in 2013–15 can expect to live to the age of 80.4 years compared to 84.5 years for a female. Genetics refers to genes, genetic variation and hereditary in living organisms and these are the blueprints for a young person's body. They can affect our chances of having several common illnesses, including heart disease, asthma, diabetes and cancer.

Many conditions involving genetics can be triggered by environmental factors. Examples are diet, lifestyle and sun exposure. If the environmental trigger for these factors is avoided then the risk can be significantly reduced.

Overcoming our genes

Identify genetic predispositions that can be reduced by environmental and lifestyle factors.

Modifiable factors

A young person's skills, knowledge and attitude can have a major impact on their health status. Young people today have the potential to understand health issues well, thanks to smartphone technology. They are also taught the effects of smoking and the protective factors needed to help improve their overall health and wellbeing. This is conveyed through media advertisements and advice from family and teachers.

Young people today are taught the protective factors for reducing the chances of developing melanoma ('slip, slop, slap, seek, slide') as well as the personal skills required to help them deal with social situations that can increase their risk of illness or injury. Ideally, this increase in knowledge comes with an improvement in their attitude to their own health.

At times it seems that young people think they are invincible. This can have a negative impact on their mortality and morbidity rates if it leads them to engage in risk-taking behaviour; for example, drinking excessively. However, young people today are equipped with knowledge from multiple platforms, which increases the value they place on their health and this is resulting in improved attitudes, as is evident in the AIHW 2016 report: 'The proportion of people choosing to abstain from drinking alcohol rose from 20 per cent in 2010 to 22 per cent in 2013.'

This was largely influenced by an increase in young people aged 12–17 abstaining, from 64 per cent in 2010 to 71 per cent in 2013.’

Teaching young people assertiveness, decision-making, problem solving and communication skills, as well as coping strategies to build resilience, self-esteem and self-worth equips them for making informed decisions about their health. They are less likely to be influenced by, or involved in, risk-taking behaviours that can have a negative impact on their health. However, it is not guaranteed that all young people will fall into this category, especially as they are in a life phase where they want to become independent and are influenced by sociocultural factors other than family.

Discussion

How can having increased access to information have a negative impact on young people’s health?

Sociocultural factors

Social connections become extremely important for young people and their friends have a major influence on their decision-making between the ages of 12 and 24 years. Peers, family, culture, religion and media play a greater influential role at this time than at any other age. Young people with positive social support networks are more likely to deal successfully with negative issues that may arise in their daily lives.

Support is necessary to help young people navigate from childhood/adolescence to adulthood. Positive family relationships, peer relationships and school environment have the potential to provide support to ease the transition to adulthood and prevent the onset of mental health issues (AIHW, 2016).



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Figure 9.6 Young people socialising

Young people with supportive networks have increased chances of being active, healthy and thriving. Unfortunately, there are growing trends for a reduction in physical activity and fruit and vegetable intake, with less than a quarter of young people meeting the national physical activity recommendations.

The value of recommended sleep, nutrition and hygiene practices can be learnt from family members to help young people become positive adults. Unfortunately, some young people are exposed to negative experiences by family or peers; for example, growing up with domestic violence. Excessive drinking by parents has been associated with adolescents who develop their own drinking habit, whereas children who are warned about the risks associated with drinking and have a positive connection with their parents are less likely to start this habit at a young age.

The introduction of government policies such as non-smoking areas in pubs, clubs and restaurants has significantly reduced the impact of passive smoking for young people. The New South Wales Government's 'Car and Home: Smoke-free zone' campaign was introduced to reduce the incidence of cancer developed from second-hand smoking. DrinkWise Australia (established in 2005 by the alcohol industry) is a national campaign to change the way Australians consume alcohol. The campaign's advertisements are directed towards parents/carers in the household to encourage healthy choices and create positive environments for young people.

Regardless of family situations (single or dual parents, single or dual incomes), young people are often asked to take on additional responsibility for household duties and/or caring for younger siblings. There is a risk involved in minimal supervision with young people being more likely to become involved in risk-taking behaviours. Strong connection to family, culture and/or religion can result in mature young people with healthy outcomes such as resilience and independence.

Socioeconomic factors

Health and illness are not distributed evenly across the population of Australia. Overall, health tends to be better in situations with good socioeconomic conditions. In *Australia's health in brief: 2016*, the AIHW reported that people living in lower socioeconomic areas generally have a lower life expectancy by approximately four years. They tend to have poorer nutrition, be less active, are less likely to be involved in leisure and sporting groups, and more likely to live with increased risk of damaging behaviours such as alcohol abuse and smoking, which contribute to lifestyle diseases.

Increased incidence of mortality is a direct result of increased socioeconomic disadvantage and there is an increase in the incidence of mortality in relation to chronic lifestyle diseases. The leading causes of premature death among all five socioeconomic groups were coronary heart disease followed by lung cancer (see figure 9.7). For both causes of death, rates increased as disadvantage increased.

Social exclusion for young people can be the result of low socioeconomic factors, resulting in lower levels of education, poorer housing conditions and reduced access to health services. This, in turn, increases the incidence of deaths that are potentially preventable or treatable. Young people living in these conditions are 47 per cent less likely to have private health cover than people of higher socioeconomic status and government concessions do not allow for specialists that would be needed for some health conditions. Therefore, people from low socioeconomic families are at greater risk of poor health, they experience higher rates of illness, disability and mortality and have a shorter life expectancy.

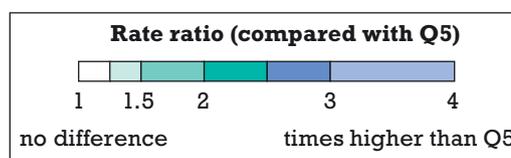
The level of a young person's education can be linked to their health throughout life. Education enables them to achieve and retain stable and safe employment, a secure income, adequate housing, the best conditions to provide for a family and cope with ill health (AIHW, 2016).



WebLink

Watch

DrinkWise is an Australian not-for-profit organisation. It has campaigned to parents about their children's drinking habits. Search for DrinkWise and watch some short videos about drinking patterns and habits.



		Socioeconomic group				
		Q5 (highest)	Q4	Q3	Q2	Q1 (lowest)
1	Coronary heart disease					
2	Lung cancer					
3	Breast cancer	Suicide	Suicide	Suicide	Suicide	COPD
4	Suicide	Colorectal cancer	Colorectal cancer	Colorectal cancer	COPD	Suicide
5	Colorectal cancer	Breast cancer	Breast cancer	Breast cancer	Colorectal cancer	Cerebrovascular disease

Source: Australia's health 2016, AIHW, p. 69, CC-BY 3.0 licence

Figure 9.7 Top five leading causes of premature death, by socioeconomic group, 2011–13

Occupation can have a strong impact on a young person's health. Higher levels of education are generally associated with higher levels of income. Lower levels of education not only result in lower wages but also increased risk within employment if young people are employed in factories or in industries with a high level of risk of injury, either through physical labour or exposure to chemicals and carcinogens.

Income and wealth play important roles in socioeconomic status and therefore in health. A higher income allows for greater access to goods and services that provide health benefits, including the ability to purchase healthy food compared to highly processed food and this contributes to better health outcomes. A higher income also leads to the ability to live in quality housing in suburbs that have good access to services and technology. The health care options in metropolitan and regional areas (in comparison to rural and remote areas) are greater, as are the opportunities to use gyms and sporting venues.

According to the AIHW report, compared with those living in the highest socioeconomic areas, people living in the lowest socioeconomic areas in 2015 were:

- 3.6 times as likely to have diabetes
- 1.8 times as likely to be hospitalised for diabetes
- 2.0 times as likely to die from diabetes
- 1.6 times as likely to have biomedical signs of chronic kidney disease
- 1.9 times as likely to be hospitalised for chronic kidney disease
- 1.6 times as likely to die from chronic kidney disease.

People living in the lowest socioeconomic areas also had higher rates of stroke – the prevalence of self-reported stroke being more than twice as high. Also, death rates were 1.4 times higher than those of people living in the highest socioeconomic areas. People living in the lowest socioeconomic areas were:

- 2.2 times as likely to have chronic heart disease
- 1.5 times as likely to be hospitalised for chronic heart disease
- 1.4 times as likely to die from chronic heart disease.

TEN FACTS ABOUT SOCIAL DETERMINANTS AND HEALTH INEQUALITIES

- 1 The 20% of Australians living in the lowest socioeconomic areas in 2014–15 were 1.6 times as likely as the highest 20% to have at least two chronic health conditions, such as heart disease and diabetes.
(ABS 2015a: National Health Survey, first results 2014–15. ABS cat. no. 4364.0.55.001. Canberra: ABS)
- 2 Australians living in the lowest socioeconomic areas lived about three years less than those living in the highest areas in 2009–11.
(National Health Performance Authority 2013. Healthy communities: avoidable deaths and life expectancies in 2009–11. Sydney: NHPA)
- 3 If all Australians had the same death rates as people living in the highest socioeconomic areas in 2009–11, overall mortality rates would have reduced by 13% and there would have been 54 000 fewer deaths.
(AIHW 2014d: Mortality inequalities in Australia 2009–11. AIHW bulletin no. 124. Cat. no. AUS 184. Canberra: AIHW)
- 4 People reporting the worst mental and physical health (those in the bottom 20%) in 2006 were twice as likely to live in a poor-quality or overcrowded dwelling
(Mallett S, et al. 2011. Precarious housing and health inequalities: what are the links? Melbourne: Hanover Welfare Services, University of Melbourne, Melbourne City Mission and Adelaide: University of Adelaide.)
- 5 Mothers in the lowest socioeconomic areas were 30% more likely to have a low birthweight baby than mothers in the highest socioeconomic areas in 2013.
(AIHW 2015a: Australia's mothers and babies 2013: in brief. Perinatal statistics series no. 31. Cat no. PER 72. Canberra: AIHW)
- 6 A higher proportion of people with an employment restriction due to a disability lived in the lowest socioeconomic areas (26%) than in the highest socioeconomic areas (12%) in 2012.
(AIHW analysis of ABS 2012 Survey of Disability, Ageing and Carers)
- 7 Unemployed people were 1.6 times as likely to use cannabis, 2.4 times as likely to use meth/amphetamines and 1.8 times as likely to use ecstasy as employed people in 2013.
(AIHW 2014e: National Drug Strategy Household Survey detailed report: 2013. Drug statistics series no. 28. Cat. no. PHE 183. Canberra: AIHW)
- 8 Dependent children living in the lowest socioeconomic areas in 2013 were 3.6 times as likely to be exposed to tobacco smoke inside the home as those living in the highest socioeconomic areas (7.2% compared with 2.0%).
(AIHW analysis of the 2013 National Drug Strategy Household Survey)
- 9 People in low economic resource households spend proportionally less on medical and health care than other households (3.0% and 5.1% of weekly equivalised expenditure, respectively, in 2009–10).
(ABS 2012: Australian social trends, March quarter 2012. ABS cat. no. 4102.0. Canberra: ABS)
- 10 People living in the lowest socioeconomic areas in 2014–15 were more than twice as likely to delay seeing – or not see – a dental professional due to cost compared with those living in the highest socioeconomic areas (28% compared with 12%).
(ABS 2015b: Patient experiences in Australia: summary of findings, 2014–15. ABS cat. no. 4839.0. Canberra: ABS)

Environmental factors

A young person's environment has a major impact on their health even before they are born. Their home life can have a negative impact on their health if there are risk behaviours such as excessive drinking or tobacco smoking.

The availability of resources depends on geographical location and this can impact on health. As already stated, there is a link between education and the ability to purchase housing in a residential environment with well-developed infrastructure that meets the demands of the community, such as easy access to services and safety.

Disease prevalence in rural and remote areas is generally higher than in the major cities. Data from the National Health Survey shows that in 2014–15, people living in inner regional and outer regional/remote areas of Australia were more likely to experience arthritis, asthma, and a number of other chronic health conditions. For nearly all causes of death, rates were higher for people living outside major cities. For example, the rate of dying due to a land transport accident was more than four times higher in remote and very remote areas than in major cities. This can be attributed to the distances involved in accessing services in rural and remote areas.

The premature mortality rate among people living in remote areas was 1.6 times higher than the rate among people in major cities, and in very remote areas it was 2.2 times higher.

People living in rural and remote areas are, on average, also more likely to engage in lifestyle behaviours that can lead to adverse health outcomes, including smoking, lower levels of physical activity, and risky alcohol consumption (see figure 9.8). These poorer health outcomes may also reflect a range of social and other factors that can be detrimental to health, including a level of disadvantage with regard to educational and employment opportunities, income and access to goods and services.

	Major cities	Inner regional	Outer regional/remote
Current daily smoker	13%	17%	21%
Overweight or obese	61%	69%	69%
No/low levels of exercise	64%	70%	72%
Exceed lifetime alcohol risk guideline	16%	18%	23%
High blood pressure	22%	27%	24%

Source: Australia's health 2016, AIHW, p. 250, CC-BY 3.0 licence.

Figure 9.8 Self-reported health behaviours and risk factors from the 2015 National Health Survey

Determinants of health

Examine the determinants of health for young people that exist across most age groups, and propose strategies to overcome the negative factors.

DEVELOPMENTAL ASPECTS THAT AFFECT THE HEALTH OF YOUNG PEOPLE

Revising roles within relationships

When young people are transitioning into adulthood, they become more independent from parents and family, and their peers begin to have a greater influence. Young people push the boundaries set by parents in order to achieve independence. This period of the life cycle can be quite challenging and full of turmoil for both the parents and the child, often resulting in conflict. While the parents' role is moving from being authoritarian (or dominant) to more collaborative and submissive, parents still need to maintain a positive relationship and allow flexibility to ensure the young person feels protected and nurtured.

Many people today experience high levels of independence at a young age with extra responsibilities in the home due to parents' increased work demands, including caring for younger siblings, cooking, cleaning and household chores. Conflict can arise when parents are reluctant to accept that their children are ready for increased responsibility and still try to hold on to the dominant role while expecting maturity in other areas of the home.

Friendships for young people become more intimate and having fewer but closer friends often becomes the reality. It is through the influence of peers that young people learn how to manage relationships and develop intimacy. Intimacy refers to close relationships in which people are open, honest, caring and trusting and these qualities are then applied to romantic relationships later on.

Clarifying self-identity and self-worth

Self-identity is the perception or recognition of one's individual characteristics. **Self-worth** is the confidence people have in themselves or in their abilities. Many young people continually question their self-identity during adolescence, and at times they question their self-worth.

Situations and experiences outside the young person's control can affect their self-worth and self-identity. Failure in school examinations or non-selection for sporting teams can lead to a young person experiencing negative self-worth. However, perceived failures can lead to a stronger sense of identity and worth if they take place in positive relationships and environments. Failures can strengthen a young person's resolve to accept themselves despite their flaws, weaknesses or limitations and it is important to not allow negative outcomes to shake their confidence and self-belief.

Building a positive self-identity and self-worth can be achieved through self-understanding. Young people need to get to know themselves on a deeper level, understanding who they are and accepting themselves for who they are. A young person's self-identity is dynamic and always changing. Individuals who have a high level of self-worth are more likely to have the confidence to follow through with chosen decisions and actions. This allows them to set goals and take on challenges and positive risks in life, which can provide further opportunities for success.

Developing self-sufficiency and autonomy

Young people are moving away from a period where they are dependent on others for their basic survival. Until this point, the supply of resources, including food, water, clothing and shelter to survive, has been provided by parents or caregivers. Young people start developing self-sufficiency, where they no longer rely entirely on anyone, and developing autonomy so that they can independently manage their own affairs and make independent decisions without the influence or control of others.

Young people are presented with opportunities to develop autonomy and self-sufficiency. These include employment in a part-time job, allowing them to have more independence over how they spend their money; or gaining their driver's licence and experiencing independence without relying on parents or carers.

Establishing education, training and employment pathways

Education can be the foundation to achieving positive employment pathways. Opportunities and pathways for young people are vast. There are multiple ways for young people to achieve their employment pathway compared to the traditional school/university/employment pathway of the past. Young people can study at school, completing their RoSA and

HSC, while achieving certificates and qualifications in Vocational Education and Training (VET) courses at locations in and out of school. These qualifications can assist students in establishing connections with businesses and developing relationships and work experience needed to gain employment after completing school. These TVET, VET and SBAT courses allow students the flexibility and the security of school while they gain the necessary training to be accepted into apprenticeships and traineeships post-school. Many young people choosing to enter university are now looking at early entry, which places a higher value on preliminary studies and reduces the pressures and stresses of the HSC examinations.



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Figure 9.9 The hospitality industry is a popular career pathway for many young people.

Careers and work study education at school allow students to study work-related issues facing them as they plan for and shape their future, while also providing them with essential knowledge, understanding and skills for participating in a rapidly changing world of work. Young people develop skills, such as resume writing or job interview skills, along with communication skills and knowledge about workplaces to ensure they recognise a safe environment.

Part-time employment for young people allows an easier transition into the adult workforce, providing opportunities for the young person to develop skills and increase their self-esteem and self-worth. Part-time work also brings an income that can provide their needs and wants with less dependency on parents. The benefits of youth employment include earning money, gaining relevant work experience, achieving autonomy, easing the transition from school to work, and developing positive work attitudes.

Establishing personal support structures

Young people require personal support structures to assist them in times of trauma or from which to explore and experience the world. A personal support structure may come from parents, siblings, relatives, teachers or peers – people they can trust and who will actively listen and provide constructive advice without passing judgement.



Alamy Stock Photo / Cultura Creative (RF)

Figure 9.10 Team-mates are part of a personal support structure.

Personal support structures include basic needs – food, water, shelter and clothing; financial support that offers assistance to pay off debts; and emotional support in times of need, such as when relationships have broken down.

Young people may also wish to seek help from outside sources if they feel their personal support structures cannot assist with a particular issue. Professional support exists through counselling, specific support groups and treatment programs, such as drug rehabilitation. Making a personal decision to seek professional help and support is a sign of strength and maturity, not a weakness.

Determining behavioural boundaries

Boundaries are unique to each family and can change depending on the circumstances. As young people mature, they may become more involved in setting boundaries that will suit their new levels of independence. Setting and maintaining boundaries can be difficult for an adolescent because they may often challenge parental authority and want independence.

Sometimes determining behavioural boundaries becomes the focus of a power struggle between a young person and their parents, where the young person refuses to obey and the parents get angry and insist that they comply.

Joint discussions about rules, options, compromise and flexibility for win/win resolutions are important. Warmth and understanding are required, rather than judgemental comments or telling a young person what to do. Boundaries may be set relating to going out (where, when, with whom and how often), consuming alcohol or using other drugs, driving the car,

being in relationships and having guests in the house, doing housework and using a mobile phone or the Internet.

Consequences need to be age-appropriate. It can be helpful for parents and caregivers to consider how they would like their relationship with their child to be when their child becomes an adult. This will allow them to think about the relationship shift required between now and the future to ensure as smooth a transition as possible for the young person into adulthood.

Good health

- 1 Identify the relationship between good health and wellbeing and successfully managing two of the developmental aspects.
- 2 Critically analyse whether health is a priority for most young people.
- 3 What do you feel are the main indicators of good health in young people?
- 4 Consider your own family structure, and identify how you could personally manage the developmental aspects of good health.

CHAPTER SUMMARY

- Health diversity depends on the person's developmental stage, motivations, values, sociocultural background, influence of family and peers.
- Youth subcultures are often defined or distinguished by features such as fashion, clothing and hairstyles.
- Young people require a broad understanding of global events, and for these events to have meaning, they also need to understand their own connections with future trends.
- New technologies continue to have a significant impact on young people.
- Trends indicate that the mortality rate for young people is falling. This is attributed to reduced rates of smoking, risky alcohol intake and illicit drug use by young people.
- Determinants such as individual, sociocultural, socioeconomic and environmental factors can impact on a young person's health.
- From adolescence onwards, young people shift from being reliant on their family for basic needs to seeking greater independence. They become less inclined to be influenced by their parents and more so by their peers.
- A positive self-identity and self-worth provide a framework that links personal goals and choices in life.
- Autonomy is a necessary achievement for a young person to become self-sufficient in society.
- Personal support structures are essential in providing young people with somewhere to come back to for comfort, support and love.
- As young people mature, they become more involved in setting boundaries to align with their new levels of independence.

CHAPTER REVIEW ACTIVITIES

- 1 Outline** the diversity that may occur during a young person's developmental stage.
- 2 Identify** and **describe** THREE prevailing youth cultures that exist in Australia.
- 3 Examine** the influence global trends and technology have on young people today.
- 4 Create** a table that shows positive and ill health that exists for young people. **Analyse** the trends and predict future issues that young people of today may face in the future.
- 5 Discuss** the determinants of health for young people.
- 6 Investigate** how revising roles within relationships is important for both parents and young people.
- 7 Explain** why self-sufficiency and autonomy are important factors in young people achieving independence.
- 8 Assess** the value of determining behavioural boundaries.



Extra
exam-style
questions



CHAPTER 10

Measuring the health of Australia's young people

IN THIS CHAPTER

Major health issues affecting young people

160

MAJOR HEALTH ISSUES AFFECTING YOUNG PEOPLE

Mental health issues

Mental health disorders that emerge during childhood can have a lasting impact on the health and wellbeing of a young person and on the lives of those around them. The development of programs and initiatives for young people who need mental health care and support requires a sound understanding of the scope of the problem, which is best achieved through population-based prevalence studies.

Depression

Different types of depression can have slightly different symptoms and may require varying treatments. Three of the main types of depression are:

- major depression: a depressed mood that lasts for at least two weeks. This may also be referred to as clinical depression or unipolar depression.
- psychotic depression: a depressed mood that includes symptoms of psychosis. Psychosis involves seeing or hearing things that are not there (hallucinations), feeling everyone is against you (paranoia) and having delusions.
- bipolar disorder: formerly known as manic depressive illness, bipolar disorder involves periods of feeling low (depressed) and high (manic).



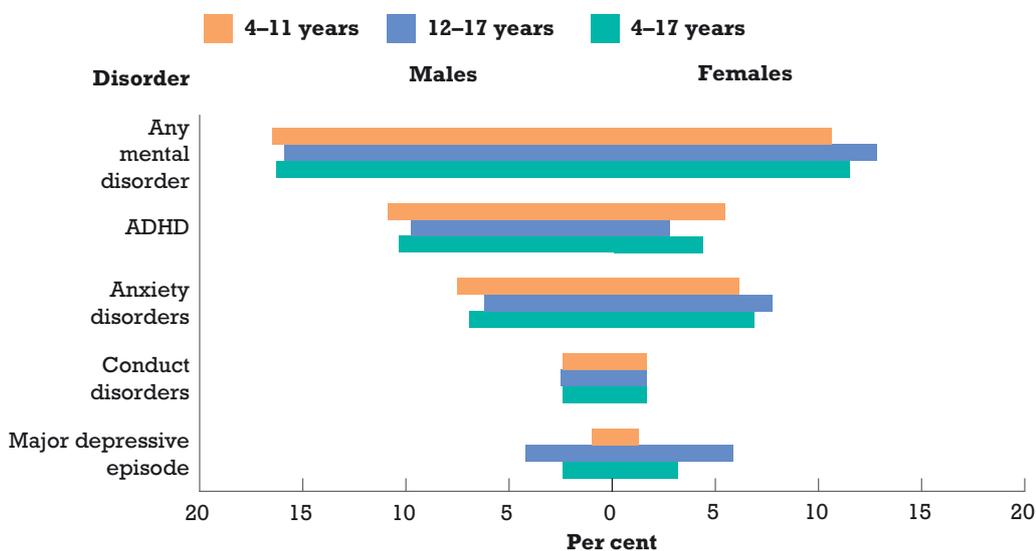
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Figure 10.1 Depression is a treatable mental health illness that affects many young people.

Young Minds Matter Survey 2013–14

Results from the 2013–14 Young Minds Matter survey indicate that the majority of children and adolescents in Australia have good mental health. However, the results also indicate that one in seven (14 per cent or 560 000) children and adolescents aged 4–17 experienced a mental disorder in the previous 12 months. Prevalence rates were higher overall among males (16 per cent) than females (12 per cent) across all disorders except major depressive disorder.

This survey also found that in 2013–14, 24 000 young people aged 12–17 experienced a mental health disorder in the previous 12 months with anxiety being the most common, accounting for 7 per cent of the 14 per cent of mental health issues.



Source: *Australia's Health 2016*, AIHW, p. 215 © Australian Institute of Health and Welfare 2017. CC-BY 3.0 licence.

Figure 10.2 Twelve-month prevalence of mental health disorders, by disorder type, by age and sex, 2013–14

Injury and poisoning

In 2013–14, there were more than 80 000 hospitalisations of young people due to injury and poisoning. Males aged 15–24 were 1.9 times more likely than females to be hospitalised for injury/poisoning. Causes of injuries requiring hospitalisation, by sex, were very different, as shown in figure 10.3. The most common cause of injury/poisoning hospitalisation for females was intentional self-harm and they were 2.8 times more likely to be hospitalised for self-harm than males in the same age group.

Self-harm

Self-harm includes a wide range of behaviours including self-mutilation, which is a form of self-injury – the act of deliberately harming the surface of the body, including cutting. It is used as an unhealthy way of coping with emotional pain or anger and frustration. The Young Minds Matter survey found that 11 per cent of young people aged 12–17 had self-harmed, which equates to around 186 000 adolescents. However, these figures are likely to be an underestimate, with around 7.5 per cent of survey respondents preferring not to answer questions about self-harm. Females aged 16–17 had the highest prevalence of ever having harmed themselves (23 per cent), more than three times the rate of males of the same age.



Source: Australia's Health 2016, AIHW, p. 209 © Australian Institute of Health and Welfare 2017. CC-BY 3.0 licence.

Figure 10.3 Hospitalisations for the most common principal diagnoses of injury and poisoning, by cause and sex, young people aged 15–24, 2013–14

Suicide

Suicide is the act of taking one's life voluntarily or intentionally. Unfortunately, suicide was the leading cause of death for young people in 2011–13 (11 per 100 000). Suicide attempts during the 12 months prior to the Young Minds Matter survey were highest in females aged 16–17 (4.7 per cent), followed by males aged 16–17 (2.9 per cent).

Risk factors for mental health problems

A variety of factors increase the likelihood that a young person will experience a mental health problem. They include:

- geographical location and a feeling of isolation
- unemployment
- feeling lonely or unloved; social rejection
- low self-esteem
- gender
- family history of mental health issues
- relationship breakdown
- bullying
- death
- postnatal depression.

Protective factors for mental health problems

A variety of factors reduce the likelihood that a young person will experience mental illness.

These include:

- positive self-identity and self-worth
- feelings of self-sufficiency and autonomy; being in control of one's life
- strong support networks within the family and external services
- resilience and positive coping strategies
- positive connections with the community and/or school
- financial security.

Sociocultural, socioeconomic and environmental determinants

Sociocultural factors

Any experience of family disharmony can change the structure of a family. Young people may experience this if their family has to settle into a new country and adopt a new culture. Learning how to manage a new social life can challenge their existing value systems, way of thinking and behaviour.

Women in western society are pressured to conform to the ideal body image and being 'thin' is highly credited in modern society. The male muscular image also influences boys to feel that they need to build up their muscles to be attractive to others and to feel better about themselves.

Socioeconomic factors

The more disadvantaged a person's socioeconomic condition is, the higher their risk of developing mental illness. Rising unemployment, poverty and poor housing affordability are socioeconomic issues that impact directly on a person's coping ability and stress level, especially among lower income groups. This can eventually lead to depression. Some young people use alcohol or other drugs in an attempt to block out their depression, but drugs are often misused and can have serious side effects.

Environmental factors

Environmental causes of depression among young people are the sociological factors that occur during their everyday lives. These may include prolonged stress at home or work, coping with the loss of a loved one or other traumatic events. Relationships young people have with others, how they are brought up, and how they cope with loss and crisis affect their thoughts, emotions and behaviours. Young people's reactions to these events may trigger the onset of depression.

Young people most at risk

Young people most at risk of mental illness are those suffering from:

- anxiety disorders, including panic disorder, obsessive compulsive disorder and post-traumatic stress disorder
- mood disorders, including depression and bipolar disorder
- alcohol abuse
- drug addiction
- family history of mental illness.

Alcohol and drugs

28.7%



Discrimination and equity

27.0%



Mental health

20.6%



Alcohol consumption

Although alcohol consumption is still high among young people aged 15–24 years, it is decreasing. According to the 2013 National Drug Strategy Household Survey, 39 per cent of young people aged 15–24 drank more than four standard drinks of alcohol on one occasion, at least once a month, putting them at risk of harm. This is a decrease from the 2001 figure of 49 per cent (*Australia's health 2016*, AIHW, p. 210). More than 6 per cent of young people aged 15–17 engaged in binge drinking, which is more common among males than females (Australia's Children and Young People Health Tracker website, Australian Health Policy Collaboration).

While there has been a decrease in binge drinking, the number of young people drinking in general has increased. According to the AIHW, 27 per cent had never drunk alcohol, which is an increase from 16 per cent in 2001.

According to Mission Australia's youth survey, young people viewed alcohol and drug use as the top issue in 2016 (see figure 10.4). A greater proportion of males (31.1 per cent) than females (26.9 per cent) identified alcohol and drugs as important national issues. Further information is provided in table 10.1 and figure 10.5.

Figure 10.4 Top three national issues for youth (Mission Australia Youth Survey, 2016)

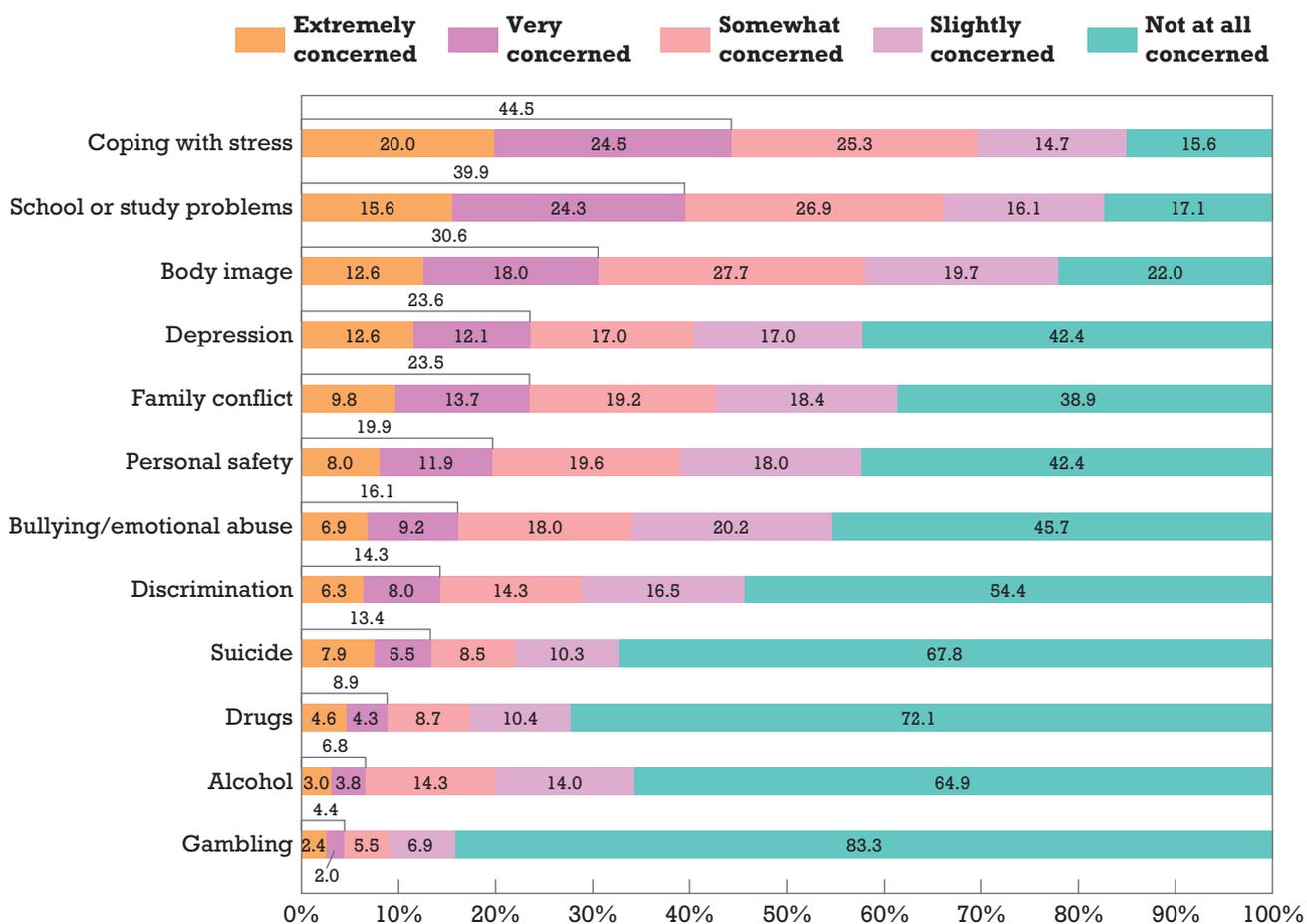
Table 10.1 Issues of personal concern to young people, by gender

	Extremely concerned %	Very concerned %	Somewhat concerned %	Slightly concerned %	Not at all concerned %
Females					
Coping with stress	27.1	31.1	24.8	10.6	6.4
School or study problems	17.9	25.9	28.3	16.9	11.1
Body image	17.6	23.3	29.2	17.8	12.1
Depression	12.9	15.0	19.5	18.5	34.1
Family conflict	10.4	14.0	20.3	20.9	34.4
Bullying/emotional abuse	6.8	11.2	18.8	22.1	41.2
Personal safety	6.5	10.8	19.3	21.3	42.1
Suicide	7.3	7.0	10.5	13.1	62.2
Discrimination	4.7	7.6	14.2	18.3	55.2
Drugs	2.7	3.5	7.8	10.2	75.8
Alcohol	1.9	3.5	14.0	15.0	65.6
Gambling	1.1	1.2	3.8	5.0	89.0

>>

>>		Extremely concerned %	Very concerned %	Somewhat concerned %	Slightly concerned %	Not at all concerned %
Males						
	Coping with stress	10.1	16.7	26.5	20.5	26.1
	School or study problems	8.6	15.2	27.1	22.3	26.8
	Body image	5.9	10.9	23.5	24.8	35.1
	Depression	7.2	9.2	14.9	17.1	51.6
	Family conflict	5.6	7.6	15.6	18.0	53.3
	Bullying/emotional abuse	4.4	6.2	14.3	19.0	56.1
	Personal safety	4.8	7.3	14.6	18.1	55.2
	Suicide	5.4	4.1	7.4	8.9	74.2
	Discrimination	3.5	4.7	11.2	14.1	66.4
	Drugs	3.9	3.0	7.2	9.0	76.9
	Alcohol	3.2	2.9	11.5	12.1	70.3
	Gambling	2.2	1.7	5.1	5.8	85.2

Source: Mission Australia Youth Survey 2016, Table 1.5, p. 22



Source: Mission Australia Youth Survey Report 2016, p. 21

Note: Items were ranked by summing the responses for *extremely concerned* and *very concerned* for each item.

Figure 10.5 Issues of personal concern to young people

Risk factors for alcohol consumption

A variety of factors increase the likelihood that a young person will abuse alcohol. These include:

- early exposure to alcohol in the home
- boredom
- ease of access
- lack of community support
- absent family structure (single/broken home)
- conflict within families or other relationships
- pressure from peer groups
- low self-identity and esteem
- cultural norms associated with alcohol.

Protective factors for alcohol consumption

A variety of factors reduce the likelihood that a young person will abuse alcohol. These include:

- support network in place
- positive self-worth and self-esteem
- individual factors including assertiveness and decision-making
- access to health services
- increased education and health literacy
- health education in PDHPE lessons and Crossroads programs.

Sociocultural, socioeconomic and environmental determinants

Sociocultural factors

A range of sociocultural determinants can have an impact on a young person's use of alcohol. In Australia, drinking alcohol is a social activity. The cultural significance of drinking is relayed to young people at an early age by family members and older siblings. As young people grow older, drinking can become a cultural function because it communicates to others a particular identity.

The Australian culture supports heavy consumption of alcohol, especially at large events during public holidays. An ever-increasing range of alcoholic beverages is being produced for their novelty value. There is also an established connection between alcohol and sport in Australia, with large beer companies as major sponsors of team sports.

Socioeconomic factors

Socioeconomic status does not generally appear to be a strong predictor of drug use among youth in Australia. The World Health Organization (WHO) conducted a survey of 162 305 young people (aged 11, 13 and 15 years) in 34 countries, providing data on family affluence, alcohol consumption and episodes of drunken behaviour. They found no correlation between family socioeconomic status and drinking patterns among 15-year-olds (WHO 2000 survey of young people).

Environmental factors

The risk of alcohol-related harm will vary depending on the environmental determinants that exist. For instance, the place where a young person drinks (at home, in a licensed venue, at a public event, with family or friends, or alone) will determine the level of alcohol they consume. Some young people seek out environments where heavy drinking is available. Situations and activities that encourage risky drinking include group parties, illicit drug taking, BYO-alcohol gatherings, and drinking games.

Young people most at risk

Groups of young people most at risk of health problems due to alcohol consumption are:

- unemployed individuals and others who are struggling to meet basic needs
- individuals suffering from anxiety or depression
- males in rural and remote geographical locations
- victims of trauma or abuse.

Violence

Since 2014, international relations and crime, safety and violence have been increasingly identified as key issues in Australia. There is no one reason why young people get caught up in violence but it has been identified that increased risk in their lives can lead to them becoming violent.

Young people may also be exposed to the harmful drinking and drug-taking behaviours of others. This includes alcohol and drug-related violence at home or in public places, parental and peer drinking or substance use and the risk-taking behaviours of others, including driving under the influence of drugs and/or alcohol. Continued and targeted public health messaging around harm minimisation is required to reduce alcohol-related harm at all ages across Australia.

According to the WHO survey, compared to the past two years, crime, safety and violence represent an issue of national concern among respondents. Also, close to one in five young people indicated high levels of personal concern about personal safety and bullying emotional abuse.

Rates of hospitalisation for assault among young males were three times that of young females in 2013–14. The most common cause for both (69 per cent and 62 per cent respectively) was assault by bodily force (such as assault with a fist, foot or hand).

Strategies to prevent violence

The National Day of Action against Bullying and Violence (NDA) is Australia's largest anti-bullying event for schools and provides an opportunity for schools and students to promote their own anti-bullying messages and programs to the community. By participating in the NDA, schools, students, teachers and parents can proactively:

- support the key message that bullying and violence at school are not okay at any time
- run their own activities to foster respectful and inclusive school communities
- utilise lesson plans and other resources provided on the Bullying. No Way! website.

(Source: Youth Survey Report 2016, Mission Australia, p. 12.)

Risk factors for violence

A variety of factors increase the likelihood that a young person will experience violence.

These include:

- low self-esteem
- gender
- family history of domestic violence
- low socioeconomic status
- family breakdown
- involvement with drugs, alcohol or tobacco
- high emotional distress
- delinquent peers
- social rejection by peers
- poor academic performance.

Protective factors for violence

A variety of factors reduce the likelihood that a young person will experience violence.

These include:

- support networks
- positive self-worth and self-esteem
- individual factors including assertiveness and decision-making
- health education and health campaigns around domestic violence and bullying
- access to external health services
- connectedness to family or adults outside of family unit
- consistent presence of a parent during at least one of the following times: upon waking up, arriving home from school, at evening mealtime, and when going to bed
- involvement in school and/or social activities.

Sociocultural, socioeconomic and environmental determinants

From a social and cultural perspective, young males reinforce **stereotypes** introduced predominantly by their fathers or other male role models. Many young males still see it as culturally acceptable to have power over young females and are more likely to accept violence being directed towards the females. A young person's exposure to violence in relationships is heightened by strong peer norms, inexperience, age differences in relationships and lack of access to social services. Attitudes towards violence within intimate partnerships are worst among younger males, with sexist peer cultures being the key risk factors for violence. Young people's cultural attitudes towards violence are often shaped by pornography and other media.

Socioeconomic disadvantages are strongly linked to violence among young people. Low income and unemployment put pressure on families and are determinants of violence against young people, both within and outside the home. The social, economic and educational exclusion associated with poverty can be worsened by acts of violence such as bullying, harassment and discrimination. Generally, people with low education levels have poorer health status and are more vulnerable in terms of seeking employment and managing change. Young people who experience a safe and supportive school environment have an increased sense of connectedness to their school and community. This sense of belonging is protective against a range of health issues including depression, violence, unsafe sexual activity and substance misuse.

In the environment, determinants of youth violence include poverty, poor housing, an uncaring community or neighbourhood, drug availability and prevailing community crime and violence. Other contributing factors are the media, family life, school and peer environments. Physical environments such as pubs, clubs and parties, where alcohol is consumed at high levels, can also heighten the risk of violence occurring.

Young people most at risk

Some young people are more likely to be exposed to risk than others. Those most likely include:

- males in public settings
- females in the home
- individuals in rural and remote settings
- young people of low socioeconomic status
- individuals with a history of violence in the home.

In addition:

- young Indigenous Australian and young non-English-speaking people are at greater risk of being the victims of violence in society
- lesbian, gay, bisexual and transgender young people have attempted suicide and self-harm at a high rate because of the violence that is perceived, threatened or experienced
- children up to 12 years of age may be subjected to child abuse, such as neglect, physical abuse, sexual abuse and emotional or psychological abuse.

Road safety

According to the Road trauma Australia 2015 Statistical Report (Bureau of Infrastructure, Transport and Regional Economics (BITRE)), land transport accidents were the leading underlying cause of death among people aged 1–14, at 14 per cent. In 2015, there were 225 deaths due to road traffic accidents, significantly fewer than in 2010 when there were 332.

Males were most likely to be hospitalised for transport accidents (613 per 100 000), and were 2.2 times as likely to be hospitalised for this reason as females. Transport accidents ranked as the third most common cause of hospitalisations for females (276 per 100 000).

Australia has achieved significant and lasting reductions in land transport deaths as a result of road improvements, safer vehicles, lower speed limits, graduated licensing and a range of programs that target the behaviour of individuals, such as seatbelt laws (applicable across Australia since 1972), random breath testing (first introduced in 1976 in Victoria), and slower default speed limits in urban areas and school zones (progressively implemented across Australia from 1997).

The most common causes of motor accidents involving young people include risk-taking, use of mobile phones, speed, driver fatigue and inexperience on the road in a variety of environments.

Risk factors for road injuries

The most common risk factors for young people while driving were:

- taking eyes off the road, slowing down, lack of concentration, failing to indicate, lane drift and sudden braking
- speeding
- driving under the influence of alcohol or drugs
- poor road design
- geographic location and areas of higher speed limits
- low socioeconomic status and poor-quality vehicles without safety standards
- fatigue.

Protective factors for road injuries

A number of factors protect young people from road injuries. These include:

- seatbelts
- safety standards in cars, including airbags and crumple zones
- policies that include increased driver awareness and training
- better road design and traffic control
- better vehicle design for easier control
- speed cameras
- new legislation in relation to P-plate drivers, including speed limits and curfews.



Figure 10.6 Mobile phone use while driving is one of the top risk factors for young people

Sociocultural, socioeconomic and environmental determinants

Sociocultural environments, which vary with gender, age and cultural background, influence choices that affect driving safety. The motor vehicle is considered an essential part of life in youth culture, so there is a greater tendency for young people to want to participate in driving. This opens up increased risk-taking in speeding or drink driving. Further, a culture has developed among young males that suggests that risk-taking when driving demonstrates their masculinity. Many also want to experience a feeling of control over a powerful vehicle.

A Roads and Traffic Authority advertising campaign, known as the 'Pinkie' campaign, was the most persuasive youth speeding campaign ever. More than 98 per cent of the young male target audience were aware of the 'Speeding. No one thinks big of you' campaign, with 70 per cent believing it to be effective in encouraging young male drivers to obey the speed limit. Overall, the 'Pinkie' campaign elicited a crucial behavioural shift, provoked a global media storm and empowered the community to render speeding socially unacceptable.

The immediate physical environment inside the car also contributes to risk-taking behaviour. Recent research conducted by the George Institute into the broader issues of driver distraction shows that drivers are engaged in a distracting activity once every six minutes. During a given driving trip, 72 per cent of drivers will report a lack of concentration, 69 per cent will adjust in-vehicle equipment, 58 per cent are distracted by outside events, objects or people and 40 per cent will talk to passengers. These distractions account for thousands of driver errors and road accidents each year. In fact, one in every five crashes in this study was caused by driver distraction.

In 2009–11, people living in remote and very remote areas had mortality rates 1.4 times higher than people living in major cities. For nearly all causes of death, rates were higher for people living outside major cities, with people in remote and very remote areas faring the worst. For example, the rate of dying due to a land transport accident was more than four times higher in remote and very remote areas than in major cities.

Young people most at risk

Young males are more likely than young females to be involved in road trauma, especially if they exhibit risk-taking behaviours mentioned throughout this chapter. Other people at high risk from road injury include shift workers (due to increased fatigue) and high-performance vehicle drivers.



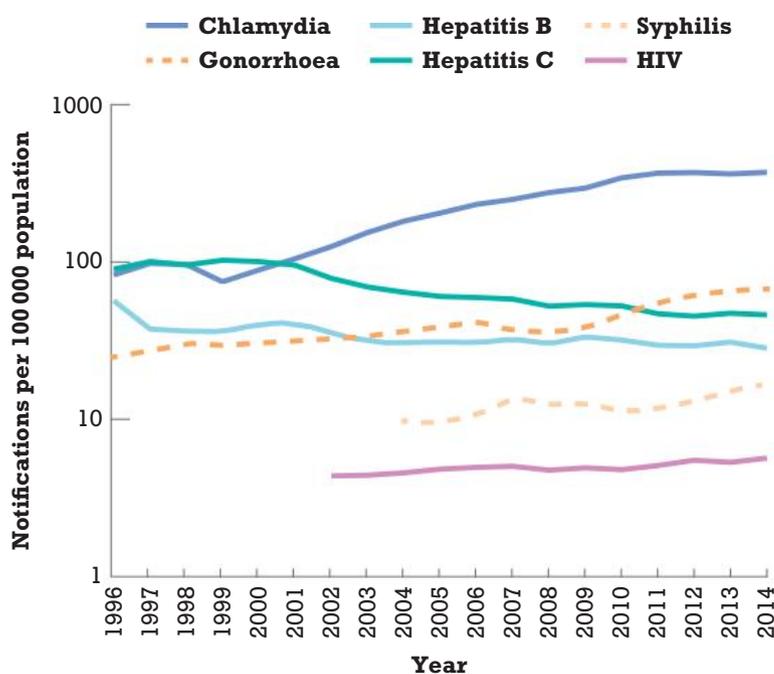
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Sexual health

Sexuality is a combination of a young person's gender, sexual feelings for others, feelings about themselves as sexual beings, sexual orientation and sexual behaviour. Unsafe sex practices and unwanted pregnancy are significant health issues for young people.

Sexually transmitted infections (STIs) can cause significant long-term morbidity and they remain a major public health concern in Australia. Among young people, rates of STIs have been generally increasing over the past 10 years. In 2013, 43 per cent of sexually active young people (in Years 10–12) reported 'always' using condoms when they had sex in the previous year (AIHW, 2016, p. 211). In 2014, there were more than 50 000 notifications of chlamydia, gonorrhoea and syphilis (a rate of 1812 per 100 000) with chlamydia accounting for 89 per cent of notifications among young people. Rates have increased since 2005 when 1040 per 100 000 notifications were reported (see figure 10.8).

Notification rates of hepatitis B and hepatitis C have fallen since 1996; however, the notification rates for hepatitis B have remained stable over the last 10 years whereas, for hepatitis C, they have continued to decline.



Note: Data are presented using a log scale.

Source: *Australia's Health 2016: in brief*, p.390, © Australian Institute of Health and Welfare 2017. CC-BY 3.0 licence.

Figure 10.7 Notification rates of sexually transmissible infections and blood-borne viruses, 1996–2014

Risk factors for sexual health

The following factors place young people at a higher risk of poor sexual health:

- unemployment
- low level of education and health literacy
- substance use
- low self-esteem
- low socioeconomic status
- engaging in unprotected sex.

Protective factors for sexual health

Protective factors for sexual health include:

- using contraception
- strong support network
- access to external services such as Family Planning Association
- parent–child connectedness
- reducing levels of drug use
- immunisation programs preventing contraction of human papillomavirus.

Sociocultural, socioeconomic and environmental determinants

A significant **sociocultural** factor for young people in regard to sexual health is the influence of values, attitudes and beliefs about sexuality. Issues around sexual orientation and health are taboo for young people in many cultures, and perceived shame and embarrassment can lead to a reluctance to discuss and address sexual health issues.

The link between low socioeconomic status and teenage pregnancy is significant. Children born to young parents are more likely to grow up in poverty, be the victims of drug and alcohol misuse, become teenage parents themselves, and become involved in crime. Teenage mothers are more likely to suffer from depression, be dependent on welfare and live in poverty. Teenagers who give birth are also at greater risk of medical complications.

In general, parental care, peer influence, economic factors and education are major influences in determining the nature of a young person's sexual health.

Young people at risk

Young people who are sexually active and do not use protection are at higher risk of contracting an STI or being presented with the issue of an unplanned pregnancy. Other groups who are at risk are young people who use drugs and young gay males.

Body image

Mission Australia's Youth Survey Report (2016) found that the top three issues of concern for both males and females in New South Wales were coping with stress, school or study problems and body image. The proportion of females concerned about these three issues was much higher than the proportion of males. Concerns about body image were considerably higher among females, with 41.3 per cent (*extremely concerned*: 17.6%; *very concerned*: 23.7%) indicating that body image was a major concern, compared with 17.8 per cent (*extremely concerned*: 6.2%; *very concerned*: 11.6%) of males.

Every young person has an image of how they would like to look, whether it is taller, slimmer, bigger or something else. Women in western society can experience substantial social pressure to conform to an 'ideal' body image. While being thin is seen by some as an ideal for women in modern society, men may feel that they need to build up their muscles to be attractive to others and to feel better about themselves.

It is important to note that hereditary factors determine height and basic shape, skin colour and type of hair. The media often creates unrealistic images that people try to live up to without any guarantee of success.

Influences on young people include the media, fashion, peer groups, their family, advertisements and particularly social media, which provides endless imagery for comparison and criticism.

Body image is about:

- how you see yourself
- how you think you ought to look
- how you wish to be seen by others.

The biggest issue affecting young people in relation to body image is disordered eating. This occurs when someone feels so unhappy with the way they look that their whole life becomes centred on diet, exercise and body image.

The main eating disorders that affect young people are:

- anorexia nervosa: occurs when a person is so afraid of becoming fat that they starve themselves
- bulimia nervosa: occurs when people binge eat and then get rid of the food by ‘purging’, which may involve taking laxatives or by deliberately making themselves vomit
- compulsive overeating: occurs when a person constantly overeats in an attempt to feel better.

One in 100 adolescent girls develops anorexia, and five in 100 develop bulimia. Anorexia nervosa has the highest mortality rate of any psychiatric illness, with approximately 15–20 per cent of sufferers dying before they turn 20.

There are many signs of an eating disorder. Some of these are listed below but they may not relate to everybody, and sometimes it can be difficult to notice any signs at all. Some of these signs include:

- thinking and talking about food and dieting a lot of the time
- knowing about the amount of energy (kilojoules) in every type of food
- eating very little or eating very large amounts of food sometimes
- often going to the toilet after meals
- strenuous exercise routines
- severe weight changes
- sudden mood changes, irritability, depression, sadness, anger
- poor concentration and feeling unusually tired.

It is important to note that these signs do not necessarily indicate the presence of an eating disorder.

Risk factors of body image issues

A number of factors may contribute to a young person developing body image issues. They include:

- family history of mental health issues
- high expectations for self, such as having unrealistic body image expectations
- setting unrealistic goals that the individual believes will bring love and respect from family and friends
- a person feeling the need to gain control over their life
- overwhelming feelings of not being good enough
- having low self-esteem
- being depressed or irritable much of the time
- avoiding doing things with friends
- problems with relationships and communication, or family conflict
- family making a person feel worthwhile only when they match up to their expectations by being, for example:
 - very good at study or sport
 - very well behaved
 - thin and attractive.

Protective factors of body image issues

The presence of the following factors may protect a young person from developing body image issues:

- early diagnosis
- strong support network
- healthy self-esteem
- connection and positive family relationships
- increased awareness of media manipulation in advertisements



Cetty Images/SolStock

Figure 10.8 Conforming to the ‘ideal look’

Sociocultural, socioeconomic and environmental determinants

There is substantial pressure on young women within western society to conform to the ‘ideal look’. The beauty and fashion industries constantly try to persuade women that there is only one acceptable body shape, even though the majority of women are not healthy at this size. While there are campaigns such as the Dove Self-esteem Project that aim to help young people overcome anxiety, some fashion catwalks and reality television shows (such as *Next Top Model*) reinforce the expectation and perception that females should remain thin to be fashionable. At the same time males are being persuaded that they need to ‘bulk up’ (for example, by using protein shakes) and some may spend a lot of time in a gym trying to achieve what they see as the ideal body image as depicted in magazines and films; all in an attempt to feel better about themselves and be more attractive to others. Family eating and exercise patterns can also have an impact on the health and body image of young people, who are likely to be influenced by their family and peers.

There is increasing evidence to suggest that young people from a low socioeconomic (SES) background may be more likely to develop bulimia nervosa. The link between eating disorders and socioeconomic status is more closely connected to low levels of education and health literacy than to family income. The children most at risk of being overweight are from lower SES backgrounds with prevalence twice that of their higher SES peers. Lower SES young people also receive fewer opportunities for education and advice on diet and weight control.

Environmental factors that favour eating disorders can be hereditary, with female relatives most often affected. There is also evidence that a young girl’s immediate social environment (including her family and friends) can be a contributing factor. For example, regular discussion about weight and dieting may normalise societal pressure to be thin. Weight-related teasing by peers and family is related to low body esteem and eating disorders among young girls. The National Institute of Mental Health (NIMH) reports that girls who live in families that tend to be strict and place strong emphasis on physical attractiveness and weight control are at an increased risk of developing eating disorders.

Young people most at risk

A major life-changing event may trigger an eating disorder for a young person, especially if they were already displaying some of the risk factors mentioned earlier. These events could include:

- life crisis or the death of a loved person
- family changes
- moving home or school
- change of job
- school problems.

Cyberbullying

A person who practises cyberbullying uses technology to repeatedly make fun of another person with the intent to hurt, humiliate or isolate them.

Mobile phones

A cyberbully may use text messages, pictures and video clips where the sender's number is withheld so that nobody knows who is sending them.

Internet

Emails may be sent from an address that does not give the real name of the sender and social unkind media posts or comments may come from anonymous sources.

More than 80 per cent of teens use a mobile device regularly, making it the most common medium for cyberbullying. Over half of all young people have been bullied online, and about the same number have engaged in bullying. The Australian Covert Bullying Prevalence study reported that one in four students were being bullied every few weeks or more. More than one in three young people had received threats online, and 25 per cent had been repeatedly bullied through their phones and on the Internet.

Cyberbullies use threats, nasty rumours and lies. They may send embarrassing pictures that someone took on their phone/camera without the victim knowing (for example, in the change room at the pool or at a party). With the widespread use of social media, young people today are at increasing risk of cyberbullying, with consequences as serious as suicide.

Risk factors for cyberbullying

Factors that may lead a person to cyberbully include:

- low socioeconomic status
- low self-esteem
- access to the Internet and social media at a young age
- a person's gender
- a person's age.

Protective factors for cyberbullying

The following factors may protect young people from this form of bullying:

- never giving passwords to **anyone**
- only allowing people who are real friends onto a friend's list
- morphing or blurring photos so that they cannot be used to embarrass the person in the photo
- not posting anything that could be used to embarrass
- not doing or saying anything online that would not normally be done or said offline
- protecting friends' privacy by not posting anything about them without their permission
- checking friends' comments and pictures to make sure they are protecting their privacy and not opening them selves or their friends up to possible cyberbullying
- not giving out email addresses to strangers

- changing passwords often for protection
- deleting the sender's name before forwarding emails
- not forwarding messages without the sender's permission
- using the 'Bcc' field when sending group emails to ensure that the only address the receiver sees is their own.

Sociocultural, socioeconomic and environmental determinants

Attitudes of the community, family and peers all contribute to the determinants of cyberbullying. Many people in the community have little knowledge of cyberbullying or how it works. This in turn allows a cyberbully to do what they like, without members of their family being aware of their actions.

Some young people, who may not have the autonomy or confidence to socialise within the community, may look to seek power in other ways, such as through an anonymous form of cyberbullying.

Most cyberbullying incidents occur outside the school environment, except for cyberbullying via text messaging. Young people are unlikely to report cyberbullying to teachers because it frequently occurs via mobile phone, which is usually against the school policy. Young people are also likely to be reluctant to report cyberbullying to their parents because they may fear losing their Internet rights at home.

Young people most at risk

The following are conditions that can lead young people to be at risk:

- giving out personal details to people they do not know very well
- accepting friend requests from people they do not know
- having friends who have passed on details without asking first
- being seen by a bully as an easy target or one who would get upset easily
- not having strong support networks to assist in dealing with the issue.

Risks to health

- 1 In pairs, determine to what degree young people are prepared to take risks. How do young people perceive risk? When do males and females stop taking the risk and why? How does this compare with older age groups?
- 2 Choose ONE major health issue affecting young people and conduct Internet research to determine the number of support groups available for young people who are dealing with this issue.
- 3 Examine what policies may exist within the school to address the major health issues you have studied.
- 4 In groups, create a health promotion advertisement to highlight the issues associated with ONE major health issue. with ONE major health issue.

CHAPTER SUMMARY

- Major issues that impact on young people's health include mental health, alcohol consumption, violence, road safety, sexual health, body image and cyberbullying.
- Each of these issues can be analysed by means of the nature and extent of the major health issue, risk factors and protective factors, the sociocultural, socioeconomic and environmental determinants, and young people most at risk.
- Health diversity depends on the person's developmental stage, motivations, values, sociocultural background, influence of family and peers.
- Youth subcultures are often defined or distinguished by features such as fashion, clothing and hairstyles.
- New technologies continue to have a significant impact on young people.
- Trends indicate that the mortality rate for young people is falling. This is attributed to reduced rates of smoking, risky alcohol intake and illicit drug use by young people.
- Determinants such as individual, sociocultural, socioeconomic and environmental factors can impact on a young person's health.
- From adolescence onwards young people shift from being reliant on their family for basic needs to seeking greater independence. They become less inclined to be influenced by their parents and more so by their peers.
- Positive self-identity and self-worth provide a framework that links personal goals and choices in life.
- Autonomy is a necessary achievement for a young person to become self-sufficient in society.
- Personal support structures are essential in providing young people with somewhere to come back to for comfort, support and love.
- As young people mature, they become more involved in setting boundaries to align with their new levels of independence.

CHAPTER REVIEW ACTIVITIES

- 1 **Examine** the trends of TWO major health issues you have studied.
- 2 **Compare** the risk factors and protective factors that exist with young people for TWO major health issues.
- 3 **Assess** the effect multiple risk factors could have on a young person.
- 4 Referring to TWO major health issues you have studied, **critically analyse** the determinants that impact on young people.
- 5 **Describe** the impact a major health issue may have on the community.
- 6 Using TWO major health issues for young people you have studied, **evaluate** why certain young people are most at risk.



CHAPTER 11

Skills and actions to attain better health

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SKILLS IN ATTAINING BETTER HEALTH

Building self-concept

Self-concept is a belief about oneself. A positive self-concept can help a young person to effectively meet challenges and cope with issues in life. Building a good self-concept also involves building self-esteem and self-confidence, as well as learning to accept success and failure, criticism and praise.

A healthy self-concept is more than having good self-esteem; it is based on self-worth and includes beliefs about being capable. Developing a healthy self-concept takes planning and effort and is developed through interaction with key people in a young person's environment – family members and peers. If the interaction is loving and supportive, self-concept will be positive.

Young people can build their own positive self-concept by learning how to:

- praise themselves occasionally
- recognise and identify their personal strengths
- acknowledge their personal successes and their contributing strengths
- develop areas in their life that require work
- acknowledge their mistakes and benefit from them.

For young people to view themselves positively, they must feel competent in their ability in areas they value. One such area is academic performance at school. A young person who achieves high marks in a particular field will feel competent in that area. When this is reinforced by teachers, peers and family members the young person will most likely develop a positive self-concept.

Developing connectedness and support networks

Identifying with a community, feeling connected, and having a sense of belonging to that community provides a positive stimulus for self-esteem. Healthy development is based in part on a positive social environment. The connections young people develop and maintain with family, friends and members of the local community influence how well they will cope during difficult times.

Young people who feel part of an energetic and healthy community are more likely to see that they have something worthwhile to contribute. In contrast, a young person's lack of connectedness and involvement with their community may affect them personally in a negative way. Social consequences, such as alienation, loneliness, low self-esteem, boredom, lack of tolerance for others and lack of motivation, may negatively impact on family cohesion.

Support networks form an essential foundation that provides comfort, support and love. A young person's support network may include parents, siblings, relatives, teachers and peers – people they can trust and who will actively listen and provide constructive advice without passing judgement. Depending on the nature of the personal issue, a shared responsibility with someone within a support network can help lighten the burden of personal problems.

Developing resilience and coping skills

For a young person, resilience is best described as successfully adapting to hardship in life. It is also about overcoming personal weaknesses and coping with difficult circumstances or events. Resilience includes developing individual **character** and personal strength, and the ability to bounce back from problems arising from environmental factors within the family, school or community.

Coping skills enable young people to be self-reliant, to solve problems and to make informed choices about situations for their own wellbeing. Developing these skills will assist them to deal with the events, challenges and stresses that occur in their daily lives, without resorting to risk-taking measures, such as alcohol consumption and drug taking. Young people with a strong sense of their own effectiveness and ability to cope with the circumstances in their lives are more likely to be successful in maintaining healthy lifestyles and behaviours.

There is strong evidence that children are born with an innate ability to cope, which means that they are resilient to stress and negative circumstances. However, their coping ability is influenced by early childhood experiences. Factors such as gender, temperament, family functioning, interaction with peers and the nature of community support can encourage or discourage a child's ability to develop strong resilience and coping skills.

Some young people may test their resilience by participating in high-risk activities such as driving a car at high speed. They will require very strong resilience if they are involved in an accident where a passenger is injured or dies.

Developing health literacy skills

Health literacy skills are fundamental and essential to a young person's level of commitment to their wellbeing. If they do not have the capacity to access, process and understand basic health information, they will not be able to look after themselves effectively or make appropriate health decisions.

A young person may understand everyday sources of information, but may struggle to make sense of health-related materials, which often contain unfamiliar vocabulary or concepts. Young people need to ensure they understand how to gain access to specific health information and be able to assess the validity and reliability of what they are reading.

Low health literacy is more prevalent among young people from lower socioeconomic groups, ethnic minorities, and those with chronic conditions or disabilities. Consequently, young people within these groups are likely to:

- be at greater risk of hospitalisation
- have higher rates of admission to emergency services
- find it difficult to stick to prescribed treatments
- have less knowledge of disease management and health-promoting behaviours
- have limited ability to communicate with health care professionals
- make less use of preventative health services.

Developing communication skills

Communication is the successful transmission of information through a common system of speech, writing, behaviour, symbols or signals. Developing effective communication skills is essential to a young person's mental and physical wellbeing.

Young people from culturally and linguistically diverse backgrounds may not have the same opportunities or abilities to be effective communicators. Many have come to Australia without English language skills and must learn them quickly; this may lead to missed and ill-informed health opportunities and potential risky behaviour.

A major risk factor of poor communication skills is social isolation, which can contribute to a number of diseases and conditions. Good interpersonal communication skills are essential for a young person's wellbeing.



Alamy Stock Photo/Derek Meijer

Figure 11.1 Effective communication skills are essential.

Now, more than ever before, the Internet is a major facilitator of social engagement and connectedness between young people. While some experts suggest that the Internet encourages social isolation, others feel this medium has benefits for individuals who find face-to-face interactions difficult. Opportunities for young people to develop communication skills through online forums and chat rooms support the importance of this form of communication.

Young people who have learnt how to listen well and have strong communication skills to convey their message clearly to others are almost always the more confident individuals. Developing good communication skills will strengthen relationships, minimise misunderstandings and improve a young person's overall self-confidence.

Assessing health services

It is essential for all young people to be aware of the health care services available in their community and how to access them. Many young people over 15 years of age are unaware that they are entitled to their own Medicare account and benefits.

During adolescence, many young people are too embarrassed to discuss personal issues with their parents, and would benefit from talking in confidence to an appropriate health professional, especially about important issues relating to mental and sexual health. It is critical for young people to be able to access health services early, so that mental health concerns are addressed before they reach crisis point, or to ensure safe sexual practices are encouraged.

The affordability of health services also determines how often they are accessed. For a young person with a limited cash flow, outlaying the full consultation fee for a general practitioner visit can be financially overwhelming. The combination of limited finances and lack of access to Medicare or bulk billing services means that many young people who live at home are forced to access health care under a parent or carer's card.

Many health services are located away from public spaces and transport facilities, which ultimately limits the choice of health care service. Despite their need for support and treatment, young people may be reluctant to access mainstream health services, particularly if they are from Indigenous or non-English speaking backgrounds, living with a disability or same-sex attracted.

Becoming involved in the community

Community service promotes learning and provides an opportunity for young people to become involved in educational experiences outside school. Learning can also occur through volunteering, service-learning, internships and work experience, which all differ in scope.

The point of volunteering is to provide service to others within a community or group context. Students undertake internships and work experience activities to help them understand and experience an area of study or career that interests them.

Service-learning programs focus equally on learning and service. They often require young people to design, implement and report on service projects as part of their learning. Ongoing reflection is a crucial aspect of a service-learning program.

In general, community service gives young people the opportunity to be involved in activities that help others. It is hoped that they will benefit from the experience through reflection to gain a better understanding of the people and groups they work with and the issues they work through.

When young people are involved in community service the benefits include:

- developing their sense of civic responsibility
- becoming part of a social network
- creating opportunities for strengthening connections within a community
- gaining personal satisfaction and a sense of pride from doing something worthwhile for the community and the environment

- meeting new people and making new friends
- growing in self-esteem and self-confidence
- participating in healthy, active and enjoyable activities.

Creating a sense of future

Young people with a well-established sense of their future possess the flexibility to respond to change, recognise connections with the past and develop solutions for the future. They have a sense of optimism about their ability to actively contribute to, critically reflect on, and act in shaping their chosen future. Achieving this allows young people to:

- express their goals for the future
- develop a focus for their efforts
- increase their self-motivation
- develop a feeling of being in control
- establish a positive sense of wellbeing.

Most young people want security, stability and direction. They want to know that what they are doing will lead them somewhere in life. To achieve this, they need to feel that the people around them will be there to support and guide them in making the right decisions.

Young people value the opportunity to discuss their future with each other and with adults. They need to be given plenty of these opportunities in school, within the family and the community, so that they can verbalise their goals and be given advice and assistance. In this way, they can begin to find meaning in their lives and in the world around them.

Attaining better health

- 1 In pairs, develop a table for each of the skills needed to attain better health. Using realistic situations, analyse how each skill can assist young people to enjoy good health.
- 2 Create a personal ranking system to show how effective you are at achieving the skills for attaining better health.
- 3 Critically reflect on your own personal health influences (both positive and negative) and determine personal future courses of action for better health.

ACTIONS TARGETING HEALTH ISSUES FOR YOUNG PEOPLE

Social action

Social action means taking steps to change things in society by introducing new ideas and processes for doing things better in the future. It involves all members of a community coming together to achieve a common goal for change; for example, for improved health outcomes.

The following key points are typical for successful social action:

- Change almost always stems from small beginnings. Social action cannot be achieved without the willingness to go through the hard labour of small, incremental change.
- A collective group effort and mass action are needed for stronger, more effective and long-term social change.
- The process of social action is as important as the outcome. The values developed and skills learnt during the process of social action are valuable for all members involved.

Although the outcome of social action is not always assured in the short-term, sustained social action will provide the settings for future social change.

Legislation and public policy

The New South Wales Government's *Youth Action Plan – The Way Forward: Supporting young people in NSW* is a policy introduced to promote a safe and healthy environment for young people now and in the future. (Note that legislation is the law and a policy is a plan or course of action.)

To ensure that young people had a say in the plan, government representatives visited and consulted with a range of young people, youth organisations, and local and state government agencies. They also used online forums and an email alert service.

The Youth Action Plan aims to:

- deliver a wide range of education and training services in schools and TAFE to assist young people in making a smooth transition from school to work or further study
- provide community services offices across the state to protect young people at risk of harm and provide care for those unable to live with their families
- provide free and concessional travel entitlements and subsidies to students, jobseekers, apprentices and trainees, and young people with disabilities
- provide youth-specific sport, recreational and artistic programs and services
- provide opportunities for young people to participate in government policy, programs and services that affect them
- recognise young people's different situations and backgrounds, particularly Aboriginal and/or Torres Strait Islanders and those from culturally diverse backgrounds, as well as young people with disabilities and those in out-of-home care.

(Adapted from www.youth.nsw.gov.au/)

Health promotion initiatives

Health promotion is underpinned by the five principles of the Ottawa Charter. Government and non-government organisations have implemented policies that target major health issues affecting young people.

Health initiatives

Research and evaluate a range of strategies implemented by government and non-government organisations that target the TWO major health issues you have studied that impact on the health of young people.

CHAPTER SUMMARY

- Skills that assist young people to attain better health include: building self-concept, developing connectedness, support networks, resilience and coping skills, developing health literacy skills and communication skills, accessing health and community services, being involved with the community and creating a sense of future.
- Social action means taking steps to change things in society by introducing new ideas and processes for doing things better in the future.
- Legislation is the law and a policy is a plan or course of action.
- Government and non-government agencies have implemented policies that target major health issues affecting young people.

CHAPTER REVIEW ACTIVITIES

WS

Extra
exam-style
questions
Assessment
tasks
Option 1

- 1 **Identify** the links that exist between each of the skills needed for attaining better health for young people.
- 2 **Outline** how a young person's skills in attaining better health may differ from those of their parents or grandparents.
- 3 **Explain** the role that peers play for a young person attaining skills.
- 4 **Describe** the role health professionals can play in promoting young people's health.
- 5 **Propose strategies** that your local community could use to take social action on an important local issue affecting young people.
- 6 **Evaluate** the role your school can have in developing policies to address major issues affecting the health and wellbeing of students.
- 7 **Identify and assess** TWO health promotion strategies that target the health of young people.



OPTION 2: SPORT AND PHYSICAL ACTIVITY IN AUSTRALIAN SOCIETY

CRITICAL QUESTIONS

How have meanings about sport and physical activity changed over time?	186
What is the relationship between sport and national and cultural identity?	200
How does the mass media contribute to people's understanding, values and beliefs about sport?	211
What are the relationships between sport and physical activity and gender?	219

Source: Personal Development, Health and Physical Education Stage 6 Syllabus © NSW Educational Standards Authority for and on behalf of the Crown in right of the State of New South Wales, 2012

OUTCOMES

When you have read this section you should be able to:

- 1 analyse the health status of Australians and explain the roles and responsibilities of individuals, communities and governments in addressing Australia's health priorities
- 2 argue the benefits of health-promoting actions and demonstrate a range of personal health skills to promote and maintain health
- 3 gather, interpret and communicate information about health and physical activity concepts and propose ways of working towards better health for all.

KEY TERMS

amateur sport
professional sport



Getty Images/iStock/OSTILL

CHAPTER 12

Sport and physical activity over time

IN THIS CHAPTER

Sport in 19th-century England and colonial Australia	186
Sport as a commodity	192

The chapters in this section focus on the sociocultural perspectives of sport and physical activity in Australian society. They explore how the meanings of sport and physical activity have varied over time and how they differ among different groups of people. You will investigate how sport, as a major social institution in Australian society, is important in shaping people's values and beliefs regarding national identity, gender and culture.

You will examine the range of participants, degree of participation and societal importance of sport as a product of the contextual values and beliefs throughout history.

After reading this chapter you should be able to:

- compare the nature of sport in the 19th century with sport in today's society
- analyse the consequences for various sports as they have adopted a business focus.

SPORT IN 19TH-CENTURY ENGLAND AND COLONIAL AUSTRALIA

This section looks at the way sport has changed in meaning over time, how it differs for different social groups, and how participation rates differ between males and females.

Indigenous Australians were the first inhabitants of Australia, some 100 000 years ago. Their way of life included recreational and cultural activities and games that demanded physical fitness to survive. To collect food, hunters needed to be able to climb trees and throw weapons with accuracy and power. Mock fights were a popular pastime and good preparation for warfare

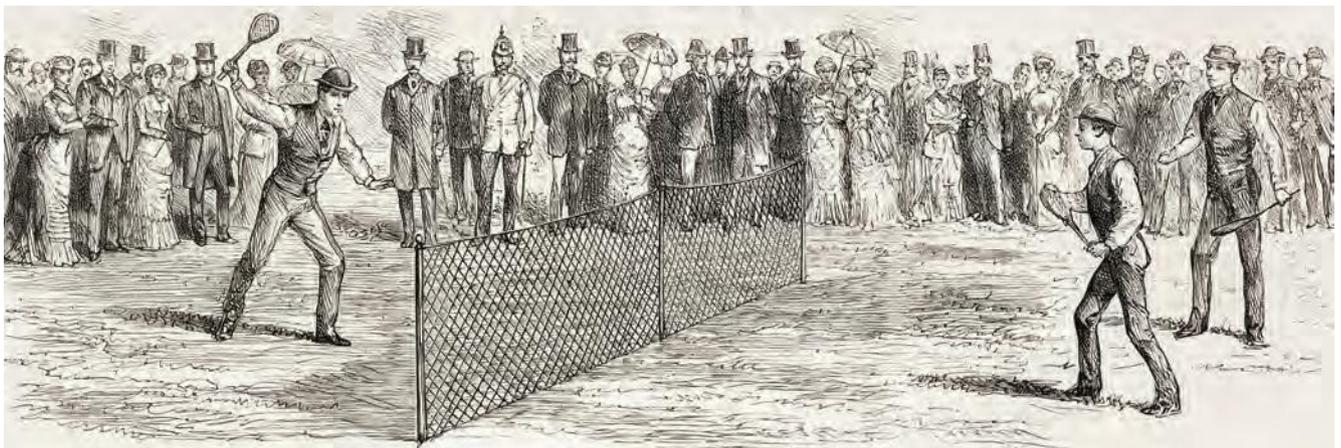
for the younger members of the tribes. Young children participated in such activities as climbing, jumping and running as forms of enjoyment while developing their survival skills.

When Europeans arrived in Australia in the late 1700s, Aboriginal lifestyles and customs changed dramatically. The Aboriginal peoples' culture and spiritual connections with nature were disrupted by the new Europeans who adapted the environment to suit their colonisation. A number of Aboriginal people who survived the European invasion were forced to engage in distinct types of European sport and leisure.

The first European settlement was established in 1788 and comprised mainly convicts. While hunting remained a popular activity with the new settlers of Australia, new sports began to develop. In England, sports such as horseracing, football, cricket, hockey, golf and tennis were increasing in popularity in the early 1800s. Those who immigrated to Australia brought with them cricket, rowing and boxing. The early settlers took up the 'blood sports' of boxing, cock fighting and kangaroo hunting. Several blood sports were banned at various times but many of them took place in secret venues; for example, informal boxing matches were held with no equipment, so they were more like street fights. Gambling, dice and card games were also common in pubs and meeting places. Later, upper-class Europeans introduced new leisure activities such as dancing, sailing, rowing and fishing.

Greater participation in sports across this new society created a sporting culture that was increasingly valued, leading to an increase in resources to further facilitate sporting development.

As the early settlers and convicts learnt how to handle the dry, arid Australian climate, survival became easier and there was more room in their lives for recreational activity. Sport began to emerge as an integral element of the Australian identity for colonisers to connect to English values and traditions. Sport also served as a medium through which England could assert superiority over its newly colonised land.



Getty Images/De Agostini/Biblioteca Ambrosiana

Figure 12.1 A tennis game at Government House, Brisbane, 1881

In the mid-1800s, the gold rush brought different types of settlers to Australia. It also brought considerable wealth to many communities. During the 1860s, sport became far more structured with horseracing introduced as Australia's first formally organised sport. The first Melbourne Cup race was held in 1861 at Flemington racecourse. A number of Australian sporting clubs were established in cities and towns to support a sporting lifestyle. In Sydney, the first club to be established was for boxing (in 1814) followed by cricket (in 1826). Cricket was very popular and was played by Indigenous Australians. An Aboriginal team toured England in 1868 as a sporting team in its own right. The establishment of such clubs highlights the importance of sport in Australian history at the time.



Figure 12.2 Edward 'Ned' Trickett was the first Australian to be world champion in any sport and became a national hero.

Much of early Australian settlement took place along the coastline, fuelling the development of aquatic sports. Swimming was viewed as a healthy recreational pursuit and communities built public baths to cater for the demand. Around the turn of the century, as people began to make greater use of the beautiful beaches, surf lifesaving organisations were established with the introduction of volunteer surf lifesavers.

Rowing (sculling) became extremely popular and attracted huge crowds. In 1876, Australian Edward 'Ned' Trickett won the world sculling championship in London, becoming the first Australian to win a world championship in any sport.

All Australians enjoyed football as an organised sport. English soccer and rugby had a major influence on the initial matches but by the late 1850s a new football code had been developed in local communities, establishing Australian Rules football. This was a significant development in Australia's sporting history because Australian Rules football was the first game actually developed in Australia for Australians. Prior to this all other sports played in this country had originated from England.

Links with manliness, patriotism and character

The huge distance between the Australian colony and Great Britain provided challenges for the British military and the public servants living in Australia. Britain needed to be sure its interests were protected while simultaneously developing the colony. Educational and religious leaders at the time viewed sport as an effective medium to achieve this goal.

Sport seemed to be a way of developing strength of character, masculinity or manliness, and **patriotism** to the homeland. Virtues such as team loyalty, discipline and sacrifice were instilled into the male students in public and elite private schools. The concept of manliness was initially linked to the displays of masculinity that occurred in the physical nature of contact sports.

Schools and universities considered participation in physical sports to be an effective way to build and test a man's strength, muscular abilities, and overall manliness. It was also thought that sport could strengthen a man's character, enabling him to persevere and not be afraid to enter into battle. Football players were believed to exhibit brave soldiering qualities valued by the military and colonial leaders.

At the same time, a concept known as 'muscular Christianity' developed in schools, universities and working-men's clubs. This term described young men who were athletic, active Christians, who displayed good sportsmanship and were ready to serve and defend their country. The defence of the British Empire was deemed to be 'man's work' and school sports such as rugby and cricket instilled the characteristics of courage, determination, self-discipline and manliness. Becoming a successful sporting hero was important to the men in the colony and the overall success of the colony was often measured by its successes in sporting competitions.

Organised team sports brought national pride for the British Empire as well as the beginnings of patriotism in early Australians. Competitive rivalry between sporting teams has stood the test of time and strong rivalries still exist between England and Australia.

Amateur and professional sport

Colonial Australia adopted many of its traditions from British culture and society and therefore developed its sports in a comparable manner. Amateur participation in sport was an integral part of Australian culture for many years. Participation in amateur sport was mainly for pleasure and athletes were encouraged to consider the interests of the team first, rather than being motivated by a reward, which could leave athletes open to cheating and bribery. The 'true sportsman' was an amateur who embraced the values of fair play and respect for the rules and the opposition. Amateurs received no financial reward for participation in their chosen sport.

There were also a few professional sportsmen who received rewards (usually financial and social) for their sporting results. These individuals often failed to uphold the 'Australian values' of sport and were involved in corruption and bribery.

Amateur sport

Amateur sport encouraged a class distinction between sportsmen. A rigid class structure led to many upper-class amateur athletes not wanting to take part in competitions with lower-class competitors. Sports clubs (for rugby, cricket, tennis, hunting and golf) were established in the more exclusive suburbs and schools, and were under the control and patronage of the upper classes. Membership of these amateur sports clubs was expensive and excluded anyone who could not afford it. Therefore, amateur sport contradicted the Australian sporting ideals of fair play and sportsmanship.

Working-class sportspeople tried to stay amateur in their sport but they faced many obstacles. They did not have the money to compete in amateur sports without financial help but if they did receive money from a sponsor for equipment, travel or clothing, or if they collected prize money for winning a competition, their amateur status was revoked. Prize money became an important part of sports that were considered to be for the working classes, such as boxing, sculling and athletics.

Professional sport

Professional athletics was characterised by wealthy people sponsoring runners in an event. The Stawell Gift was first run in 1878 and it remains Australia's oldest and richest short-distance running



Figure 12.3 American sprinter Warren Edmonson wins the Stawell Gift in 1977. The prize money offered and the prestige of the event continues to attract athletes from around the world.

race. Young Indigenous males were attracted to compete and this marked the first significant involvement of Indigenous Australians in professional sport in Australia. Wealthy entrepreneurs controlled gambling in professional sport and young Indigenous athletes were exploited.

Chance, athleticism and honesty took a backseat to the gambling underbelly of sport with combat sports fighters sometimes being paid to lose a fight. Gambling associated with sport allowed the lower classes to profit and thereby improve their social status, prompting blood sports such as boxing to become popular. Eventually, 'purse payments' were made to boxers who won their fights but this did not stop betting on fights and allegations of bribery. A strong association between gambling and the growth of professionalism in sport developed in Australia.

Rugby

Rugby union was traditionally played by men from the wealthy classes and they had to pay fees to play for the clubs. Rugby league was developed from rugby union by the working class, and was a professional sport by 1895. It is still known as the 'working man's game' and was one of Australia's first 'blue collar' sports. Rugby league turned professional in order to guarantee its survival. Also, players from the lower classes needed to be paid for travelling expenses and for the time they took off work. Gambling remained important because it gave supporters the chance to earn extra money and helped to draw crowds. This ensured that rugby league competitions became regular events and were supported by large crowds.

Amateur sport today

Amateur sport today follows a corporate management system, composed of national sport organisations that support and fund elite sport development. These national organisations include the Australian Institute of Sport (AIS) and the Australian Sports Commission (ASC). At the state level, there are state sporting bodies, state institutes of sport and state departments of sport. A third level is the district/regional associations that coordinate local clubs and community sports in conjunction with the government.

History of women's participation in sport

Sport in the 19th century was viewed as a male domain and women were rarely encouraged, or permitted, to participate. As a consequence, few records were kept of women's sporting involvement and successes at that time. Women's sport was deemed to be less important and received negative reviews in the media. Women were stereotyped as fragile, pale and sedentary. Women's leisure and recreational activities were less physically demanding than male sport, and were limited to needlework (sewing), music and reading. Female participation in sporting activities was discouraged. Instead, women's role in society was restricted to family duties with a focus on being pretty and maternal rather than strong and athletic.

Women who pursued an interest in physical activities were discouraged from participating. This was based on medical opinions disseminated from a male-dominated medical profession.

Women and sport in the 19th century

Women were discouraged from playing sport in the 19th century for a variety of reasons.

- Society's concept of women was that they were not to be rough or unladylike, both qualities that sport encouraged.
- Women's clothing at the time restricted athletic movement.
- Negative societal views of women's sport limited the number of sports available to women.
- Women were viewed as being frail and it was believed that sport could damage their reproductive organs and/or skeleton.
- Society believed that women could develop unattractive muscle bulk through training and that this would threaten male masculinity.

- Societal values meant that women were supposed to focus on marriage and family.
- Women were considered to be unable to handle the stress of competition.
- Women were not allowed to join the male-dominated sports clubs.

These barriers hampered the development of women's sport for a long time. Slowly, societal attitudes to women's sport evolved over the years, resulting in increased sporting activities being open for female participation. These included walking, golf, croquet, rowing and swimming at female-only beaches or pools.

In the late 1800s, schoolgirls were taught marching, callisthenics and dancing. Young girls from elite families could play selected team sports but most people still had a low opinion of female sport.

During the First World War, women were needed to fill many of the roles vacated by men who were fighting (such as factory work). After the war their role began to change in society with an accompanying change in attitude towards their participation in sport. There was women's athletics and running, for example, although they were restricted to shorter distances than men – 800 metres or less.

First female Olympians

Australia's first female Olympians were Fanny Durack and Mina Wylie, who competed in the 1912 Olympic Games in Stockholm, Sweden. They won gold and silver for the first ever women's 100-metre freestyle swimming event and became national heroes and role models for Australian women, with their success being published in the local media. Durack and Wylie forged the path for women's participation in sport in Australia.



Alamy Stock Photo/Paul Fearn

Figure 12.4 From left: gold medallist in the women's 100-metre freestyle event at the 1912 Olympic Games in Stockholm, Sweden: Australian Fanny Durack, Australian silver medallist Mina Wylie and Great Britain's bronze medal winner J Fletcher

Review and apply

- 1 Create a presentation for the class on the development of sport in Britain and Australia from the 18th century to the present day.
- 2 Explain the relationship between social class and sports in the developing colony of Australia.
- 3 Discuss how Australian sport was used to maintain the social structure of Britain in the 19th century.
- 4 Discuss the meanings associated with sport among the social classes in colonial Australia.
- 5 Investigate the success of Australian women in the early Olympics.
- 6 Examine the reasons why women were discouraged from participating in sport in colonial Australia. Is this still the case today?

SPORT AS A COMMODITY

The idea of professional athletes being paid to play has been around since colonial days. Wealthy businessmen would often sponsor cricket matches, and publicans would host boxing matches as a means to benefit financially from the associated drinking and gambling activities. Sportsmen were keen to compete and win prize money, while businessmen were stimulated by financial gain from paying spectators. Gate entry fees were introduced and space was leased for the supply of refreshments. When clubs began to make profits from gate takings, working-class players sought compensation for missed working days and injuries.

The modern era has witnessed a change – sport has evolved from a recreational and spectator pursuit into a **commodity**. The marketing opportunities available to big businesses have seen some sports and athletes becoming commodities that can be bought, sold or traded by franchise agreements or player contracts. Image consultants or management companies then market the sport, franchise or athlete to the highest bidder. The market success of the athlete or sport combined with the product creates value to the franchise or sponsor.

Developing professional sport

In this section we analyse the consequences of sport becoming professional. During colonial times sport quickly developed from a recreational, spectator pastime into a business commodity. We have seen sportspeople move on from being part-time athletes receiving paltry match payments to becoming highly paid professionals.

Large corporations and rich business people now own sporting teams. In the National Rugby League (NRL), for example, actor Russell Crowe is a part owner of the South Sydney 'Rabbitohs'. Revenue is raised by selling a range of products featuring sporting logos, including T-shirts, jerseys and caps. Media moguls and corporations bid to secure the rights to broadcast high-profile sporting competitions and events.

The value and structure of sport has changed. High-profile sport today requires substantial financial resources and it is run on a business model. Resources must be directed to the construction and maintenance of venues along with the welfare and training of athletes. Sporting venues are expensive to construct and maintain, involving architects, builders, electricians, plumbers, painters, landscapers, media and camera crews. There is a high cost to maintaining the infrastructure of stadiums, which provide patron services, catering and merchandise shops. They employ a high volume of workers; for example, people who design and sew uniforms/merchandise, chefs, ushers, event managers, bartenders and food-stall-sellers. Teams and athletes also require high-performance, state-of-the-art training facilities, coaching teams (for fitness, technique, strength and conditioning), support staff (counsellors, psychologists, managers), ancillary staff (physiotherapists, dieticians, doctors) and

administrative staff. Thus, professional sport in Australia has come a long way since the times of the early settlers.

The concepts of 'amateur' and 'professional' have changed. Individual and team sports have been modified to accommodate the needs of sponsors and television viewers. The format of many games has changed in many sports to accommodate the media and fee-paying spectators. Examples of this include T20 cricket, Fast4 tennis and Fast5 netball, developed to increase spectator excitement through fiercer, faster completions.

Players are traded between clubs and the value of a franchise contract is not necessarily binding in the eyes of rival clubs. Players and officials are cued by producers of the sporting broadcasters as to when to enter the arena and start play. The nature of many games has changed to accommodate promotion and prime-time television viewing. The NRL has scheduled games for Thursday, Friday, Saturday and Monday nights as well as Sunday afternoons (which is prime-time television viewing) and this guarantees spectator attendance at games. The large viewing audience provides exposure for sponsors' advertising and earns the NRL revenue. All games are screened live on the pay TV channels and a selection of games is aired on free-to-air TV.

Sport as big business

Sport is a big business in Australia today, providing opportunities for employment and investment. Sports companies constantly market new fashions and products using the image of high-profile sportspeople to sell these to consumers. Well-directed advertising influences individuals to make decisions that inevitably make them consumers. The latest 'state-of-the-art technology' slogan is used to convince players and consumers they can hit or kick the ball further, gain greater control or run faster using the latest product. Young footballers strive to wear the boots their heroes are wearing and their team's current home or away jersey. The golf clubs a player bought last year will be quickly superseded by modern technology or a 'scientific design breakthrough' that has produced a set of clubs promising better performance. This cycle continues for as long as there is a demand in the market.

Sportspeople must satisfy their commitment to training and playing, as well as sponsorship and promotional work. Some sports run educational courses for players to help them manage their time and finances and plan for life when their sporting career is over.

Fifty years ago, it was common for families to go to a major sporting event with their own food and sit on the ground. Now spectators expect tiered seating, grandstands, toilets, food outlets, souvenirs, security guards, technicians and cleaners. They also demand public transport or parking close by. Spectators expect the playing surface to be of a high standard so the players can perform at their best. At home spectators also expect live footage of the action from a variety of camera angles with professional commentary. The problem for sports administrators is the excessive cost of building and maintaining these facilities for the large array of sports in a town or city.

The following two examples are of big businesses becoming involved in sport.



Getty Images/Patrick Eagar

Figure 12.5 Australia takes on the West Indies in a World Series Cricket match in Sydney in 1979.

World Series Cricket

World Series Cricket (WSC) was a breakaway professional cricket competition staged between 1977 and 1979, organised by Kerry Packer for his Australian television network, Nine Network. The matches ran as a separate competition to traditional international cricket. World Series Cricket changed the nature of cricket and its influence continues to be felt today. The main factors leading to the formation of WSC were discontentment of international players over their salaries and the Nine Network's wish to secure the exclusive broadcasting rights to Australian cricket, which were then held by the Australian Broadcasting Corporation (ABC).

The Super League

In the mid-1990s a corporate dispute developed over the broadcasting rights of rugby league in Australia. When News Corporation, led by Rupert Murdoch, was unable to gain the pay television broadcasting rights to the Australian Rugby League (ARL) competition, it created a rival one, the Super League. The ARL, led by Kerry Packer and sponsored by Optus Vision, opposed the new league and fought a court battle to prevent it from happening. Super League only existed for one season, then a deal was reached between the two leagues and the NRL was created.

Costs of professional sports

Sports fans spend money using the many 24-hour dedicated sports channels on the pay TV network. An example is Fox Sport. There are also many online betting agencies dedicated to sports betting.

Sports administrators have discovered the high costs involved in running sport at the professional level. Costs include:

- travel and accommodation expenses for players, officials and staff during domestic and international travel
- hire of grounds, equipment and facility staff
- players' contract payments (including legal costs for contracts, sponsorships, salaries)
- costs for coaches and ancillary staff (e.g. physiotherapists, dieticians, doctors and office staff)
- development of high-quality facilities
- security costs
- costs involved with catering when entertaining sponsors
- expense of enticing the best players and keeping them
- marketing of the sporting product
- marketing to fans and spectators to ensure retention of funding.

Sponsorship, advertising and sport

The level of sponsorship for a sport, team or individual is proportional to the amount and type of publicity generated. Local clubs are likely to attract only local businesses as sponsors. In return for sponsoring teams or competitions, businesses can advertise in newsletters, on uniforms and sometimes at the grounds. Businesses will often donate prizes at fundraising events for sports, in return for notoriety within the local community.

In higher profile sports, companies will provide major corporate sponsorship in proportion to the amount of media coverage a team can attract. If it cannot attract media attention, a team or club usually struggles to find sponsors. Without sponsors, its sport's potential for growth is restricted. Major sponsors in high-profile sporting codes insist on high community values and standards from their clients and inappropriate behaviour by players, clubs or sports receive negative media attention. Major sponsors do not want their brand associated with negative publicity and may withdraw their support. An example of this is the drug scandals associated with the Essendon AFL club and the Sharks NRL club in 2013.

Since the 1980s a major issue for debate has been whether sponsors should be able to promote products such as alcohol and cigarettes. Tobacco advertising was banned in Australia in 1992 due to

public health concerns and the fact that tobacco contradicted the ‘healthy’ values of sport. These actions were mirrored in the worldwide arena. This ban affected two sports significantly – cricket and rugby league. Alcohol’s association with sport remains prominent in Australia, not only with alcoholic beverages being available at live games, but also through marketing and sponsorship. For example, brewing company XXXX is the official beverage sponsor of rugby league in Queensland. Recently, some players’ bad behaviour associated with alcohol consumption has made headlines, with many high-profile players being suspended from the game or dropped from teams. This raises an important question about the effect that alcohol sponsorship has on players and whether removing sponsorship deals would improve the sport, or cause funding problems for teams and players.

Think about

When considering the ethics of advertising, is alcohol sponsorship an example of inappropriate advertising to the community?

Benefits of sponsorship

The benefits of sponsorship for sport may include:

- increased media coverage
- improved administration of the sport due to financial resources
- potential opportunities for higher levels of competition and overseas competition
- possible economic growth for the town or city where the team is located
- growth of associated businesses and increased employment opportunities
- development of the sport at the ‘grass roots’ level
- financial assistance to hire full-time athletes, resulting in better, more athletic and exciting play.

Disadvantages of sponsorship

The disadvantages of the sponsorship of sport may include:

- media coverage being dominated by a few sports (e.g. traditionally male sports)
- inappropriate sponsorship occurring (e.g. alcohol sponsorship in cricket and rugby league)
- sponsors insisting on rule changes (e.g. ‘time-outs’ for advertisements)
- sponsorship dictating timing of game (e.g. forcing late-night games for live coverage and prime advertising time)
- renaming sporting events or venues to incorporate sponsors’ names, resulting in loss of club identity (e.g. NRL club the Cronulla Sharks has had numerous naming deals for its home ground over the years, including: Ronson Oval, Caltex Field, Shark Park, Toyota Park, Toyota Stadium, LG Park, Shark Stadium, Remondis Stadium and Southern Cross Group Stadium).

Economics of hosting major sporting events

A large amount of planning and preparation goes into a city bidding for the rights to host a major sporting event. The costs are high and begin as soon as the process of formalising the campaign is established. Sponsorship of major events has made it more competitive for countries to host such events. A bid to host a major event must outline the city’s overall vision, and include plans and budgets for staging the event. Special consideration must be given to environmental issues, infrastructure development (stadiums), transport systems, security, telecommunications/ broadcasting, medical treatment, merchandising, advertising, ticketing and accommodation for participants, spectators and officials. The bidding process is highly competitive with no guarantees of success or return on investment. Once the bid has been won, the host city then begins the preparations of venues, transport, accommodation sites and other logistics.

Countries hope to achieve economic growth through world media sponsorship, infrastructure development, increases in employment opportunities, investments from local and overseas businesses and spending from tourists. A global spotlight from a major sporting event can influence tourism to the city or country for years to come. Organising committees need to secure government funding and support in return for a legacy of world-class sporting facilities and services left for future generations. The costs of the event are dependent on the existing

infrastructure, planned building projects, the type of sport, size of the event, projected number of participants and spectators, and inflation.

Sponsorship and ticket sales may contribute to offsetting the costs associated with hosting a major event, but government taxes often need to be increased to cover expenses. There have been questions raised about the use of sporting facilities after the event and whether they will continue to cost the community in terms of maintenance, traffic, noise and pollution. Sydney's Homebush Bay is an example of effective planning by creating suburbs, relocating businesses and continuing sporting events. Much of the infrastructure was fuelled after Sydney's bid to host the 2000 Olympics was successful. Since the Olympics, many of these venues have been transformed to host a range of state and national sporting events; for example, NRL, soccer, AFL, cricket, and netball, as well as concerts, and wood chopping at the Sydney Royal Easter Show. Some members of the community may question the ethics of spending government funds on sports facilities when they could be better spent addressing community issues. A major sporting event also brings with it an increased security budget to counter potential terrorist threats.

FOR CITIES, HOSTING MAJOR SPORTING EVENTS IS A DOUBLE-EDGED SWORD

David Rowe, Western Sydney University

Just as the publicity machine is cranking up for the 2018 Commonwealth Games on the Gold Coast, new Australia-based bids have already been signalled to host the same event in the future.

Shepparton is leading a bid by 11 regional Victoria cities and towns for the 2030 Commonwealth Games. And western Sydney is interested in hosting the event in either 2026 or 2030.

Nobody in Australia seems to have been deterred from bidding by Durban losing the rights to hold the 2022 Commonwealth Games because the South African city could not afford it. Adelaide, Melbourne, Perth, Sydney, and even a Gold Coast reprise have been mooted as replacements.

Meanwhile, a 2017 V8 Supercars Championship event is controversially to be held for the first time amid the heritage streets and green foreshore spaces of Newcastle East this November.

Despite the event's under-performance at – and subsequent departure from – Sydney's Olympic Park, Newcastle City Council, the New South Wales state government and Destination NSW have been happy to wave it through with minimal consultation and attention to due process.

But what is the appeal of hosting big sporting events and does the economic equation stack up?

Economic justifications

In a world where place-marketing is seen as essential to the success of urban centres large and small, grabbing attention is imperative.

Sports stars and brands attract people to watch contests close up. But, even more importantly, they attract the media. So, investing in staging sport is ultimately a matter of turning the entire host environment into a stage.

This can be called the showcase justification, which conceives the sport as less intrinsically important than its picturesque location. This is why TV establishment shots always focus on key landmarks like Cape Town's Table Mountain during the 2010 football World Cup, London's Big Ben at the 2012 Olympics, and Rio de Janeiro's Christ the Redeemer statue at the 2014 FIFA World Cup and 2016 Olympics.

For Gold Coast 2018, it will be the Surfers Paradise skyline.

Although attracting sport tourists to the event is the immediate aim, it is intended to lodge appealing imagery of place to a wider audience for a much longer period.

Like Barcelona after its 1992 Olympics, a buzz can be created about a city that has little to do with sport. General tourist and convention traffic may be drawn to the place, along with companies looking to relocate to smart places where their employees would like to live.



Where place recognition and appeal are not immediately obvious, some marketing hyperbole is needed. For example, in justifying why the V8 Supercars should zoom through inner Newcastle, the street circuit is presented, in reference to the Formula One Grand Prix, as 'the Monaco of the southern hemisphere'.

Such attempts to take sport away from dedicated stadiums in often-isolated locations to the heart of the city are integral to the idea of selling the space rather than the sport. Inevitably, though, it results in additional cost and community disruption.

This objection is frequently met with the urban redevelopment justification. In its pre-Games makeover, Barcelona spent millions of dollars and sacrificed many old streets, vineyards and gardens to turn itself into an Olympic city.

The same occurred to different degrees with the Athens, Beijing, London and Rio Olympics. And the Manchester 2002 Commonwealth Games stimulated an estimated £2 billion [about \$3.5 billion] in public and private investment in the city's east over 15 years.

Because hosting sport means tight, immovable deadlines, work in and outside the stadium has to be completed much faster than usual for sizeable building projects. The result can be a thoroughly unpleasant experience for affected communities, including forced and permanent displacement, corrupt and unethical conduct by government and business, and shoddy work requiring subsequent rectification.

Worse still, overly optimistic and unreliable financial projections mean the promised economic bonanza is often a long, painful event hangover. As both Athens and Rio have discovered, urban debt and decay quickly become the real legacy of the exhilarating moment of playing host to big sport.

The International Olympic Committee's demand for prestige venues that can quickly become white elephants has caused a sharp decline in host city bids. As a result, there is increased emphasis on recycling existing sport infrastructure in affluent cities like Tokyo, Paris, Los Angeles and Sydney that have previously hosted the event.

Social justifications

If the economic arguments for playing host still look shaky, there can always be a resort to the participation stimulation justification.

This is the familiar idea that sport watchers will be inspired to be sport players through exposure to big events. The problem is, hosting sport events rarely leads to sustained higher levels of participation. And, in cases such as motor sports, mass participation is neither feasible nor desirable.

When all else fails, the 'sleeper awakes' justification can be deployed against those who oppose or are sceptical about the event by portraying them as whingers, NIMBYs, party-poopers, and – in the go-to insult of the Trump/Brexit era of political populism – elitists.

This championing of hosting events is partially dependent on sporting taste. But if that doesn't convince, it can rely on the tried-and-tested unforgettable party justification. As with other great parties, those who enjoy them most tend to forget the stomach-churning clean-up afterwards.

In 2015, Australia hosted the men's cricket World Cup and football Asian Cup, as well as the netball World Cup. This was a particularly busy year, but recent developments indicate that its state and territory capitals, provincial cities and regions are now continually on the hunt for a large or medium-sized sporting event to host.

In other parts of the world, potential hosts including Berlin, Boston, Cardiff, Edmonton, Hamburg, Rome and Singapore have withdrawn bids for the Olympic or Commonwealth Games.

This is not an argument against hosting big sport events. But it does advocate looking closely at the hyperbole, concealed self-interest, confected populism and voodoo economics that try to submerge the enduring question: who benefits?

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Questions

- 1 Explain the economic justifications of hosting a major sporting event.
- 2 What is a showcase justification?
- 3 Outline some of the benefits gained by cities who have hosted major sporting events.
- 4 What are the disadvantages of taking sport away from dedicated stadiums into locations that are often isolated from the heart of the city?
- 5 What are some of the perceived disadvantages of hosting a sporting event in terms of deadlines and community experience?
- 6 Explain the social justifications of hosting big sporting events.

Consequences of commercialisation

Consequences for spectators

Companies that sponsor and advertise in sport invest large sums of money and expect to have some influence on the product. In some instances, they request the format of the sport be changed to maximise their sponsorship investment. They may request scheduling of fixtures and start times, timeout or drink breaks, and the naming rights of venues and the competition. This can result in a loss of tradition for that sport and difficulties for athletic performance; for example, athletes may be training during the day but be expected to be at peak performance for 7 p.m. matches.

Consequences for players

The investment in sport by sponsors can lead to better players being attracted to the competition, resulting in higher quality games. Games are scheduled to attract the biggest audience and more live sport is available with high-quality commentary and analysis on pay television. The advancement of technology allows for improved adjudication on the field and a closer insight for the viewers at home. This technology includes features such as the NRL Bunker and Spidercam, Hot Spot and Snickometer ('Snicko') in cricket and the Hawk-Eye system in tennis. On the negative side, player loyalty has diminished because decisions are based on economics. Ticket prices have substantially increased and major events are sold out quickly with scalpers making money from inflated prices. These days not all sporting events are available on free-to-air television, so consumers must purchase a subscription to pay television to watch their favourite sports, or a ticket to watch the game live.

Elite players are paid very well with contract and endorsement incomes, combined with the opportunity to play in competitions around the world. Players are expected to fulfil all training, media and sponsorship commitments (for example, appearing in sponsors' apparel). Being in the public eye they must avoid any negative publicity and, as role models for their sport, they are subject to strict behaviour governed by codes of conduct.

Due to consumer demand the length of the playing seasons has been increased, also increasing the risk of injury for athletes. In addition to expectations from sponsors and spectators, elite sportspeople need to be aware of the consequences of being involved in issues such as match fixing, drug taking and bribery.

Commercialisation in sport

- 1 Outline the changes made by various sports to make them more entertaining and saleable.
- 2 Discuss the consequences for these sports and for the individual athletes involved in these sports.
- 3 Select a club or team of your choice from any elite sport. Investigate how the club or team runs their business.
- 4 Brainstorm the names of three elite professional athletes and their sponsors. Evaluate how the sponsorship arrangement has worked for the athlete and the sponsor.

CHAPTER SUMMARY

- Australia's sporting origins were strongly influenced by the British in the 19th century.
- Sport in colonial Australia was male-dominated, patriotic and focused on character and values. Sporting values and ideals were discipline, mateship and physicality.
- Different social class groups in colonial Australia participated in different sports and activities, based on a similar system within the British society. Upper-class society enjoyed memberships to sporting clubs that excluded the lower class and women.
- Social class segregation divided athletes into amateur and professional status in colonial Australia.
- Women were restricted to a minimal role in sport in colonial Australia. Society and the medical profession did not support their involvement, and women's clothing restricted athletic movement.
- Women of the upper class could eventually participate in recreation activities such as croquet, tennis and golf.
- Lower-class athletes participated in boxing and athletics for financial gain.
- Since the 20th century, sport has evolved into a commodity.
- Sport has become big business, involving sponsorship and contractual obligations. Substantial amounts of money are generated through corporate sponsorship. Sponsors look to maximise their investment dollars in positive product association with the sport or athlete.
- Before hosting major sporting events the city or nation must carefully consider the economics and the consequences for both spectators and participants.

CHAPTER REVIEW ACTIVITIES

- 1 Discuss** how the meanings of sport varied for different social groups in the 19th century.
- 2 Compare** the differences between amateur and professional sport.
- 3 Define** the terms manliness, patriotism and character.
- 4 Describe** the differences in sport played during early colonial Australia with the sports played today.
- 5 Investigate** the historical participation of women in sport from the early 19th century.
- 6 Explain** how sport has become a commodity.
- 7 Analyse** the development of sport as big business.
- 8 Assess** the consequences for participants and spectators of sport developing into big business.





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CHAPTER 13

Sport and national and cultural identity

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After reading this chapter you should be able to:

- explain how sport has been used to promote an Australian national and regional identity
- identify when Australia has used sport for political purposes
- discuss how physical activity and sport have influenced the lives and identities of Indigenous Australians
- determine the cultural significance for particular groups in physical activities or sports.

AUSTRALIAN SPORTING IDENTITY

In this section we critically examine how sport has been used to promote an Australian national and regional identity (for example, Olympic coverage and State of Origin) and then identify instances when Australia has used sport for political purposes. (for example, in the Moscow Olympics and the apartheid boycotts). The section continues with an evaluation of the impact of sporting identity on the athletes and the Australian public

As Australians we have developed a strong national pride in our sporting achievements. We make heroes of our most successful sportsmen and women. Australia has developed traditions in sport that tend to demonstrate a unique set of characteristics, such as mateship, teamwork and a stoic ‘never say die’ attitude. Colloquial expressions such as ‘having a go’, ‘punching above your weight’, ‘taking it down to the wire’, ‘give it 110 per cent’, ‘it was do or die’ and ‘taking it a week at a time’ epitomise our sporting culture. Australia’s sporting identity has developed from traditional competitions against other countries, such as England. Now Australia upholds a range of sporting rivalries spread across the world in a variety of sporting codes.

National and regional identity through sporting achievements

Australia's sporting success has led to heroes being worshipped and folk tales being passed down through the ages. Australian sporting achievements have always been celebrated and owned by the public with national pride. Australia is often depicted as the 'underdog' in sporting events, and the media helps to promote this to develop national pride and support for the competing team or athlete. Our success against larger, dominant sporting countries has reinforced a sense of patriotism and achievement as well as leading to greater acceptance on the world stage. Since Australia's early colonial days, the English have felt superior towards Australia in sport. Over time, as we achieved wins over England – initially in cricket and subsequently in other sports – Australians developed a sense of national pride and no longer felt inferior to England. Australia's first victory over England in cricket signified the start of the Ashes competition between the two countries. Rivalry also exists with the US through swimming, and New Zealand with rugby league, rugby union and netball.

Australians unify in support of the national team competing at the Olympic Games. As spectators, we watch with pride as the team marches in uniform at the opening ceremony and buzz with excitement when individual names are announced when they are about to compete. We cheer when our athletes win medals and our national anthem is played at medal presentations while the Australian flag is being raised. The media provides regular updates on the 'medal tally' at each Olympic Games, and this allows us to make our own judgements about our sporting achievements. The medal tally of each Olympics and Commonwealth Games is used to gauge our performance on the international stage. Traditionally our swimming teams have excelled at the games. The media scrutinises high-profile athletes in their pre-Games performances and places considerable pressure on individuals and sporting disciplines to win medals at the Games. Their results at the Olympics can affect their future funding and shine a spotlight on their sport at a national level. The country's hopes and expectations are placed on the shoulders of our high-profile athletes.

Successful Olympic teams are given tickertape parades through capital cities on their return. Australia's World Cup Football campaign brings the nation together, as evidenced by the team's recent response to the qualification for the world cup finals in 2018. The 'race that stops a nation' – the Melbourne Cup – is a world-renowned horse race. Together with the Sydney to Hobart yacht race, they symbolise our national pride and Australian identity.



Getty Images/Jewel Samad

Figure 13.1 Australians are enthusiastic supporters of many types of sport.

In 1983, Australians celebrated when the US's 132-year winning streak in the America's Cup yacht race was broken by *Australia II*. The symbol of the nation's fighting spirit became the boxing kangaroo, which was used to encourage national pride. The prime minister at the time, Bob Hawke, declared, 'I tell you what, any boss who sacks anyone for not turning up today is a bum.' Regional identity has been celebrated over many years with areas of Australia being renowned for developing sporting heroes. These athletes represent their towns and regions before moving on to national competitions where, if they excel, they represent their country. Individual towns take special pride in the ownership of sporting champions who were born and grew up in their town. Local communities often fundraise to build monuments to celebrate the athlete's achievement and remind the community they were once local kids. The Bradman Museum of Cricket in Bowral was built in honour of cricketer Sir Donald Bradman; in Lithgow there is a statue of the 'Lithgow Flash' (Marjorie Jackson); tennis great Rod Laver's name will live on through the tennis arena in Melbourne; and swimming legends Dawn Fraser and Ian Thorpe have swimming centres named in their honour in Sydney. Many successful athletes have sporting fields or grandstands named in their honour in their hometowns.

Competitions such as 'City vs Country Origin' and 'State of Origin' reinforce the regional identity of athletes and their hometowns.

Try this

- 1 Research five sporting fields or grandstands that have been named after famous sportspeople. Outline the rationale for this honour.
- 2 Watch a state of origin game and list references to national and regional identity.

Government funding for sport

Athletes and sporting associations had to fund their participation in sport up until the mid-20th century. They did this with donations, fundraising activities or by the athletes sponsoring themselves. Self-funding came from the idea of sport being an amateur pastime and athletes who competed in world championships or in the Olympic Games had to pay their own passage.

Australian Olympic Committee

In 1914, the Australian Olympic Committee was formed with the goal of raising funds so that national teams could travel to compete for Australia at the Olympic Games. The 1956 Melbourne Olympics was financially backed by the federal government and a national patriotism with the Olympic movement developed. In that instance, the media provided financial support for some athletes so that they could concentrate full-time on training and competition. The federal government continued to provide support to sporting bodies, helping them develop sportsmen and women to be competitive on the world stage. This action set a precedent, and sporting bodies have continued to attract government funding. In 2000–01 overall government funding for sport and recreation activities was \$2124 million. The federal government contributed \$199 million (9 per cent), state and territory governments contributed \$875 million (41 per cent) and local governments provided \$1050 million (49 per cent).

In 2016–17 the AIS investment allocation was \$118 million, which was almost \$4 million less than the previous year. This included \$85 million on Able High Performance, \$13 million on Para Participation and \$20 million on General Participation.

Australian Sports Commission and Australian Institute of Sport

In the late 1970s the Australian Sports Commission (ASC) was established by the Australian Government to manage, develop and invest in all levels of Australian sport. It is the responsibility of the ASC to work closely with national sporting organisations, state and local governments, schools and community organisations to provide strategic guidance for sporting activities and to ensure smooth operations and accessibility for all Australians.

One of the key structures of the ASC is the Australian Institute of Sport (AIS), which was formally opened in 1981. The AIS is responsible for the development and administration of the Olympic Athletes Program (OAP) and coordinates the national development of sport from junior competition to adult and special interest groups. The AIS also administers an international scheme to facilitate knowledge shared between international athletes and coaches. It provides scholarships to talented young athletes targeted for Olympic selection and manages some sponsorship deals and acquisition of facilities. Since the emergence of the AIS the quality and success of Australian athletes has improved, as evidenced by Australia's improved medal tallies at subsequent Olympic Games and results at World Championships.

What is the AIS?

Look at the AIS website, in particular at its role, how it operates, and its key initiatives. (You can follow the link.)

- 1 What is the role of the AIS?
- 2 What services does it provide?
- 3 What are the AIS's key initiatives?

Try this

Research government funding for three sports of your choice, and prepare a short presentation.



Weblink

Politics and sport

As sport has become more important in Australia, it has attracted greater interest from politicians. Political involvement spans state and federal governments and affects national and state sporting associations, through to local clubs. Political involvement in sport can both aid and hinder its development.

History shows that teams and individual athletes have protested racial and other human rights issues on the world stage through the medium of the Olympic Games. Adolf Hitler used the 1936 Berlin Olympics to enforce his racist and fascist propaganda. In the 1956 Melbourne Olympics, the famous 'blood in the water' water polo match took place between Hungary and the USSR, a direct result of the Hungarian revolution. At the 1968 Mexico City Olympics, two African American athletes, when being presented with gold and bronze medals, raised black-gloved fists to the 'Black Power' salute. This was to protest the inequalities suffered by the black population in the US. Australian silver medallist Peter Norman showed support for the issue by wearing a human rights badge during the ceremony.

Palestinian terrorists at the 1972 Munich Olympic Games killed a group of Israeli athletes and officials to make a statement about the conflict between Israel and Palestine. Some western countries boycotted the 1980 Moscow Olympic Games in protest against the Soviet Union's human rights record. In retaliation, the Soviet Union boycotted the 1984 Los Angeles Olympic Games.

Governments and politicians have made effective use of sport as a diplomatic tool on both the domestic and international fronts. The Australian Government has intervened on sport policies and interfered with competition and international tours to press home a specific point in international policy. This was the case when Australian sportspeople boycotted South Africa in the



Figure 13.2 Indigenous AFL St Kilda player Nicky Winmar in 1993

improve diplomatic relations between countries. Governments have assisted sporting federations by fast-tracking visa applications for athletes, and supporting the World Anti-Doping Agency (WADA) in enforcing drug testing at major domestic and international events.

Recently Russia was banned from the 2018 Winter Olympics after the International Olympic Committee (IOC) found the country had engaged in ‘systemic manipulation of anti-doping rules’.

Political action in sport can also occur on an individual level. Nova Peris, Indigenous Australian Hockeyroos gold medallist in the 1996 Olympic Games, used her notoriety as a sporting icon as a platform for political change. Peris was the first Indigenous Australian to win an Olympic gold medal. She became a senator, representing the Australian Labor Party, from 2013 until her retirement from the Senate in 2016. Similarly, sporting legend Marcia Ella Duncan, the first Indigenous Australian woman to represent Australia in netball, also uses netball as a vehicle for addressing the social injustice, health inequalities and inequities experienced by Indigenous Australians.

In 1993, Indigenous AFL player Nicky Winmar, playing for St Kilda, was abused by members of the Collingwood cheer squad. After the game, he lifted his shirt and defiantly pointed to his chest, indicating, ‘I’m black and proud of it.’ As a result, the AFL, NRL and other football codes now have an Indigenous round and numerous other rounds to celebrate the game’s heritage and diversity. Sports organisations across the world have done likewise with campaigns tackling social

1970s due to its practice of apartheid. Under apartheid, the white minority held power over the black majority. This resulted in discrimination against the black majority and resulted in South Africa being expelled from the Olympics and other international events. These boycotts, along with economic sanctions, helped contribute to the downfall of the apartheid regime. In 1992, South Africa returned to the Olympics for the first time after being barred 32 years earlier.

Governments plan and distribute funding to a variety of sports and sporting bodies lobby to ensure that their funding is maintained or increased to aid their development. The Premier of New South Wales was responsible for the successful bid for the 2000 Olympics in Sydney and the support of successive governments ensured the success of the Games.

Politicians use sport to enhance their own reputation and popularity. Australian prime ministers have consistently aligned themselves with major sporting events. They regularly attend cricket tests, rugby, AFL and football matches.

Sport and politics can help

issues on a large scale, including racism and violence against women. Nelson Mandela once said, ‘Sport has the power to change the world. It has the power to inspire ... to unite people in a way that little else does. It speaks to youth in a language they understand ... It is more powerful than governments in breaking down racial barriers. It laughs in the face of all types of discrimination.’

National identity

- 1 Select an athlete from a high-profile sport. Discuss their role in developing regional pride and identity for their place of origin. Analyse how the public perception of this athlete has contributed to the sense of national identity in Australia today.
- 2 Critically examine how the Australian Sports Commission and its subsidiary entities have impacted on the development of Australia’s national and regional identity.

MEANING OF PHYSICAL ACTIVITY AND SPORT TO INDIGENOUS AUSTRALIANS

Many Indigenous Australians have competed at the highest level in elite sports. Examples include Cathy Freeman, Nova Peris, Lance (Buddy) Franklin and Johnathan Thurston.

Prominent Indigenous athletes in sports such as rugby league, rugby union and AFL attract a lot of media attention. This publicity allows them to present a positive role model and to encourage society to focus on overcoming the social injustices that many Indigenous Australians face in the wider community.

Traditional activities and sports

Aboriginal and Torres Strait Islander (ATSI) Australians have an abundance of inherent talent and skill in a variety of sports. They have created and performed in culturally significant sports as well as physical activity for hundreds of years, fuelling the excellent sporting demonstrations of Indigenous Australians in modern-day sport.

The Indigenous people have traditionally always been very active and physically fit because most of their traditional daily activities involve physical fitness – hunting and fishing for food – combined with a deep connection to the land, which is revered and sacred.

Early Indigenous Australians had no formal organised sport, unlike the colonial settlers. Dance was used in the initiation process of young boys, and corroborees were performed for ceremonial purposes to celebrate good fortune and these involved dance and music. Games focused on target sports, throwing spears and boomerangs, and movement skills, such as the running, jumping and climbing activities that formed a part of everyday life. ‘Sporting’ competitions included survival skills in activities such as tree-climbing races, wrestling and throwing spears for distance. Games involved catching, throwing and kicking of balls made of materials such as possum hair, kangaroo intestine, beeswax and seeds. These were played for enjoyment; they were informal with few rules and no need for umpires or referees. Indigenous Australians who lived near waterholes or coastal beaches fished, paddled canoes and swam.

Indigenous games had close links to survival skills and respect for tribal elders. Their major focus was enjoyment and they represented pastimes that demonstrated clear links with family, tribe and land.

Links between community and identity

Indigenous Australians have always had strong links to their community because this is fundamental to the formation of individual and group identity. Colonisation resulted in the



Weblink

Investigate

Check out some of the traditional Indigenous games online. The AIS has some examples (e.g. the Yulunga traditional Indigenous games). On the Creative Spirits website you can find discussions about how these games affect Indigenous feelings of identity.

degradation of Indigenous Australians' ties to the land. The colony introduced many individual and team sports to Australia and by the mid- to late-1800s the Aboriginal people had become prominent in sports such as cricket, boxing, football and a form of professional walking.

Early in the days of colonisation, Indigenous Australians could participate in sport if they wished, although there were some restrictions. The first Australian cricket team to tour England in 1868 was an all-Aboriginal team. It was made up of Indigenous males and was not sanctioned by the government. They left secretly and suffered hardship on the journey with three team members dying. The team was a novelty to the British people, who were charged entry to see these Indigenous people. As a mark of respect to their culture, the cricket matches concluded with displays of traditional Indigenous activities such as dancing and boomerang throwing. The team's performance was commended by both the British and Australian press, which enhanced the identity of these sportsmen.

The passing of the *Aboriginal Protection Act* in 1869 restricted the movement of Aboriginal people from place to place, removed many Indigenous Australians from their communities and prohibited them from socialising with Europeans. This action had a negative effect on the development of the Indigenous sporting culture and identity. It became very challenging for Indigenous Australians to participate in mainstream sport. This Act was repealed in the 1960s.

Since then, many Indigenous Australians have excelled in sport, reaching elite levels of participation and achieving national and international recognition. Being naturally gifted athletes, some young Indigenous Australians have quickly risen to the top ranks in their sporting professions and have experienced newfound status in terms of socioeconomic gain. Like most high-profile identities, they are easily recognised and often objects of public scrutiny. Jonathan Thurston and Buddy Franklin are two of the most recognisable figures in Australian sport.

Both rugby league and AFL have become an important part of Indigenous community life, with competitions taking place region against region, and players being scouted for larger competitions such as NRL and AFL. This link has helped to bond local communities and establish an identity for young Indigenous men within their communities. Both rugby league and AFL hold Indigenous recognition rounds in their competition. The NRL celebrates Aboriginal heritage and recognises Indigenous rugby league's role models with an Indigenous All Stars game at the beginning of the season.

Investigation: Patty Mills



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Follow the link to Patty Mills' website. Patty is an Indigenous Australian who is a member of the Brooklyn Spurs basketball team. In particular, read the article from 15 March 2017: 'For Patty Mills, giving voice to Indigenous Australians comes naturally'. Then, as a class analyse how Patty Mills' successes have contributed to a positive perception of Indigenous culture.

The National Aboriginal Sporting Chance Academy (NASCA) uses the power of structured sporting and culture programs to harness the life aspirations of young ATSI people. The Indigenous community, led by prominent Aboriginal sportspeople, organises community sporting events each year aimed at improving community links and promoting healthy lifestyle messages to all participants. Examples of these events include the Aboriginal Knockout Rugby League Carnival, Ella-7s rugby union and the Koori Netball Tournament.

The ASC is supporting Indigenous athletes with their Indigenous Sports Program. The aim of the program is to increase opportunities in local communities with the expectation that assistance at this level can only improve participation and the emergence of more elite

Indigenous athletes. NASCA is a not-for-profit organisation developing Indigenous sport at a grass roots level, using sports such as netball, rugby league and cricket as a vehicle to influence health, education and improve school and community harmony.

The introduction of the National Indigenous TV channel and Indigenous Community Television ICTV, available on pay TV services and on free-to-air digital, has helped strengthen links between community and identity through broadcasts of many sports programs specific to the Indigenous communities.

Indigenous games

- 1 Research two different Indigenous games. For each game, explain:
 - a What is its significance to the Indigenous culture?
 - b What is the purpose of the game?
 - c How is it played?
- 2 Present your findings to the class.



Weblink

NASCA

Browse the National Aboriginal Sporting Chance Academy (NASCA) website to discover what it does, and to check out its latest programs.

PHYSICAL ACTIVITY, SPORT AND CULTURAL IDENTITY

There is a relationship between the types of physical activity and sport that are traditionally played and the cultural identity of the athletes. Each culture has different values, beliefs and customs and perceptions of health. These form the basis for a culture's traditional sports, physical activities and cultural identity. Some cultures value competition and success through physical activity, while others emphasise the importance of socialisation and good overall health. Sport can provide opportunities for people of all cultures and the tools for overcoming obstacles in everyday life, as well as for developing resilience.

Role of competition

The Olympic motto of 'faster, higher, stronger' epitomises the values of sporting competition, with athletes striving to be the best that they can be. Competition in sport is highly valued in Australia with an emphasis on winning, gaining public recognition and being paid accordingly. Competitive sport can be exciting and allows for a 'tribal spirit' where individuals, teams and spectators embrace the culture of the team. Participation in sport can also be character-building; it can help to prepare a person for the world outside sport and provides the tools for overcoming obstacles in everyday life.

Competition brings out the best in athletes. It provides the motivation for the athlete to train hard and then perform at their best against others. With competition comes a variety of tactics that are used to achieve the desired outcome. Examples of this are short-pitched bowling or 'bodyline' in cricket and team running in long – distance events. Competition also develops strong rivalries such as between New South Wales and Queensland (rugby league), Collingwood and Carlton (AFL), Australia and New Zealand (netball and rugby union) and Green and Mundine in boxing.

Links to cultural identity

Australia can trace its sporting origins to England during the early colonial period. Many popular sports in Australia today were introduced by the wealthy upper class during colonisation. Migrants from European countries instilled a love and passion for soccer to the local game. Most immigrant communities maintained their links to their country of origin through the sport that was most familiar to them. Australian soccer clubs were initially founded to provide cultural groups with a chance to socialise with family and friends. Clubs such as Marconi in Sydney's

west have provided the infrastructure and community support to allow promising soccer players to achieve their potential in the game. In some clubs in the past, racial tensions were evident and poor crowd behaviour often resulted. Establishment of the A-League competition helped reduce these issues and refocus the game on national pride. Clubs such as the Queensland Roar or the Central Coast Mariners are working to instil a new type of regional pride in their franchises.

The increase in immigration from Asian countries has led to a greater acceptance by young people of traditional pursuits such as martial arts disciplines and tai chi. Australia has been very successful internationally in judo and taekwondo, with participation in these sports on the increase.

The AFL has a long association with Indigenous sport and identity, and Indigenous communities value their success in local competitions. The game of AFL has many components that are similar to traditional Indigenous activities – running, jumping and kicking. 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 AFL. The games reflect the cultural identity of their participants, and assist in bringing their communities together.

Relationships to health

In our society, health is often associated with fitness, muscularity and being slim. The ‘bronzed Aussie’ image depicts toned, muscular male physiques and toned, slim female physiques. This body image is stereotyped as the ‘typical Aussie’ with a ‘beach body’. These physiques are usually a result of participation in serious competitive sport or physical training. In other cultural groups, such as Asian cultures, participation in physical activity is undertaken by linking the mind and body.

Health is more than just physical fitness symbolised by strength, endurance or power. Health extends to include other areas such as social and mental health and sport also plays a key role in these areas. Team sports can bring an individual a sense of social health through communication and friendship with team-mates. Sport and physical activity can also positively impact an individual’s mental health through relaxation or meditation (for example, yoga or tai chi). Other physical activities can provide a distraction from daily life and produce mental clarity; for example, running can be used as a time to clear one’s head.

The traditional Australian idea of sport is often one of competitive activity (winning or losing) or participation for pleasure and socialisation. In Australian society, sport and physical activity are a means to improve health. Participation in physical activity is linked to lifestyle changes that can help eliminate lifestyle diseases. In recent years, the view that sport and physical activity can assist with health-related fitness and bring holistic health benefits has become more popular. However, many cultures view physical activity and sport as avenues purely for recreation, socialisation and competition and do not necessarily equate this with health.

Ways of thinking about the body

The ancient Greeks used art and sculpture to depict the symmetry and proportion of the ideal human body. This image depicted muscle development, strength and athleticism. Physical activity was the most effective method of achieving a preferred body shape. Body builders train their bodies to achieve the ultimate body sculpture. There is a range of body types or somatotypes in sports. Young children can be channelled into sports because of their body type. For example, tall ectomorphs can be encouraged into basketball or high jumping while

endomorphs might try shot-put or discus. In Australia today sport is one of the best ways of developing a strong, well-trained, working body that can compete at any level of competition undertaken. An improvement in training techniques has seen the inclusion of psychological aspects to train sportspeople for strength of mind and mental toughness, as well as for the skill and fitness aspects of their sport. Sports psychologists and motivational trainers have been employed by elite athletes and teams to improve goal-setting, concentration and focus. Elite performers now consider that the edge they gain over their opponents is in their psychological preparation for a competition.

Diverse cultural values and meanings can have an important influence on how individuals think and feel about their bodies, physical activities and sport. Some cultures encourage participation in physical activity and sport equally for boys and girls, while others may limit it for girls because of religious beliefs, cultural values or the belief that sport is a masculine pursuit.

In Asian cultures, the value of sport and its effect on the body can be viewed as a holistic approach to promote balance and harmony between mind, body and spirit. Many of the martial arts promote the idea of 'centering' an individual's thoughts and concentration, allowing mental energy to build self-esteem, wellbeing and a sense of self. This combination of developing physical body strength and athleticism with a holistic way of thinking is the future for sportspeople and how they think about their bodies.

Boycotts and culture

- 1 Select ONE of the sporting issues below. Investigate the issue and analyse the effects it had on the athletes involved, the sporting public and international government relations. Present your investigation to the class.
 - The Moscow Olympic boycott of 1980
 - The apartheid boycotts
 - World Series Cricket
 - Rugby league's Super League war
 - Nicky Winmar being abused by members of the Collingwood cheer squad
 - Cathy Freeman parading with the Indigenous flag at the Commonwealth Games in 1994.
- 2 Research two culturally based physical activities or sports and evaluate the significance for their culture.



CHAPTER SUMMARY

- National and regional identity is well promoted and closely associated with sporting achievement.
- Government funding is linked to sporting achievement.
- Sport and politics are interrelated from national governments down to local sporting associations.
- Physical activity and sport have a strong influence on the lives and identity of Indigenous Australians with traditional activities and sports depicting everyday life activities.
- 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 assisted in creating and reinforcing a sense of identity.
- Physical activity and sport has significance for individual cultural groups.

CHAPTER REVIEW ACTIVITIES



- 1 **Identify** what is meant by 'national identity'.
- 2 **Discuss** how sport contributes to Australia's national identity.
- 3 **Investigate** the development of present day funding for sports in Australia.
- 4 **Suggest** why some sports receive more government funding than others.
- 5 **Discuss** the effects of apartheid on the development of sport throughout the world.
- 6 **Discuss** why sport can be a valuable tool for politicians.
- 7 **Analyse** the value of developing Indigenous athletes for sport in Australia.
- 8 **Analyse** the role competition plays in developing sport and cultural identity.
- 9 **Discuss** why sports from diverse cultures continue to be a part of Australia's sporting landscape.



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CHAPTER 14 Mass media and sport

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When you have read this chapter you should be able to:

- think critically about the impact of the mass media on sport
- analyse the media’s role in giving meanings to sport.

RELATIONSHIP BETWEEN SPORT AND THE MASS MEDIA

The media is recognised as the most influential and comprehensive method of communication available today. The media is constantly changing thanks to technological advancements but the two most popular methods are still print and electronic media. Print media includes newspapers, magazines and journals. Electronic media covers television, radio and the Internet where information can be accessed via computer, tablet or mobile phone. Electronic media platforms provide greater access to sports coverage due mainly to advancements in technology; for example, real-time updates of scores.

Representation of sport in the media

Who benefits and in what ways?

Big media companies gain many benefits through their sports coverage, while athletes and sporting organisations benefit equally. It is an interdependent relationship. Without media exposure, lesser known athletes and sports would not have the platform to build up

their profile, nor the opportunity for advancement of wages and sponsorship. Similarly, without the athletes and sports to cover, the media companies would not be able to attract advertising revenue.

How does the media influence our understanding of sporting events?

The media can dictate which sports are promoted and which are not. The expert sports journalists and commentators strongly influence the opinions of the reading and viewing public. People learn the rules, techniques and tactics involved in sport by reading about it or watching it. By allocating media space – including headlines, photographs, articles and airtime – to a sport, the media can influence the public's opinion and understanding of the sport and increase its popularity. The techniques used in marketing a sport have a substantial influence on the amount of media coverage it receives.

How have sports been changed to suit the needs of the media?

Television, radio and live-streaming media can provide live commentaries of sporting events all over the country and the world. The increase in live-streaming coverage has provided an alternative access to sport away from television. This has allowed social networking sites such as Facebook and Twitter to open opportunities for interactive debate and comment on all aspects of sport. Social media is changing the way sports stars, clubs and fans are interacting with each other. Through live-tweeting, creation of memes and live-supporting, viewers are using social media to watch their sport, and obtain news, insights and commentary. Sporting organisations are developing their own media platforms, such as NBL TV and AFL Media, to broadcast their games and provide news.

Team uniforms – both on and off the field – are emblazoned with sponsors' names. Sporting equipment is also covered with the relevant sponsors' logos. Media networks have worked with sports to change the formats of some games so they fit better into the scheduled broadcasting of their programs. Cricket has developed the T20 concept, netball the Fast5 series and tennis the Fast4. This allows the media to structure more advertising breaks into their programs.

The NRL has a committee that evaluates the rules in terms of developing the game. The increase in points for a try in 1983, the 10-metre rule in 1993 and, more recently, the number of interchange players have all made the game a more attractive fixture.

On television

On television, 'pay per view' for specific sporting events has allowed sports that have traditionally been attended less often to become more viable because they are now available to those who cannot afford the cost of attending an event. Television can manipulate and influence public opinion about sport, the choice of sport watched and the viewer's perception of what is happening. Mobile camera angles, close-ups and wide-angled shots can influence the opinions of both viewers and commentators. Sports that are regularly televised are usually those that have mass appeal. Traditionally, female sports have been under-represented on television. Netball, basketball and international tennis have all had regular coverage in recent years; however, there has been controversy over scheduling of games and switching to scheduled programs such as the national news broadcast at key points in the game.

Investigate

Research other examples of rule and uniform modifications introduced to accommodate advertising breaks.

The Channel 10 network aimed to change the face of televised sport in Australia when it launched a new digital free-to-air sports channel, 'One Digital', in March 2009. Major sports such as netball, golf and swimming moved from pay TV to this channel, which was deliberately named without the word 'sport' to attract all members of the viewing audience. This programming continued until 2011 when the station changed to a more general entertainment format.

In print

The print media continues to be a major vehicle for delivering sport coverage and although it must compete with television and other electronic media, it does provide lasting images of great sporting moments and articles that dissect and analyse the game or event. Most print media publications are also available electronically. Newspapers devote generous space to sport, with action photographs and articles satisfying society's expectations of athleticism, strength and tough mental armour. Sporting magazines, such as *Inside Sport*, also encourage the public to hero-worship their star players.

The use of sensational headlines in newspapers aims to catch the reader's attention and curiosity and motivate them to read an article. Language relating to aggression, courage, perseverance and physical size is emphasised, such as 'hammered the opposition' and 'bone-crunching tackle'. Elements of controversy are discussed from all points of view.



The opinions of journalists can manipulate and influence public interpretation of specific sporting incidents. Journalists reporting on violent behaviour (either on or off the field), drug use or other unsociable conduct by athletes can cause major rifts in the sporting community. Pressure on sporting clubs, teams and athletes can be fuelled by emotive articles from the press and social media platforms encourage audience members to voice their opinions and contribute to an ongoing discussion. The Australian Communications and Media Authority (ACMA) is responsible for the standards and codes of practice that are now legislated for the media.

Media influence

- 1 As a class, brainstorm incidents where the media has showered an athlete with accolades for their courage on the field in defying physical pain from injury and battling on to play or compete.
- 2 As a class, watch a televised sporting event and then complete the following:
 - a Choose one passage of play or incident from the event and state how the media influenced what you saw as a viewer.
 - b Suggest reasons why the media determined what images and commentary were presented to viewers.
- 3 Investigate the social values and standards that are promoted in sports coverage. Do these influence the social fabric of the community?
- 4 Read the sport section of a newspaper and complete the following to share and discuss with the class:
 - a Locate a sensational or provocative headline.
 - b Count the number of male sports that are represented.
 - c Count the number of female sports that are represented.
 - d Find examples of different language used in articles about male and female sports and athletes.
- 5 Locate an article in which the journalist shares their views on a particular sporting event or incident. How could this influence the public's view?

Money in media coverage and sport

Sport plays an important part in sustaining the financial viability of the print and electronic media. It has become a marketable product that provides entertainment for the whole Australian population. Television networks pay massive amounts of money in contracts with sporting bodies for exclusive broadcast rights to cover specific sporting events. These include domestic football codes, cricket, national and world championships, and the Olympic and Commonwealth Games. Competition between television networks is intense in the race for sponsorship dollars.

Television sports commentators are emerging as celebrities because they enhance the marketability of a sport and can play a key role in sponsorship deals. Sponsors can expect high returns for their exposure during prime media time. Sponsors are visibly promoted on uniforms and sporting equipment. Commentators often encourage audience participation through social media and make the coverage more interactive by discussing key points and analysing sport statistics. Viewer competitions are a good public relations exercise because they increase the profitability of both network and sponsor.

Television and live-streaming is continually trying to improve the quality of programs and promote viewer interest in sports coverage. These are some examples:

- introduction of sports more suited to TV scheduling (e.g. T20 cricket)
- dedicated sports channels
- rule changes to ensure that the match flows faster and more smoothly (e.g. number of interchanges of bench players)
- technological umpires, such as the third umpire or video referee, stump cam, snickometer, and Hawk-Eye
- drone video coverage
- player access for 'up to the minute' or live interviews
- scheduled breaks during play to allow for advertisements
- changes to scheduling to increase audience numbers.

Media impact

- 1 Choose ONE of the following sports and investigate the changes that have been made to it to accommodate the needs of the media.
rugby league rugby union AFL cricket tennis
- 2 Discuss how these changes have impacted on the sport, both positively and negatively.

DECONSTRUCTING MEDIA MESSAGES, IMAGES AND AMOUNT OF COVERAGE

How does the coverage given to sports reflect which sports are valued and which ones are not?

Decisions concerning which sports gain coverage, and the space allocated to those sports, are closely associated with how society values and perceives them. The media covers those sports that are highly valued in the community but, in turn, it is the media that influences the community about which sports are valued. As an example, high-profile sports such as AFL and cricket rely on their revenue from the media for their continued operation. This, in turn, relates to the potential of the sport to gain public recognition and sponsorship.

What metaphors are common in sport?

A metaphor is a figure of speech in which a term or phrase is applied to something to which it is not literally applicable, in order to suggest a resemblance. Metaphors are often used in headlines to attract attention and sensationalise a report. They are symbolic representations of the characteristics attributed to sport. Common examples of sporting metaphors include: 'this game is war', 'battle of the gladiators', 'played like an old dog', 'smashed him out of the park' and 'he's mercurial'.

Has the media pushed extreme sports to take excessive risks?

The increased media coverage of extreme sports has led to a higher demand for athletes to take greater risks, jump higher, go faster or do more complicated manoeuvres. The audience at home wants to be closer to the action, so filming is often done with hand-held cameras, helmet-mounted cameras, or by camera operators who also put themselves at risk in the same environment just to get close-up photos of the action. Many extreme sports are self-regulatory with no regulations regarding safety requirements, so the safety of camera operators in these situations can be a problem.

The Australian media aims to inform and entertain people. They are under great pressure to produce news stories that attract viewers. The balance between providing entertainment and informing the community about issues is influenced by ethical and financial considerations.

The major criticism of media in Australia is the domination of sporting coverage at the expense of serious discussions about social issues that impact on much of the viewing population. Many people in society want their entertainment to be light and non-serious and allow them to share in the passion of a team playing well. When sport and serious social issues combine, the media and sporting clubs struggle to maintain clear, light entertainment in the face of health messages. Domestic violence, alcohol-fuelled assaults and the use of illegal recreational drugs have all dogged the high-profile football codes over the last few years. All codes have active anti-doping policies and players are subject to random

drug testing. Some players have had contracts terminated when they have failed drug tests or breached club codes of conduct. These are examples of how important it is for a sport to maintain a positive image in the community, subsequently attracting sponsors and advertising through positive media coverage.

Differences in coverage for different sports across various print and electronic media

The media has a responsibility to provide a balanced coverage and to encourage public debate on social issues. Decisions concerning which sports gain coverage, and the space allocated to those sports, are closely associated with the potential of the sport to gain corporate sponsorship and public recognition. Televised sports and, to a lesser extent, print media allocate time or space to sports that can gain corporate sponsorship and are popular with the public. Networks and media companies collect demographic data that provide them with statistics on the population's habits and opinions. These statistics inform their selection of programs and coverage in order to produce the highest profit for all stakeholders. Sports with star players and those who are associated with a brand product are more likely to be given media space and coverage. Often, sensational headlines, images and articles are used in print media to help build the profile of a sport and increase its popularity. The media can determine which sports are given the greatest coverage. During the summer months, the televised coverage of cricket competitions and surfing tournaments leads to an increase in popularity of those sports and a dedicated media following. Little Athletics enjoys a surge in registrations in an Olympic year.

Television and media outlets compete for exclusives and 'brought to you first' stories. Television networks and newspapers often sensationalise a sporting story to gain an advantage over a competitor. Sometimes rough play can be exaggerated to develop an interest in a story. Newspapers with headlines like 'traditional rivals' and 'outright war' are using language and clever positioning of articles to sensationalise situations between teams and players.

Social values are evident in the way the media covers sport, with the most prominent ones being traditional Anglo-Saxon sports: horseracing, football, tennis and cricket. Male sports and athletes tend to dominate in newspaper articles, typified by their 'manly' characteristics. Female sports tend to get less coverage, and the language used often focuses on the athlete's appearance and femininity. The descriptors used for male or female athletes tend to conform to society's general expectations of masculine and feminine stereotypes. Male performances are often described as 'tough encounters' or 'awesome displays of strength'. These phrases describe the admirable characteristics of the courage, determination and power and accompanying images usually reflect the same qualities. Female performances are usually described in terms of aesthetically pleasing movements, skill level and overall appearance. Extreme sports and those associated with ethnic and Indigenous groups are allocated less space or airtime in both print and electronic media.

Try this

- 1 Study the sports coverage in a weekend newspaper or on an electronic media site.
- 2 Identify the types of sports covered and the volume of the coverage.
- 3 Describe the language used and the types of images, in terms of the issues discussed in this section.

Extreme sports as entertainment

Extreme sports involve a high element of risk and have been around in various forms for many years. Extreme sports are physical activities that are adventurous and daring. These sports have the potential to be hazardous and require heightened levels of fitness, fearlessness and high-quality specific equipment and clothing. Extreme sports have increased in popularity, leading to an increase in companies catering for the needs of thrill-seekers. These sports are highly dangerous and require specific components of fitness and resilience to bring about the desired adrenaline rush. Extreme sports include big wave surfing, BASE jumping, street luge, motorcycle/BMX stunt jumping, and parkour.

The participation rate in extreme sports is not high, so film-makers and media companies have been quick to promote the sports on television as short films or documentaries. These productions have some advantages to media outlets: fewer people involved, lower production costs, film footage can be stored and used to fill gaps in traditional sport coverage.

The footage of surfers riding huge waves or BMX riders negotiating death-defying stunts is appealing to viewers because of the nature of the challenge being presented on the screen. White-water rafting is one extreme sport that has benefitted from clever marketing, promoting itself as both an unconventional thrill and a corporate bonding activity.

The future of extreme sports appears to be bright as the public demands more daring footage. This will lead to an increase in the level of danger as film producers encourage participants to be even more adventurous. Television networks will have to source more extreme footage in a bid to keep their share of the viewing audience and sponsorship dollars.



Shutterstock.com/Nadezda Murnakova

Figure 14.1 BASE jumping is an extreme sport with a high level of danger.

Media and extreme sport

In pairs, choose ONE of the extreme sports listed below and complete the following:

- 1 Create a profile of the sport including any star performers and film footage.
- 2 Provide opinions for and against the question:

Has the media contributed to extreme sportspeople taking excessive risks?

Present your research in the form of a PowerPoint presentation or another electronic method.

canyoning	rock climbing	abseiling
big wave surfing	parachuting	paragliding
mountaineering	BASE jumping	deep sea diving

CHAPTER SUMMARY

- Sport and the media enjoy a mutually beneficial relationship.
- The media can dictate which sports are promoted and which are not. The expert sports journalists and commentators strongly influence the opinions of the reading and viewing public.
- Media networks have worked with sports to change the format of some games so they are more marketable and fit better into scheduled broadcasting of the programs.
- Sport plays an important role in sustaining the financial viability of the print and electronic media.
- Decisions concerning which sports gain coverage, and the space allocated to those sports, are closely associated with the potential of the sport to gain corporate sponsorship and public recognition.
- Media coverage of sport often uses metaphors (e.g. referring to 'war' in football). Metaphors are often used in headlines to attract attention and sensationalise a report.
- Extreme sports have increased in popularity, leading to an increase in companies wanting to cater for the needs of thrill-seekers.

CHAPTER REVIEW ACTIVITIES

WS

Extra
exam-style
questions

- 1 **Explain** the relationship between sport and the mass media.
- 2 **Describe** how the media influences our understanding of sports.
- 3 **Discuss** how sports have been changed to suit the needs of the media.
- 4 **Explain** the difference in coverage for different sports across various print and electronic media.
- 5 **Explain** how the media has pushed extreme sports to take excessive risks.



CHAPTER 15

Sport, physical activity and gender

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Sport and gender

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Discrimination in sport

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Historically, it has been men who participated in competitive sport in Australia but this is changing through strong lobbying by women’s sporting bodies. However, there are still many examples of gender stereotyping of males and females in sport – in the media, sports policy and sports development.

SPORT AND GENDER

In this section we look at the social construction of gender and explore ways in which sport today either reinforces or challenges the traditional view of ‘gender’. We analyse the participation rates of males and females in a range of sports, consider why there are differences and look at how this is changing.

Throughout history male-dominated sports have traditionally held a higher profile than female ones. As elite male athletes have become famous they have been able to secure lucrative sponsorship deals. Women have also had a long history of sporting participation in Australia but their level of recognition has not been as prominent. More recently society and the media have challenged the relationship between sport and gender, and redefined the constructs of masculinity and femininity in sport.

Young children are mainly influenced by their family environment, which can significantly determine how they view themselves. Schools and communities also influence the expectations of young boys and girls at an early age. Gender roles are reinforced by society and this includes sport. Female sport has made some inroads into what has traditionally been a male sporting domain.

In the past, boys who pursued less ‘masculine’ sports such as ice skating, gymnastics or dancing may not have had the support they now experience. Similarly, girls who wanted to break down male-dominated barriers and play rugby or AFL faced obstacles. Sportswomen who managed to participate in these sports had to fight for their right to do so. They also had to fight for media recognition, which continues to favour male sports. Progress has been made in the development of the women’s cricket Big Bash League, the AFL women’s competition (the AFLW) and the women’s NRL competition.

How gender differences affect participation

The gender gap in sport is closing but still exists due to biological differences affecting performance, as well as reduced opportunities and sociopolitical factors that influence full female participation across a range of sports in Australia. Even though males and females do not generally compete against each other, a distinct lack of career opportunities and rewards exists for female athletes. Since 1928, despite the fact that women have comprised only 20 per cent of the Australian Olympic team throughout the 20th century, they won 80 per cent of track gold medals and many medals in the pool.

There are many factors to explain why the participation rates for boys and girls in sport are significantly different. Family and cultural background, past experiences, genetic makeup (including body composition and personality traits), socioeconomic status and geographic location all influence the type of sports played and the level of an individual athlete’s commitment and competition. Boys typically receive more encouragement than girls to participate in sport. Both girls and boys can be motivated by positive role models, such as Sam Kerr or Buddy Franklin, to encourage them to take up a sport, or continue with their chosen sport. However, in physical education at school the boys tend to dominate mixed classes, allowing girls fewer opportunities for involvement. When this happens girls tend to lose their desire to acquire skills and drop out of physical activity. Some athletes also tend to drop out of sport if their gender identity is questioned or if they do not conform to gender norms in today’s society. This can lead to boys and girls developing a poor body image and losing self-confidence, which can have a long-lasting effect.

It can also be difficult for girls from certain cultural backgrounds to participate in sport; for example, where cultural or religious beliefs restrict their participation. Muslim girls can struggle to adapt to the social and female sporting traditions of Australia. Cultural dress codes have made it difficult for some girls to participate in sport. A recent development in clothing design has addressed the Islamic dress codes and allowed for greater physical movement. An Australian company called Ahiida has developed the ‘hijood’ – a hijab (head scarf) that is shaped like a hood and conforms to religious standards but contains less fabric than the traditional hijab and allows women greater opportunities to play sport. Surf clubs have developed Islam-appropriate attire for surf life savers and fitness and sporting venues offer women-only sessions that provide an opportunity for Muslim women to participate in a greater range of activities. Check out Ausport’s AusPlay Focus sheet, ‘Women and girls participation’.



Weblink

MOST POPULAR ACTIVITIES FOR AUSTRALIANS, 2016

These tables show the top activities (engaged in at least once a year) for different population groups and various criteria.

Table 15.1 Top 20 activities for adults

	Population estimate	% of population
Walking (recreational)	8 397 408	42.6
Fitness/gym	6 317 614	32.1
Athletics, track and field (includes jogging and running)	3 115 027	15.8
Swimming	2 852 924	14.5
Cycling	2 302 614	11.7
Football	1 141 027	5.8
Bushwalking	1 058 061	5.4
Golf	1 022 127	5.2
Tennis	946 790	4.8
Yoga	866 679	4.4
Basketball	667 006	3.4
Cricket	643 919	3.3
Netball	630 638	3.2
Surfing	528 058	2.7
Australian football	496 829	2.5
Pilates	489 731	2.5
Fishing (recreational)	412 049	2.1
Touch football	402 756	2.0
Canoeing/kayaking	312 664	1.6
Dancing (recreational)	269 798	1.4

Table 15.2 Adults via organisation/venue

Top 10 activities	Population estimate	% of population
Fitness/gym	5 045 386	25.6
Swimming	1 593 531	8.1
Golf	888 794	4.5
Football	825 866	4.2
Yoga	654 830	3.3
Tennis	611 815	3.1
Netball	583 736	3.0
Athletics, track and field (includes jogging and running)	537 454	2.7
Cricket	463 042	2.3
Basketball	461 233	2.3



Table 15.3 Adult men: Top 10 activities

	Population estimate	% of population
Walking (recreational)	3 189 754	32.8
Fitness/gym	2 785 040	28.6
Athletics, track and field (includes jogging and running)	1 728 674	17.8
Cycling	1 387 756	14.3
Swimming	1 261 924	13.0
Football	884 972	9.1
Golf	836 606	8.6
Cricket	571 010	5.9
Tennis	537 917	5.5
Bushwalking	520 642	5.3

Table 15.4 Adult women: Top 10 activities

	Population estimate	% of population
Walking (recreational)	5 207 654	52.3
Fitness/gym	3 532 574	35.4
Swimming	1 591 001	16.0
Athletics, track and field (includes jogging and running)	1 386 353	13.9
Cycling	914 858	9.2
Yoga	742 136	7.4
Netball	562 698	5.6
Bushwalking	537 419	5.4
Pilates	441 642	4.4
Tennis	408 873	4.1

Recreational walking is the most popular physical activity for Australians overall, followed by fitness/gym activities. However, fitness/gym activity is by far the most preferred activity involving some type of organisation or with access to a venue.

Source: Australian Sports Commission (ASC) 2018, AusPlay – January 2017 to December 2017 data, ASC, Canberra

Questions

- What are the most popular activities for:
 - adult men?
 - adult women?
 - adults through an organisation or venue?
- Compare the participation rates for men and women.

Sponsorship, policy and resourcing

Sponsorship is a mutually beneficial business arrangement. A company wishing to sponsor a sport wants to align its brand with that sport to gain a range of economic, public relations and product placement advantages. Sponsors may also associate themselves with an athlete, team, league, or the sport's positive brand to gain public trust, acceptance or alignment with the perceived image a sporting entity has established. In return, sporting organisations, teams, and/or athletes receive financial benefit for their association with a company, product or campaign. There can also be additional non-financial advantages, such as goods and/or services, provided by the sponsors. Sponsors may invest in parallel advertising through a sporting venue or media

broadcast to develop a public association with a sport's brand. If a sport, team or athlete does this, they may not be able to control how their image or brand is used. The federal government has provided sponsorship guidelines and restrictions on products that are not deemed healthy or in the best public interest. The bans on advertising of tobacco and alcohol are examples of this.

There are far more sport sponsorship opportunities for males than females. This inequitable distribution of sponsorship is related to the higher exposure and importance placed on male sports as portrayed in the media. Traditionally male sports, such as cricket, NRL and AFL have a majority of the corporate dollar because they are considered to be entertaining, high profile and worthy of media attention. Australian sporting teams that are successful in international events are more likely to gain sponsorship and media coverage, which means greater resources for their sport.

The average yearly wage of a male AFL player is more than \$280 000. An average female player on the Australian representative netball team receives approximately \$43 000 per year, even though the Diamonds have won 10 world championships since 1963 and finished runner-up three other times. Elite netballers have just received increased total player payments for the current Suncorp Super Netball season where the minimum payment for all players rose by 8.75 per cent per year to \$30 000 per year. There are only two women in Australia's top 50 sports earners – six-time world surfing champion Stephanie Gilmore (number 39 at \$1.75 m) and World Golf Hall of Fame member Karrie Webb (number 50 at \$1.28 m). They are both way behind the top two male athletes – basketballer Andrew Bogut (number one at \$16.2 m) and golfer Adam Scott (number two at \$15.5 m).

Securing sponsorship from large corporations is relatively new in women's sport. The success of sportswomen in international competitions has increased the opportunities for increased government funding and sponsorship, along with a higher media profile. Women's netball, basketball and hockey teams are raising their profile and this has attracted more sponsorship. Australian sporting stars including pro surfer Tyler Wright and Matildas star striker Sam Kerr enjoy fame and opportunities for sponsorship beyond the sporting field because of their success. Outstanding international performances by Australian female athletes have been rewarded with increased support from governments and the media; for example, Ellyse Perry has been associated with brands such as the Commonwealth Bank, Jockey underwear, Adidas, Priceline, Hisense and Fox Sports. The federal government has introduced anti-discrimination laws that support women in their goal to achieve equality in sport. The Australian Sports Commission's Women Leaders in Sport program provides women with development opportunities to reach their leadership potential in the sports industry.

WHY THE PROFESSIONALISATION OF WOMEN'S SPORT IN AUSTRALIA COULD PUT OLYMPIC PERFORMANCES UNDER THREAT

Greg Blood

There are many positive developments happening in women's sport in Australia but some of these developments may have a negative impact on Australian performances at the Olympics.

The Hockeyroos, Opals and the Stingers have been medal performers since the 1990s but none of these teams medalled at the Rio Olympics, and they may now be under pressure due to the professionalisation of non-Olympic sports.

At the Rio Olympics, for the first time, Australian female athletes outnumbered male athletes. Research that covered the period up to the London Olympics found that Australian female athletes comprised about 33 per cent of Australian Olympic teams but they won 38 per cent of medals, and about 40 per cent of gold medals.

Australia's medal performance has historically relied heavily on talented female athletes.



Non-Olympic sports such as netball, cricket and AFL have lifted in terms of opportunities and financial rewards for women over the last two years.

These sports are now becoming more attractive than Olympic sports to girls aspiring to play sport in a professional manner.



Figure 15.1 Brittany Gibson of the Lions handpasses during the 2018 AFLW grand final match between the Western Bulldogs and the Brisbane Lions at Ikon Park in Melbourne.

Netball, which historically has the greatest female participation in Australian sport, has had a national league for many years.

In February 2017, a revamped league will commence. It will include three teams linked to male professional teams in AFL clubs Collingwood and Greater Western Sydney and the NRL's Melbourne Storm.

The new league will have a total player payment pool of \$5.4 million and the average salary will be around \$67 500.

Cricket Australia has increased its women's player payment pool from \$2.36 million to \$4.23 million, with maximum retainers for the Southern Stars rising from \$49 000 to \$65 000. The best players in the women's Big Bash League will be on a retainer of \$15 000.

Accordingly, many of the leading Southern Stars players now earn over \$100 000. 2017 also saw the first ever women's national AFL competition.

Each team is managed by an existing AFL club and has a salary cap of \$200 000, with pay scales ranging from \$5000 to \$25 000.



Figure 15.2 Australian cricketer Ellyse Perry in action at the ICC Women's World Cup 2017.

There appears to be a broadcast appetite for women's AFL after one million people watched an exhibition match on channel seven in September.

Yet, what is the current state of play for Australian Olympic women's teams?

Women's rugby union, which has the Sevens game as an Olympic sport, is on the rise, particularly with the Pearls winning the inaugural gold medal in Rio.

It has been reported that the average salary in the women's Olympic squad is about \$55 000 and this included a base salary plus tax-free contributions from the Australian Sports Commission.

The FFA has set a salary cap of \$150 000 per W-League club, with a minimum spend of just \$35 000.

Last year only two clubs, Melbourne City and Canberra United, came close to reaching the salary cap.



Leading Matildas players do have the opportunity to earn an income by playing in European and North American competitions.

The women's National Basketball League, which once led the way, is currently struggling with no broadcast deal or naming rights sponsor.

In 2014, it was reported that each club's budget was about \$300 000, but this is likely to have dropped with players of the calibre of Lauren Jackson and Liz Cambage not playing.

Many top Opals now forgo the WNBL as there are now richer rewards in the United States and Europe. While the ability to earn income outside Australia is a great outcome, it does come at a cost to the standard of the WNBL and the Opals' ability to field a high-quality team on a regular basis.

While the Hockeyroos and the Stingers have limited national leagues and rely heavily on payments from the Australian Institute of Sport and state institutes of sport.

The new AFL women's national competition has already seen a marked increase in competition for female sporting talent.

Elite athletes that have been drawn to the AFL competition include basketballers Erin Phillips, Jess Bibby and Lauren Pearce, cricketers Jess Cameron and Emma Kearney, footballer Ellie Brush, netballer Libby Birch and thrower Kim Mickle.

Several of these players were at the end of their career and looking for a new sporting challenge. One thing that is certain is that the AFL competition will become stronger due to AFL clubs' experience in identifying and

developing talent and their desire to be very competitive.

I believe that the move towards more professional sporting opportunities for female athletes is a very positive development.

All Olympic sports will now need to develop strategies to ensure they have quality talent to compete in major competitions such as the Olympics and World Championships.

The goal of winning a gold medal or competing at these prestigious events may no longer be enough.

We see this in male sports where the financial rewards of AFL, rugby league and cricket, limit Australia's Olympic male talent pool.

Olympic sports that rely on female talent will need to ensure their athletes are well compensated and possibly facilitate them in participating in more than one sport during their career.

In addition, Olympic sports may need to put more resources into identifying and developing talent in what may be a smaller talent pool for their sport.

Source: www.theroar.com.au. Published by Conversant Media.

Questions

- 1 What was significant about the Rio Olympic Games in relation to women's sports?
- 2 Which female sports allow the athletes to earn the most money?
- 3 Explain the consequences of an expansion of women's professional sport on our future Olympic teams.

Role of the media

Sport has a high profile in Australian society and it attracts valuable resources as a result of coverage in the print and electronic media. At the same time, the media can have a major influence on how the public views sporting issues. Historically, it has placed greater emphasis on promoting male sport over female sport, as is evident from the prominence of sporting articles, the types of attention-drawing headlines, and the variety of action photography. Media coverage of male sports uses strong aggressive images and sensationalised headlines such as 'ball of the century' or 'the destroyer' that represent strength and determination.

Despite huge successes in sport on the world stage, women's sport receives only about 7 per cent of Australian TV sports programming time and 9 per cent of sports coverage on the news. This results in less funding, less sponsorship and lower salaries, denying sportswomen the opportunity to showcase positions of leadership and contributing to fewer career prospects for girls in sport. Research suggests that teenage girls are less likely to participate in organised sport than boys because they experience higher rates of teasing and have greater body image concerns.

Conversely, articles about sportswomen can contain references to weakness, softness and sexuality. Sportswomen are often promoted in the media as passive and supportive. Their athletic ability is discussed far less than important as their appearance, fashion sense or emotional response during performance. There is often a focus on a female sportsperson's sex appeal. In the sports sections of print media, action shots of female athletes are rare, small and usually positioned in less prominent positions. It is common for sports magazines to promote and market the female athletic body with photographs of sportswomen in swimwear. The names of male and female teams can also reinforce stereotypical ideals. Compare the Matildas, Opals and Diamonds (female teams) with the male Kangaroos, Demons and Bulldogs.

The media has an enormous influence on young people and this can create pressure for them to conform to stereotypical images of masculinity or femininity. Some sections of the media focus on the personal lives of women who have to juggle their sporting careers with their family roles while male players are rarely subjected to the same line of questioning.

On many occasions, female athletes are referred to as 'girls' while male athletes are referred to as 'men'. Sexual exploitation in the media tends to construct negative images of sportswomen and this can downplay their sporting success and achievement. Women are lobbying for a new concept of femininity that includes a fit, athletic, muscular body for athletes. The 'Girls Make Your Move' campaign aims to inspire, energise and empower young women to be more active regardless of their ethnicity, size or ability. It was developed to identify key drivers and barriers to participation in physical activity among young Australian women.

RIO 2016: #COVERTHEATHLETE HASHTAG TAKES AIM AT SEXIST COVERAGE OF FEMALE ATHLETES

Sexist media coverage of women's events in the Rio Olympics has breathed new life into a social media campaign calling for equal treatment of female athletes.

Using the hashtag #CoverTheAthlete, social media users have highlighted numerous examples of inappropriate Olympic commentary and demanded media networks focus their coverage on athletes' performances, not their appearance.

The campaign was originally launched last year after an Australian commentator asked Canadian tennis player Eugenie Bouchard to 'give us a twirl and tell us about your outfit', sparking a backlash from viewers who argued the interview was sexist and condescending.

'Sexist commentary, inappropriate interview questions, and articles focused on physical appearance not only trivialises a woman's accomplishments, but also sends a message that her value is based on her looks, not her ability', the campaign website reads.

But Twitter users have since called out numerous examples of Rio Olympics coverage deemed sexist.



Figure 15.3 Gold medal-winner Simone Biles was called 'the Michael Jordan of gymnastics'.

An NBC commentator credited Hungarian swimmer Katinka Hosszu's husband for her world record-breaking win in the 400m individual medley.

The Chicago Tribune reported the wife of a Chicago Bears football player had won bronze in trap shooting. (Her name was later added to the headline.)

People magazine referred to gold medal-winning gymnast Simone Biles as 'the Michael Jordan of gymnastics'.

The BBC referred to a women's judo event as a 'catfight'.



Two male Fox Sports presenters debated on air whether female Olympians should wear makeup.

The Huffington Post announced US swimmer Dana Vollmer had won bronze '17 months after giving birth'.

A different BBC presenter suggested Andy Murray was the 'first person to ever win two Olympic tennis gold medals'. (Murray patiently pointed out Venus and Serena Williams had won several between them.)

And the list goes on.

Sexism in sports media commonplace, study shows

A study published earlier this month by researchers from the UK's Cambridge University Press analysed more than 160 million words pertaining to sportsmen and women from decades of newspapers, academic papers, online articles and tweets.

The researchers found men were three times more likely than women to be mentioned by media in a sporting context, while language about women athletes focused disproportionately on their appearance and personal lives.

'It's perhaps unsurprising to see that women get far less airtime than men and that their physical appearance and personal lives are frequently mentioned,' said Sarah Grieves, language researcher at Cambridge University Press.

'It will be interesting to see if this trend is also reflected in our upcoming research on language used at the Rio Olympics.'

In June, a former employee of Triple M described the radio station's culture of covering football as 'sexist' and a 'boys club', and claimed male commentators at Triple M often made sexist and inappropriate jokes off air.

The claims were made after Eddie McGuire, James Brayshaw and Danny Frawley made inappropriate remarks on radio about drowning Fairfax journalist Caroline Wilson, which sparked public debate around men's language about and attitudes towards women.

Source: Reproduced by permission of the Australian Broadcasting Corporation - Library Sales © 2016 ABC News

Question

Outline the examples of sexism in sport used in the article.

Sexism in sport

- 1 Outline the corporate support for three high-profile women's sports.
- 2 Distinguish between the traditional and contemporary meanings of femininity and masculinity in sport.
- 3 How does sport reinforce the traditional ideals of gender and is it possible to challenge them?
- 4 Discuss what is needed to ensure women's participation in sport continues to grow.
- 5 Describe the impact that the media has had on the participation rates of women in sport and the perception of women's sport in society.
- 6 Research the participation rates of both women and men in sport. Has there been a change in the types of sports that are traditionally considered male and female domains?

DISCRIMINATION IN SPORT

In 1984 the *Sex Discrimination Act* was passed, allowing women to challenge the monopoly of some sports played exclusively by men. This legislation allowed women to participate in sports that had been traditionally male-dominated. Community views have been divided about women playing sports such as rugby, football, basketball, boxing and wrestling. Women who participated in contact sports such as boxing and wrestling criticised and vilified by some sectors of the community. In the 2012 Olympic Games the IOC included female boxing for the first time as an official sport with three divisions. Sportswomen have challenged the stereotypical images portrayed in the media and there are increasing numbers of young women registering to play

in these sports. Through perseverance, strength and resilience, sportswomen have worked to provide opportunities for more young women to pursue their chosen sport. It is now common to find women participating in motor sports and mountain-biking, and some are becoming jockeys in the previously male-dominated world of horseracing. Michelle Payne was the first female jockey to win the Melbourne Cup in 2015. After the race she said that horseracing is a 'chauvinistic sport'. Her winning speech about the capability of women in sport was described as 'unambiguous and galvanising'.

High-profile female athletes in male-dominated sports can often be the target of questions about their sexuality. The media has at times encouraged the idea of homophobia through suggestive headlines and articles, and this can be distracting and hurtful, both to the athletes concerned and to the wider community.

Men who are involved in sports such as diving, ice-dancing and ballroom-dancing have been subjected to taunts regarding their sexuality because, traditionally, these sports were not considered to be traditionally male ones.

Sexual discrimination in the form of homophobia can be a problem for homosexual athletes. Several Australian research studies have been conducted to ascertain the current levels and impacts of homophobia and transphobia in sport. These include:

- Come Out to Play (VicHealth study, 2010)
- Inclusive Sport Survey (ACT Government, 2014)
- Anti-Homophobia & Inclusion Framework for Australian Sports (Sydney Convicts Rugby Club and Bingham Cup Sydney, 2014)
- Out on the Fields (first international study on homophobia in sport, Bingham Cup, 2014)
- Trans, Gender Diverse & Intersex Participation in Australian Sports (Australian Human Rights Commission, 2015)
- Play by the Rules (Australian Institute of Sport, 2012).

This research has contributed to the development of the Pride in Sport Index, which provides both a historical perspective and an indication of some of the challenges faced by Lesbian, Gay, Bisexual, Transgender and Intersex (LGBTI) participants within Australian sport. It is Australia's first and only program specifically designed to assist national and state sporting organisations and clubs to include LGBTI employees, players, volunteers and spectators.

As part of this change in the way society views sport, males are now participating in traditionally female sports, such as netball. Males who have a background in court sports have been attracted to the game, as well as male relatives and partners of female netballers, who have entered into mixed-gender competitions. Men's netball is now played in associations across Australia at club, state and international levels.

The *Sex Discrimination Act 1984* makes it unlawful to treat anyone unfairly due to their sex, gender identity, intersex status, sexual orientation, marital or relationship status (including same-sex de facto couples) or family responsibilities, including pregnant and breastfeeding women.

Women in sport

- 1 Discuss how women are challenging the male domain in sport.
- 2 Profile two women who have been successful in traditionally male-dominated sports.
- 3 Investigate the entry of women into traditionally male sports and the entry of men into traditionally female sports. Examine the reaction of the public and media at the time. Did these sports attract spectators and sponsors? Why/Why not?

CHAPTER SUMMARY

- Traditionally sport has been viewed as the domain of males.
- Men and women who participated in sports that are not traditionally played by their gender may have had their sexuality questioned.
- Young girls need positive role models, encouragement and access to resources to increase participation rates beyond sports traditionally associated with females.
- Women's sports have lacked corporate support in terms of sponsorship and media coverage in comparison to male sports. Proactive lobbying has seen this starting to change.
- The media plays a key role in the public perception of femininity and masculinity in sport. This is propagated by using specific language and images for each gender.
- Women are challenging the male domain, with increasing numbers participating in male-dominated sports, such as the football codes.

CHAPTER REVIEW ACTIVITIES

- 1 **Discuss** why sport tends to reinforce the traditional understandings of gender.
- 2 **Examine** possible reasons for the media presenting male and female athletes in stereotypical ways.
- 3 **Discuss** the effects of homophobia in today's sporting world.
- 4 **Describe** the way in which some forms of sport have come to be traditionally associated with one gender or the other.
- 5 **Compare** the entry of women into male-dominated sports with the entry of men into female-dominated sports.





OPTION 3: SPORTS MEDICINE

CRITICAL QUESTIONS

How are sports injuries classified and managed?	231
How does sports medicine address the demands of specific athletes?	245
What role do preventative actions play in enhancing the wellbeing of the athlete?	259
How is injury rehabilitation managed?	276

Source: Personal Development, Health and Physical Education Stage 6 Syllabus © NSW Educational Standards Authority for and on behalf of the Crown in right of the State of New South Wales, 2012

OUTCOMES

When you have read this section you should be able to:

- 1 list a variety of approaches that enhance performance and safety
- 2 communicate strategies to manage injuries and promote safety
- 3 access, interpret and communicate information about health and physical activity concepts
- 4 analyse factors that affect performance and safety, and then select appropriate options and strategies.

KEY TERMS

abrasion	osteoporosis
contusion	overuse injuries
cardiovascular disease (CVD)	shin splints
direct injuries	soft tissue injuries
hard tissue injuries	sprain
hyperglycaemia	strain
hypoglycaemia	stress fractures
indirect injuries	tendonitis
laceration	TOTAPS
	vasoconstriction
	vasodilation

CHAPTER 16

Classifying and managing sports injuries

IN THIS CHAPTER

Ways to classify sports injuries	231
Soft tissue injuries	234
Hard tissue injuries	239
Injury assessment	242

WAYS TO CLASSIFY SPORTS INJURIES

Sports injuries are a common occurrence and can be either acute (such as sprains, fractures and tears) or chronic (such as tendonitis and overuse injuries). An acute injury is one that occurs suddenly and is very painful, such as a jarred finger in basketball. A chronic injury is caused by overuse of the same muscle group or joint over time, or a re-injury of a previous acute injury. As an athlete, it is important to learn how to recognise and treat the most common sports injuries so that they can heal properly. Some of these injuries can be treated at home, while others require more specific and professional treatment.

The most common types of sports injuries are classified as direct, indirect, soft tissue, hard tissue and overuse injuries. These classifications are outlined in table 16.1.

Direct and indirect injuries

A **direct injury** is one that is caused by a direct external blow or force (that is, generated outside of the body – extrinsic). Direct injuries include collisions and they are commonplace in contact sports; for example, a tackle in rugby league or being struck by a hard object such as a cricket ball. Other examples of direct injuries are bruises, fractures, sprains, dislocations and joint or ligament damage.

An indirect injury is one caused by force generated inside the body (intrinsic) and that does not result from physical contact with either another person or an object. Indirect injuries can

result from such things as inadequate warm-up or incorrect technique leading to excessive strain being placed on certain parts of the body (such as a shoulder dislocation from a handstand). Other causes may include fatigue or overstretching.

Getty Images/David Davies-PA Images



Figure 16.1 Knee injuries are common in social and professional sport, particularly contact sports.

Hard and soft tissue injuries

Hard tissue injuries

A hard tissue injury occurs when there is damage to the teeth or bones. Given the nature of the impact required to cause a hard tissue injury, these can often be more serious than a soft tissue injury. The most common type of hard tissue injury is a fracture.

Soft tissue injuries

Soft tissue injuries affect all tissue other than bones and teeth. This includes tendons, muscles, ligaments, cartilage, organs, nerves, skin and blood vessels. Common soft tissue injuries are sprains to ligaments (such as rolling an ankle on a poor surface) and strains (such as tearing a hamstring after an inadequate warm-up).

Overuse injuries

An overuse injury occurs through excessive or repetitive use of particular body parts such as joints, bones, tendons and muscles and is linked to exercise that requires repetitive, low-impact activity, such as running. Other contributing factors include poor technique and inferior equipment, such as footwear.

Many overuse injuries go undetected for a time because there may be little or no pain associated with the injury. As a result, an athlete continues to use this section of the body, causing further damage by not allowing the affected site to heal. As damage increases, the site can become inflamed and the athlete experiences swelling and tenderness that cause discomfort.

Overuse injuries include stress fractures – small cracks in the bone, often occurring in the lower leg (such as shin splints) – and tendonitis (inflammation of a tendon).

Table 16.1 Symptoms, possible causes and examples of injuries

Classification	Signs and symptoms	Possible cause	Specific examples
Direct	pain tenderness swelling decreased function deformity	External (extrinsic) force or blow to the body	Bruise, contusions or haematoma (e.g. a 'cork' where a knee collides with the body) Bone fracture caused by impact from an object (e.g. cricket ball) Ligament or tendon damage from over extension at a joint due to external impact (e.g. basketball hitting the top of the fingers)
Indirect	pain tenderness swelling decreased function deformity	Internal (intrinsic) forces within the body	Incorrect technique (e.g. shoulder dislocation from a handstand) Fatigue Over-stretching a joint beyond its normal flexibility range (e.g. rolling an ankle on an uneven surface)
Soft tissue	pain tenderness swelling decreased function instability	Injury to body tissue, other than bones and teeth; these can be caused by internal or external force	Abrasions, cuts or lacerations, burns or blisters all form trauma, generally to the outer layer of the skin Sprains are injuries to ligaments (e.g. rolling an ankle on a poor surface) Strains are injuries to muscles or tendons (e.g. tearing a hamstring after an inadequate warm-up) Bruises are damage to the blood vessels (e.g. impact from an object)
Hard tissue	pain tenderness swelling decreased function deformity discolouration bleeding	Injury to the bones or teeth caused by internal or external force	Bruising of the bone or periostitis, which is bleeding between the outer lining of the bone and the underlying compact bone (e.g. impact to the shin, which only has a thin layer of muscle covering) Dislocation of a joint (e.g. impact to the shoulder socket in a football tackle) Fracture or break of the bone (e.g. landing heavily on the hands after a fall, breaking bones in the wrist) Stress fractures (e.g. repeated pounding on hard surfaces) Broken tooth (e.g. impact to the mouth)
Overuse	persistent pain tenderness swelling decreased function	Excessive or repetitive use, trauma or stress on the bones, joints, tendons and muscles. Overuse problems can be caused by poorly designed training schedules	Tendonitis (e.g. repeated low-intensity activity causing tiny tears in the tendon) Doing too much too soon (e.g. insufficient rest and recovery time) Stress fractures (e.g. small cracks in the bone usually caused by repeated stress; this often occurs in the lower legs)

Potential learning experiences (PLE)

- In pairs or small groups, brainstorm and compile a list of injuries that fellow students have suffered while playing sport.
 - Be sure to think about and include how the injury happened. Then classify the injuries as direct/indirect and soft/hard or overuse.
 - For each injury, be sure to include the body part affected and, if possible, describe how the injury was treated at the time.
- Share examples with the class to mind map injuries and create a comprehensive list. Identify any trends to ascertain whether some injuries are more prevalent in certain sports than others.

SOFT TISSUE INJURIES

The most common sports injuries are soft tissue injuries. Soft tissue refers to tissues that connect, support or surround other structures and organs of the body. Soft tissue injuries can happen to muscles, tendons, ligaments, blood vessels, cartilage, nerves, skin and internal organs.

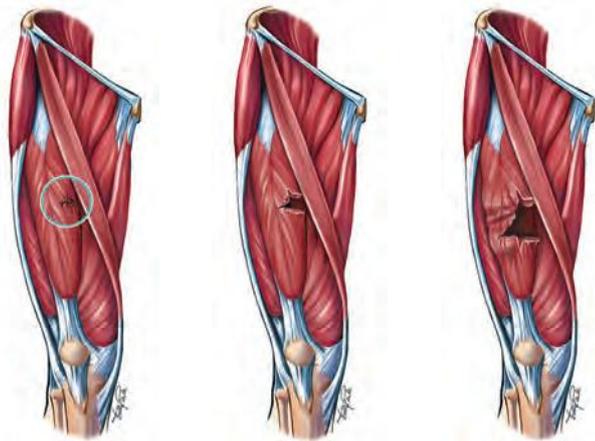


Figure 16.2 Muscle strains



Figure 16.3 Ligament strains

(second-degree) sprain has a considerable amount of damaged fibres to the joint, restricting its range of motion. A grade 3 (third-degree) sprain is a complete ligament tear with extensive damage. Figure 16.3 illustrates the three degrees of ligament damage that can occur as the result of a sprain.

A contusion (often referred to as a bruise) is caused by a collision with another person or with an object. The contact causes local muscle damage and bleeding. Contusions can

Tears, sprains and contusions

Tears, sprains and contusions are three of the most common soft tissue injuries but they differ in nature as a result of the type of damage caused.

A tear occurs when a muscle or tendon undergoes excessive stretching or is severed. There are two types of tears: a strain (when a muscle or tendon is stretched or torn) and a sprain (when there is stretching or tearing of a ligament).

A strain can happen when some or all of the muscle fibres fail to cope with the demands placed upon them. Strains generally occur when there is a sudden acceleration of movement. There are three grades (also referred to as degrees) of muscle strain, from grade 1 (first degree), which affects a small number of fibres causing localised pain (and minor damage) but no loss of strength; escalating to a grade 3 (third-degree) strain, which is a complete tear in the muscle, causing extensive damage. These levels of damage can be clearly seen in figure 16.2.

A sprain is damage or a tear to a ligament that connects the bones in a joint. Like muscle strains, ligament sprains are also graded. A grade 1 (first-degree) sprain is when there are some stretched fibres in the ligament, but generally the joint still has a normal range of motion, with some pain and a relatively minor amount of damage. A grade 2

vary in severity and while most are relatively minor and do not limit participation, occasionally damage may occur at a deeper level and potentially result in severe bleeding. A deep penetrating contusion can cause a haematoma and blood clotting. When treating a contusion, the aim is to minimise the bleeding and swelling, and then use carefully controlled soft tissue therapy to reabsorb the blood clot, and continue stretching and strengthening the muscle.

Skin abrasions, lacerations and blisters

Skin abrasions, lacerations and blisters are very common basic, external soft tissue injuries.

Abrasions

An abrasion occurs when the surface layers of the skin (epidermis) have been broken or removed through a scraping action. Abrasions usually occur as the result of rubbing against a hard dry surface (such as a gravel road or velodrome surface after falling from a bike) and various outdoor all-weather courts and playgrounds. An abrasion can often result in an open wound that may contain embedded dirt or other foreign particles (such as gravel), which can be removed through cleansing to decrease discomfort, and sterilised to prevent infection. More serious abrasions require further medical attention.

Lacerations

A laceration (often referred to as a cut) causes damage to the skin and underlying tissue and can vary in severity depending on the depth of the wound suffered. A laceration is the result of an irregular tear, so the location of the laceration determines the type and nature of treatment required. This may involve stitches (sutures) and medical assistance. Lacerations are often accompanied by bleeding and the more severe the laceration, the more significant the bleeding. The following treatment should be applied to abrasions and lacerations:

- Stop any associated bleeding by applying pressure to injured part and elevate.
- Prevent infection by cleaning the wound thoroughly with a sterile irrigation.
- Apply a non-adherent dressing.
- Immobilise the wound if it is over a constantly moving part (joint), such as the knee or elbow.

Blisters

A blister occurs when the outer layers of the skin separate due to excessive friction and cause a pocket of fluid (sometimes blood, if damage has occurred to blood vessels) to form. Blisters can be painful and can result from such things as the rubbing caused by equipment (such as new shoes) and the use of equipment for an extended period of time (such as holding a racquet or a bat). Initial management requires rest for 24 hours and following this time the blister may dissipate and disappear. If, after this time, the blister is still of concern, medical advice may be needed in order to release any built-up pressure. Blisters may result in the removal of surrounding skin. If this occurs, after cleansing and sterilising the blister, the use of a protective dressing will assist with the healing process and decrease the chance of further damage occurring at the site. Nobody should attempt to burst a blister because this increases the chance of infection.

Inflammatory response

The inflammatory response is the body's natural healing response following soft tissue damage. Its main functions are to defend the body against harmful substances, dispose of dead or dying tissue and promote the renewal of normal tissue. This process may last up to 72 hours following injury.

The inflammatory response progresses through three distinct phases.

Phase 1: Acute inflammatory response

This phase begins immediately after injury and lasts for about 24–72 hours, until damaged tissue has been removed and a new capillary network has been formed. Several symptoms are immediate, including tissues in the area becoming red, painful, swollen and warm as a result of increased blood flow to the injured area. The increased blood flow is to facilitate the proteins required to repair the tissue reaching the site. The area is painful because the tissues have expanded, causing pressure on nerve cells.

Vascular changes that occur during this phase:

- vasoconstriction: immediate decrease in blood flow to injured area for the first 5–10 minutes after injury
- vasodilation: increased blood flow after about 10 minutes to begin cellular changes.

There are also a number of cellular changes that occur during this phase. They start the chemical reactions needed to neutralise or destroy offending agents, restricting tissue damage and preparing the area for healing.

Phase 2: Proliferation or repair (regenerative) phase

This phase lasts between 48 hours and three to six weeks. It eliminates and removes debris and begins the process of forming new fibres and temporary repair with scar formation (fibroplasia).

This repair phase is undertaken in three stages:

- resolution: dead cells and cellular debris are removed by phagocytosis
- regeneration: damaged tissue is replaced by cells of the same type
- repair: original tissue is replaced with scar tissue.

Phase 3: Maturing or remodelling phase

This phase usually begins around week three and can last six weeks to a number of months. It is characterised by an increase in the production of scar tissue and the process of new cells beginning to mould or model into their surroundings to once again produce a functioning replacement tissue. This involves the laying down of collagen and strengthening of fibres to increase strength of repaired or replaced tissues. Monitored rehabilitation is essential for the strength and development of the new tissue; too much exercise of the injured tissue too early can cause further damage, while too little exercise will allow excessive scar tissue to form, inhibiting strength and flexibility.

Steps to help the inflammatory response heal (NO HARM)

The immediate aim of treatment is to reduce swelling and prevent further damage from occurring. The ‘NO HARM’ policy should be applied in the first 72 hours following injury.

- NO Heat, such as having a sauna, spa, hot shower or bath, or applying a hot water bottle or hot liniment (because this increases bleeding).
- NO Alcohol intake (because this increases swelling).
- NO Running or exercising too soon (because this can make the injury worse).
- NO Massage or using heat rubs in the first 48–72 hours (because this increases bleeding and swelling).

Managing soft tissue injuries

The initial management of soft tissue damage after an injury is vital to the recovery process, in order to:

- minimise tissue damage
- minimise inflammation

- prevent further tissue damage
- remove blood clot and tissue swelling early and efficiently
- minimise scarring of damaged tissue
- regain full function before returning to sport activity
- enable the doctor or physiotherapist to make an early diagnosis because the swelling is reduced
- reduce rehabilitation time to allow early and complete return to sport.

Immediate treatment of skin injuries

When dealing with skin injuries such as lacerations and abrasions the immediate concerns are to prevent infection and minimise loss of blood and damage to surrounding tissue. Management of skin injuries includes:

- controlling bleeding through pressure and elevation, reducing movement where possible
- cleaning the site (soap and warm water) and sterilisation
- applying an antiseptic agent (such as a cream) to the wound
- applying a dressing (sterile pad or bandage).

Depending on the severity of the wound, medical assistance may be required for suturing and (depending on the situation) tetanus shots may also be required. Any injury that shows signs of infection, contains material that could not be removed during cleaning, is associated with the head (risk of concussion), or has excessive bleeding, should be referred for medical attention.

Initial injury management and swelling control is critical because swelling can result in increased pressure to the injured area, causing pain and altered neuromuscular function. Swelling slows the healing process and normal function is not regained until swelling is eliminated. The recommended management principle to control and reduce bleeding and swelling is called RICER (see table 16.2).

Table 16.2 RICER

	How	Why
Rest	Control the mobility of the injury rather than completely immobilising it Rest the injured site for 24–48 hours before engaging in active rehabilitation, depending on the severity of injury	Without rest, external stresses are still placed on the injured area, interfering with the healing process and prolonging recovery Restricts blood flow to injured site
Ice	Apply ice over the injury and surrounding tissue for 10–20 minutes every two hours Conventional methods: <ul style="list-style-type: none"> - crushed ice in a wet towel or plastic bag - a frozen cup of water moving continuously over the area - a commercial ice pack - immersion in iced water Note: <ul style="list-style-type: none"> - Do not apply ice directly to the skin. Wrap the ice in wet cloth or towel to avoid ice burns - Ice should not be applied to an area if you are sensitive to cold or you have circulatory problems - Children have a lower tolerance to ice treatment 	Ice decreases bleeding, swelling and localised pain Ice decreases muscle spasms and secondary damage to injured site



>>	How	Why
Compression	Apply compression to the injured area. This is the single most important factor in swelling control because it mechanically reduces the space available for swelling to spread and increase Apply an elastic wrap to achieve a firm and even pressure to the injury Maintain compression continuously for 72 hours, depending on the severity of the injury For chronic inflammatory conditions, compression should be applied until the swelling is almost entirely gone	Reduces bleeding and swelling Provides support for injured area
Elevation	Elevate the injured area as often as possible during the first 72 hours of the acute injury, depending on its severity Elevate the injured area above the level of the heart, where possible Elevating the injured site: <ul style="list-style-type: none"> - eliminates the effects of gravity on blood pooling - assists in venous and lymphatic drainage of blood and other fluids from the injured area 	Reduces bleeding, swelling and pain
Referral	Refer to a doctor or physiotherapist	Provides definitive diagnosis of injury and management process for rehabilitation
Actions to avoid (HARM)	Applying heat in the first 48–72 hours Drinking alcohol Physical activity such as running or massage	Each of these actions will increase blood flow, leading to increased swelling

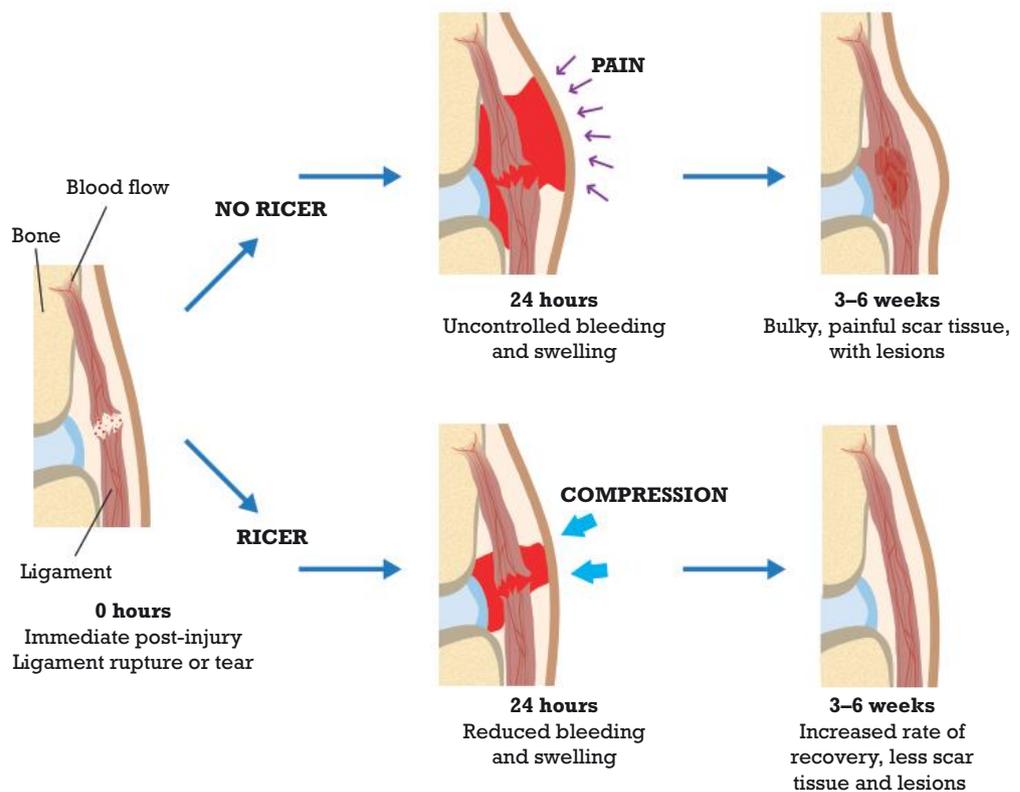
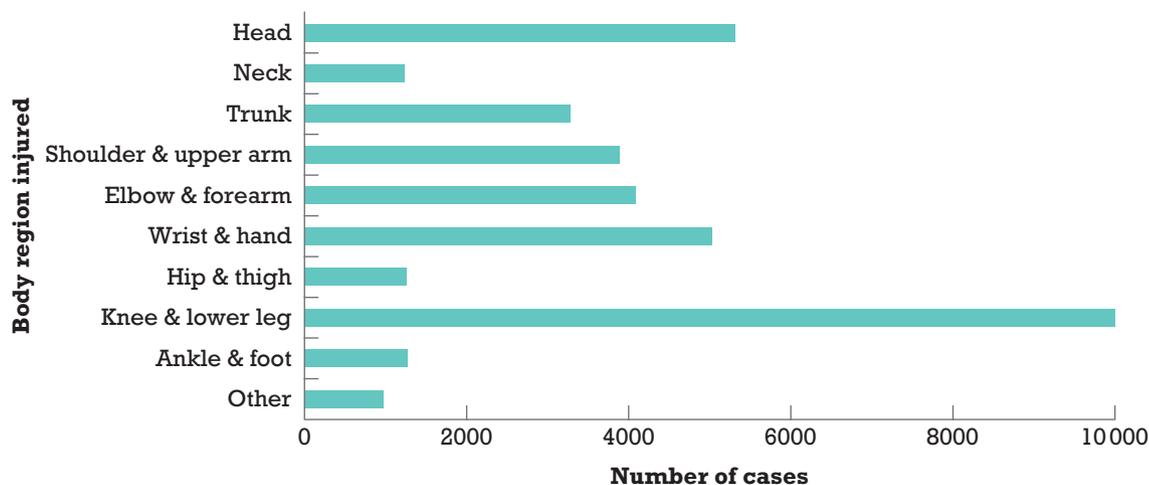


Figure 16.4 Management of a soft tissue injury using RICE

Investigate

For more information regarding soft tissue injuries visit the Sports Medicine Australia website.



Source: Australian Sports Injury Hospitalisations 2011-12. Australian Institute of Health and Welfare 2014, Canberra. CC-BY 3.0 licence. (<http://creativecommons.org/licenses/by/3.0/au/>).

Figure 16.5 Cases of sports injury hospitalisation by body region injured, Australia 2011–12

Investigate

- 1 Download *Australian sports injury hospitalisations* (most recent version) from the AIHW website. Select TWO sports from the document and analyse the hard tissue injuries and body regions they affect. Why are these body regions likely to be injured?
- 2 Analyse the information in figure 16.5. Choose TWO body regions and identify the types of injuries that could occur to these body regions and why. Consider age, gender and participation levels.



HARD TISSUE INJURIES

In this section we look at how to manage hard tissue injuries through assessment and immobilisation. These injuries apply to the bones and the teeth and the most common hard tissue injuries are fractures and dislocations.

Fractures

A fracture is a crack, chip or break in the bone. Where bones are still growing in young children, the bone may crack, split or bend (like a tree branch) and this is usually referred to as a greenstick fracture. There are four main categories of fractures: complete, incomplete, simple and compound.

Complete and incomplete fractures refer to the way the bone breaks. In a complete fracture, the bone snaps into two or more parts; in an incomplete fracture, the bone cracks but does not break all the way through. In a simple fracture (also called a closed fracture), the bone breaks but there is no open wound in the skin. However, in a compound fracture (also called an open fracture),



Figure 16.6 Compound fracture with bone breaking through the skin

Shutterstock.com/decade3d-anatomy online

the bone breaks through the skin. A fracture can also be considered complicated if there is damage to nearby tissue. Other types of fractures include depressed, comminuted and oblique (look for photos of these online). Symptoms and possible causes of bone injuries are given in table 16.1.

Investigate

With a partner, find photos of different fractures, and prepare a poster that clearly shows the different types.

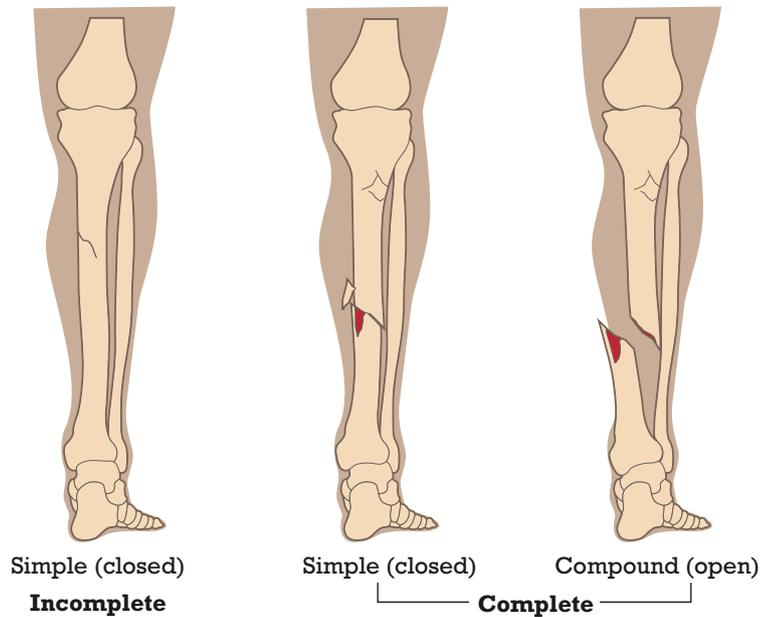


Figure 16.7 Types of hard tissue fractures

Dislocation

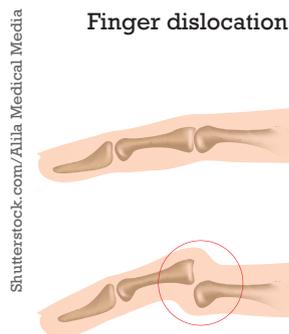
A dislocation is an injury to a joint where a bone has been displaced from the joint structure. This can happen spontaneously or as a result of trauma, and may have associated fractures. Dislocations can be painful and are often visible due to the deformity caused by the displacement (as seen in figure 16.8). Often a bone can be displaced but not necessarily broken, causing damage to the surrounding connective tissue (muscles, ligaments and tendons that support the joint).

Signs and symptoms of a dislocation include:

- loss of movement or function
- deformity
- pain and tenderness at site of injury.

FYI

When a tooth is injured, appropriate treatment is vital to its survival. It is important to locate the tooth and rinse it in milk, or the injured person's own saliva. (Use water as a last resort to rinse the tooth because chlorine will damage the it.) Holding the crown (the white part), reinsert the tooth into its socket. If the tooth cannot be reinserted, place it in milk and take it with the injured person to the dentist.



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Shoulder dislocation

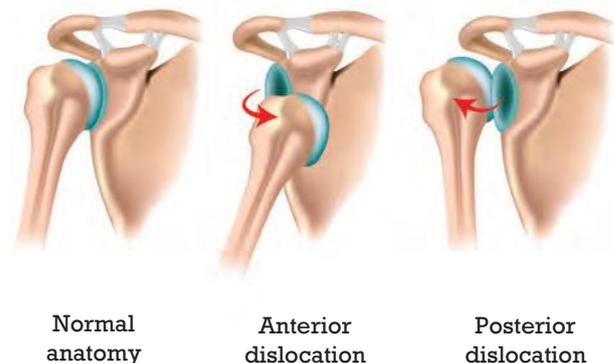


Figure 16.8 Dislocation of the finger and shoulder

Managing hard tissue injuries

In the event of a hard tissue injury it is important to minimise the risk of further damage and to make the injured athlete as comfortable as possible. This is best done by immobilising and supporting the injury site, where possible, to:

- reduce the pain
- reduce serious bleeding and shock
- prevent further internal or external damage
- prevent a closed fracture from becoming an open fracture.

Immobilisation

One of the aims of hard tissue injury management is to reduce any movement to the injured area in order to limit discomfort. The most common way to achieve this is by immobilising the joints both above and below the injured site (as can be seen in figure 16.9). When the injury occurs to a long bone (such as the tibia), the injury can be supported with a splint or a sling. A splint can be a rigid object (as in figure 16.9) or another limb or part of the body.

MANAGING FRACTURES

Managing fractures: a compound fracture to the tibia.

- Follow DRSABCD.
- Control any bleeding.
- Check for fractures (open or closed).

Immobilise the fracture by applying a splint to prevent movement in the following way:

- Gently bring uninjured leg to injured leg, padding in between them.
- Bandage around the ankles and feet in figure of eight.
- Bandage the legs together above the knees, tying on the uninjured side.
- Check every 15 minutes that the bandages are not too tight or loose.

Note: support is above and below the injury site, where possible.

- Watch for signs of loss of circulation in the feet.
- Monitor the injured person carefully until help arrives.



Alamy Stock Photo/Mediscaut

Figure 16.9 Managing and immobilising a compound fracture to the tibia

Managing dislocations

A dislocation occurs at a joint when one bone becomes displaced from another. This often includes damage to the surrounding joint tissue. The joints most frequently affected are the shoulders, elbows, fingers, hips, kneecaps and ankles. Dislocations can be painful and the site of injury is often easy to identify as a result of the associated deformity to the joint structure

where the dislocation has occurred. As with a fracture, immobilisation is the immediate aim when treating a dislocation. When providing first aid there should be no attempt to rectify the dislocation; rather, medical assistance should always be sought. There is a high possibility that attempting to relocate the joint will cause further damage. The dislocation needs to be supported in a comfortable position and, if possible, a splint should be applied. Also, applying the RICER regime will reduce the swelling. Medical advice should be sought immediately.

Posters

Create two posters or flyers designed to inform the local school/student community about the management of

- soft tissue injuries
- hard tissue injuries.

Posters/flyers should be designed for display at school or local club sporting events (similar to RLSSA aquatic response charts).

INJURY ASSESSMENT

Performing assessment procedures will determine the nature and extent of injury in simulated scenarios.

TOTAPS

When an injury occurs it is important to assess the incident or injury before taking any action. The initial response of DRSABCD should be applied – this stands for Danger, Response, Airway, Breathing, Circulation, Defibrillation. However, in most sports injury cases the athlete is conscious, allowing the trainer to continue an assessment of the injury.

Talk

Talk to the injured athlete to determine what has happened and what they may have heard. Ask the athlete a range of questions to gather as much information as possible. Is there any pain? Where is the location of the pain? Is the pain getting worse? Was there a crack or snap heard?

Observe

Look at the injured site to see if there is any swelling, deformity, discolouration or bleeding. Where possible, compare the injury to the other side of the body.

Touch

Gently feel the area for anything that feels out of place or unusual. Begin away from the injured site and work towards the site, to gauge increase in pain.

Active movement

Ask the athlete to move the injured body part. If the athlete can move, check the site for any signs of significant damage, such as grating or clicking. If they are unable to move or continue, seek further medical attention. If the athlete can move freely and without pain, move to the next step.

Passive movement

Move the athlete's limb gently and slowly. Stop at the point of pain or movement restriction. Do not allow a return to play unless there is a full or normal range of pain-free movement.

LEARNING TIP

TOTAPS is the accepted assessment process for an injury to see if medical attention is required or if activity can resume. It involves the following to assess the extent of the injury:

Talk

Observe

Touch

Active movement

Passive movement

Skills test

Skills test

Ask the athlete to stand up, walk and jog slowly. Ask them to perform a skill of the sport they were playing. Only allow a return to play if the athlete is free of pain.

TOTAPS

Apply TOTAPS and outline the appropriate treatment for the following incidents:

- a tennis player has rolled their ankle on the court
- an AFL player has been kneed in the thigh by another player
- a rugby player has received a cut to the forehead
- a mountain bike rider has a compound fracture to the lower leg
- a basketball player has suffered a dislocated finger.

Flash cards

In small groups, prepare scenario-based flash cards that identify a simulated injury scenario. Give your card to another group to perform the scenario. Each scenario needs to be accompanied by appropriate response steps and procedures.

Review and apply

- 1 Describe the differences between direct and indirect injuries.
- 2 Explain why hard tissue injuries can often be more serious than soft tissue injuries. Define soft tissue and hard tissue injuries.
- 3 How is a strain different to a sprain?
- 4 Why is it advantageous to apply the RICER regime in management of a soft tissue injury?
- 5 Outline the three phases of the inflammatory response. Why is this process significant to the rehabilitation of a soft tissue injury?

CHAPTER SUMMARY

- Sports injuries can be classified as direct, indirect, overuse, soft tissue and hard tissue, depending on the nature and cause of the injury.
- Common soft tissue injuries include strains, sprains, contusions and skin injuries. The RICER regime is recommended for immediate treatment of soft tissue injuries.
- Hard tissue injuries include fractures and dislocations. Immobilisation reduces any movement to an injured area. When the injury occurs to a long bone (such as the tibia) the injury can be supported with a splint or a sling.
- There are three phases of the healing process for soft tissue injuries:
 - 1 acute inflammatory response phase
 - 2 proliferation or repair phase
 - 3 maturing or remodelling phase.
- TOTAPS (talk, observe, touch, active movement, passive movement, skills test) is the recommended process for immediate assessment of an injury.



CHAPTER 17

Sports medicine for athletes

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CHILDREN AND YOUNG ATHLETES

Children and young athletes have particular needs in regards to physical activity. The participation levels and athletic performance of children and young athletes can be affected by certain medical conditions, coaching techniques and safety issues. Health and safety should be the first priority for children involved in sporting activities. All coaching staff, sports officials and sports medicine practitioners should ensure that they are made aware of any child's medical condition and associated treatment and management. This is crucial for children's participation in sport if it is to be an enjoyable experience. Some of the many issues of concern include medical conditions such as asthma, diabetes and epilepsy, along with resistance training, thermoregulation and overuse injuries.

Group activity

In groups, create a table highlighting three medical conditions that affect the participation of children and young athletes in sport. For each condition develop a range of prevention strategies to reduce risk and promote wellbeing.

Medical conditions

Three of the most common medical conditions that children and young athletes have to manage while participating in sport are asthma, diabetes and epilepsy.

Asthma

Asthma affects more than 10 per cent (approximately 2.3 million) of all Australians, with one in six children suffering from this condition. People with asthma have sensitive airways. When the airways are exposed to certain triggers, individuals can suffer what is known as an 'asthma attack', which causes the airways leading to the lungs to become narrow and make breathing more difficult. This is due to a combination of the muscle around the airways tightening (bronchoconstriction), increased swelling and inflammation of the lining of the airways and an increase in mucus production.

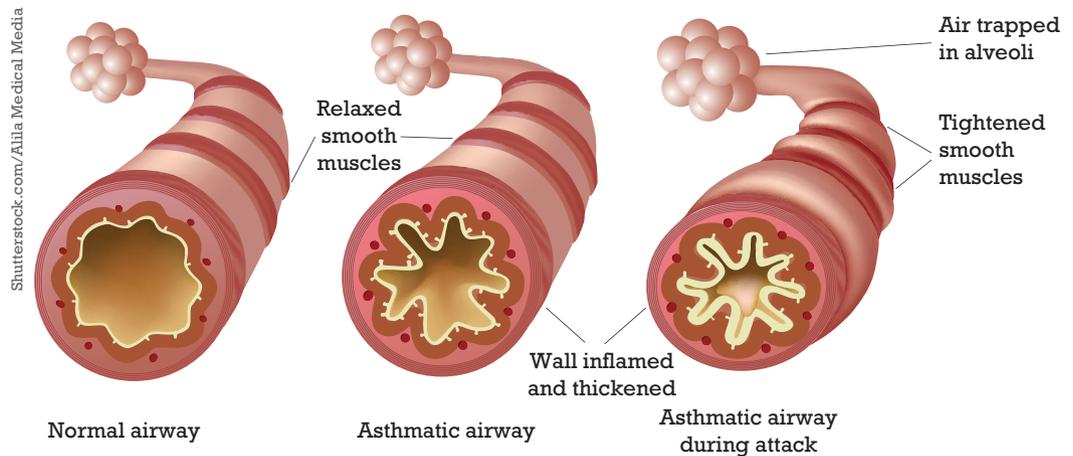


Figure 17.1 During an asthma attack the lining of the airways becomes narrow and extra mucus is produced.



Figure 17.2 Exercise can induce asthma but with the correct management techniques this should not be seen as a barrier to participation.

Physical activity can bring on an asthma attack. This is called exercise-induced asthma (EIA). While this can occur at the start of an activity, it often happens after exercise. This is a result of the airways constricting immediately after stopping because nerve endings in the air passageways cool. A number of factors can make the condition worse, including cold dry air and the type or intensity of the activity being undertaken. For example, running in cold dry air is more likely to trigger EIA than swimming in a humid water environment where the air being breathed in by the athlete does not have the same cooling influence on the airways.

However, sport and exercise should be encouraged in children with asthma, not limited or avoided. It is vital for sports coaches to have a treatment management plan (such as the one in table 17.1) to help children with asthma to participate in sport with confidence and enjoyment.

Table 17.1 Management plan for asthma sufferers

Strategies to reduce risk	Signs and symptoms	Management
<ul style="list-style-type: none"> • Avoid potential triggers (e.g. colds or flu, allergens, environmental factors, chemicals, preservatives, emotional factors) • Ensure a suitable warm-up occurs • Ensure preventative medication is taken, if appropriate • Monitor progress constantly throughout participation, and treat as necessary with rests and medication 	<ul style="list-style-type: none"> • Tightness in the chest • Difficulty breathing (particularly exhaling) • Wheezing • Pale and sweaty skin • Shortness of breath, or rapid shallow breathing • Blue around the lips, earlobes and fingertips • Coughing 	<ul style="list-style-type: none"> • Reassure sufferer • Assist asthmatic to sit and help them to administer four puffs of the prescribed asthma medication (reliever inhaler), using a spacer if possible • Encourage sufferer to relax and control their breathing. If no visible improvement after four minutes, repeat medication • Seek medical advice if breathing does not appear to improve

Diabetes

Diabetes is a condition in which the body is unable to properly maintain blood sugar (called glucose) levels. There are three main types of diabetes: type 1, type 2 and gestational diabetes.

Type 1 diabetes

This occurs when the pancreas does not produce insulin. It is one of the most common chronic childhood conditions. Symptoms include excessive thirst and urination, unexplained weight loss, weakness, fatigue and blurred vision. It is managed through insulin injections.

Type 2 diabetes

This is a progressive condition leading to the body becoming resistant to the normal effects of insulin or losing the capacity to produce insulin. It is linked to family history and lifestyle and is managed through a combination of physical activity, diet and weight control.

Gestational diabetes mellitus (GDM)

This occurs during pregnancy and usually disappears once the baby is born. It is estimated that between 5–10 per cent of women will develop GDM and it usually occurs around the 24th to 28th week of pregnancy.

Insulin is a hormone made in the pancreas, which circulates in the bloodstream to help glucose get into the body's cells to produce energy to function. Glucose cannot enter the body's cells without insulin. Two critical conditions affect diabetics. The first is hypoglycaemia (low blood glucose) where there is not enough insulin entering the body's cells for them to produce energy. The second is hyperglycaemia (high blood glucose) where too much insulin is produced; it gradually builds up and passes out into the urine, causing constant urination and thirst from dehydration. Table 17.2 outlines a management plan to address these two critical conditions.

For all children, the immediate benefits of regular physical activity are improved cardiovascular fitness, enhanced psychosocial wellbeing and reduced fat storage. For children with diabetes, the additional benefits from such activity may also include blood glucose control and enhanced insulin sensitivity. However, for these children, engagement in vigorous physical activity and sport must be properly controlled by monitoring blood levels and, if needed, modifications in insulin therapy and nutritional intake so that the advantages of exercise outweigh the risks.



Weblink

Investigate

For more information visit the Asthma Australia website or follow the link.



Weblink

Investigate

For more information visit the Diabetes Australia website.

Table 17.2 Treatment management plan for diabetics

Strategies to reduce risk	Signs and symptoms	Management
<p>Pay attention to specific dietary needs of the young athlete</p> <p>Monitor blood glucose levels</p> <p>Be aware of the young athlete's limitations</p> <p>Ensure medication has been administered appropriately</p> <p>Provide close supervision during activity</p> <p>Ensure glucose supplements are readily available</p>	<p>Hypoglycaemia (low blood glucose)</p> <p>Physical symptoms:</p> <ul style="list-style-type: none"> - shaking, dizziness and hunger - fast heartbeat - tingling around the mouth and lips - tired or weak - sweating and a headache <p>If not treated, sufferer will:</p> <ul style="list-style-type: none"> - become confused - have slurred speech - behave as if drunk - suffer drowsiness, which may lead to unconsciousness 	<p>Hypoglycaemia</p> <p>Give the sufferer a sugary substance quickly, such as:</p> <ul style="list-style-type: none"> - 5–7 jelly beans - glass of soft drink (not diet) - glass of fruit juice - 2–4 teaspoons of sugar or honey <p>If the sufferer is not feeling better in 5–10 minutes, give them some more sugar</p> <p>After sugar intake, offer the sufferer some carbohydrate (starchy) food, such as:</p> <ul style="list-style-type: none"> - piece of fruit - glass of milk - sandwich - 2–4 dry biscuits <p>If the sufferer becomes unconscious, apply DRSABCD (Danger, Response, Airway, Breathing, Circulation, Defibrillation) and call '000'</p>
	<p>Hyperglycaemia (high blood glucose)</p> <p>Physical symptoms:</p> <ul style="list-style-type: none"> - feeling constantly thirsty - frequently passing large volumes of urine - rapid pulse - breath smells of acetone - tired, dizzy or faint <p>If not treated, sufferer will:</p> <ul style="list-style-type: none"> - have blurred vision - suffer drowsiness, which may lead to unconsciousness 	<p>Hyperglycaemia</p> <p>Apply DRSABCD</p> <p>Give the sufferer nothing to eat or drink</p> <p>If the sufferer is conscious, allow them to administer medication and seek medical advice</p>



Weblink

Investigate

For more information visit the Epilepsy Action Australia website.

Epilepsy

Epilepsy is the world's most serious brain disorder (there are approximately 65 million sufferers) and is characterised by recurring seizures. A seizure is a sudden surge of electrical activity in the brain. When a young person experiences sudden bursts of this electrochemical activity, it can upset the normal function of their brain and disrupt the brain's messages to the body. These disruptions can vary from a brief loss of consciousness (petit mal) to muscular spasms and convulsions (grand mal).

It is often thought that children who suffer from epilepsy should not play sport but this is misguided advice. The opportunity to be able to participate in sport and leisure activities is important for everyone. Through self-management, many people with epilepsy are able to control their seizures (by taking anti-epileptic medication) and do not need to take any greater safety precautions than non-sufferers. Epilepsy should not be considered a barrier to achievement. It is important, however, to ensure that adequate supervision is provided during activities such as swimming, and that if a child does suffer a seizure while participating in physical activity, people around them know what to do. From the first instance of seizure, a person

nearby must protect the sufferer from hurting themselves by falling against any objects, such as furniture. Treatment management guidelines for epilepsy are provided in table 17.3.

Table 17.3 Treatment management plan for epilepsy

Strategies to reduce risk	Signs and symptoms	Management
<ul style="list-style-type: none"> • Be aware of the triggers, type and extent of children’s seizures • Be aware of the limitations of the young athlete with this condition • Closely supervise the activity or sport • Avoid certain sports that may not be appropriate, such as water or contact sports • Ensure medication is administered, if required 	<ul style="list-style-type: none"> • <i>Petit mal</i> seizures may go unnoticed because the sufferer may tend to stare, have temporary memory loss or odd movements • <i>Grand mal</i> seizures occur when the sufferer suddenly cries out and falls to the ground; their body is rigid with jerking movements 	<ul style="list-style-type: none"> • Ensure the sufferer’s safety by clearing the immediate area of any hard or protruding objects • Never restrain the sufferer or place anything in their mouth • Reassure and comfort the sufferer once the seizure has passed, and seek medical help • Apply DRSABCD if the sufferer becomes unconscious, and seek urgent medical help, but remain with the sufferer

Overuse injuries (stress fractures)

Overuse injuries occur from repetitive actions that place repetitive stress on body parts such as bones, muscles and tendons. They are common in children and young athletes. Any child who plays sport can develop overuse injuries, and the more the same sport is played, the more likely the child is to experience an overuse injury. Both parents and children should keep track of ongoing aches or pains because these may be the early signs of an overuse injury. Common overuse injuries include shin splints, stress fractures and tendonitis.

Children can be particularly susceptible to sports injuries for a variety of reasons, many of which are related to their physical growth and development. As a child grows and develops, or has ‘growth spurts’, the potential for injury increases, largely because of the amount of force placed on the bones. During these growth periods a young athlete’s performance may go backwards and there is a tendency to blame their lack of commitment on the coach or manager increasing workload and in doing so increasing the risk of overuse injury. However, in reality athletes at this age may require greater recovery periods and have increased nutritional needs.

Overuse injuries in children can be caused or aggravated by:

- growth spurts or an imbalance between strength and flexibility
- inadequate warm-up
- excessive activity, such as increased intensity, duration or frequency of playing and/or training
- playing the same sport year-round or multiple sports during the same season
- improper technique, such as overextending on a baseball pitch
- unsuitable equipment, such as non-supportive athletic shoes.

Young athletes are not small adults. Their bones, muscles, tendons and ligaments are still growing and that makes them more prone to injury. Growth plates – the areas of developing cartilage where bone growth occurs in growing children – are weaker than the nearby ligaments and tendons. As a result, what is often a bruise or sprain in an adult can be a potentially serious growth-plate injury in a child. Similarly, a muscle or ligament tear in an adult would be far more likely to break a child’s bone.

Stress fractures and overuse injuries may be caused by initial increased activity in an unfit child or by repetitive activity in an elite year-round athlete. They are now found more frequently in younger children because competitive sports have increased their training demands, and because children, adolescents and young adults are now competing throughout the year. In gymnastics, for example, repetitive loading of the wrists can injure the distal radial growth plate.



Investigate

For more information regarding overuse injuries in children and young athletes visit the Sports Medicine Australia website.

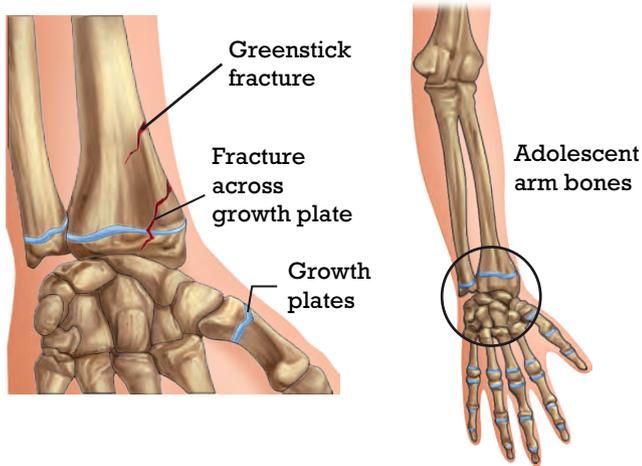


Figure 17.3 Growth plates

FYI

Children's poor thermoregulation means they are at greater risk in hot and cold environments. Children have a faster rate of heat loss than adults and are at a greater risk of suffering from hypothermia, a cold-induced condition of abnormally low body temperature. They are also at greater risk in hot environments of suffering from hyperthermia, referring to heat-induced conditions such as heat exhaustion and heat stroke.

Alamy Stock Photo/Dmitry Travnikov



Figure 17.4 Climatic conditions need to be considered in children's sport to prevent overheating.

young athletes are scheduled to perform in conditions where the ambient air temperature is 34 °C or higher should be postponed or cancelled.

Strategies to prevent the risk of heat illnesses in young athletes include:

- playing in sufficient shade to minimise heat exposure
- taking regular drink breaks to ensure hydration is adequate in hotter conditions
- wearing appropriate clothing for both hot and cold conditions
- avoiding vigorous activity in extreme conditions; for example, playing early in the day to avoid heat.

Appropriate resistance training

The appropriateness of resistance training for young athletes has been the source of much debate; however, medical associations have supported training provided there is appropriate supervision and adherence to guidelines. Perhaps the most important factor to designing a training program is *individualisation*.

If a parent or sports coach suspects an overuse injury, then it is important to get it checked by a health care professional. Physiotherapists and other sports medicine practitioners are trained in assessing such injuries, and can provide all the advice and treatment outlined above, enabling the child to continue playing sport.

Overuse injuries heal quite quickly in children. It is important that the child adheres to the activity restrictions and/or stretching and strengthening rehabilitation programs to prevent re-injury. Also, the process must be supervised by a qualified health professional. Management of overuse injuries normally requires the athlete to stop the movement that has been identified as the cause of the injury and to rest the injured body part.

Thermoregulation

Young athletes are more susceptible than adults to climate-related illnesses because they have a relatively poor ability to adapt to a rise in body temperature during exercise. The physiological differences between children and adults place children at a greater risk of suffering from heat illness. Children tend to have a much lower capacity to sweat, which reduces their ability to expend the heat that builds up in their bodies. These differences impact on a child's ability to respond to environmental heat and acclimatise to hot or cold conditions.

Poor thermoregulation requires the monitoring of children's body temperature in both hot and cold conditions. Events and activities where

Sports trainers should evaluate each child's physical and mental ability, interest level, prior experience and individual goals. A properly designed and supervised program will help improve a child's overall health and sense of psychosocial wellbeing. Evidence suggests that resistance training (also referred to as 'weight lifting') can help strengthen muscles to prevent injuries sustained while playing sport. It is recommended that children train only two or three times a week and that each session lasts no longer than 30 minutes. Technique must be perfected using light weights before resistance is attempted.

Regular exercise does not appear to significantly affect height, but it will usually reduce body fat and increase muscle mass and bodyweight. A child should avoid doing any resistance training using heavy weights (such as 1 RM) until they reach puberty, to reduce risk of long-term injury to body parts such as growth plates.

Survey

With the class divided into four groups, each group chooses one of the topics discussed (medical conditions/overuse injuries/thermoregulation/resistance training). They survey friends/neighbours about problems they remember having (from the chosen condition) when they or their children played sport as young people. Groups then pool their results/anecdotes before holding a class discussion about how these conditions are managed in different sporting areas.

Class activity

- 1 As a class, create a table listing medical conditions and injuries that affect the participation of children in sport. Include risk management, treatment and how the injuries may be prevented.
- 2 Class divides into smaller groups. Each group chooses one of the topics (i.e. medical conditions/overuse injuries/thermoregulation/resistance training) to research. They prepare a presentation to inform the class about how this condition could impact on participation.
- 3 Each presentation should have at least one example of how a particular sport has addressed this issue for young athletes.

Optional activity

Create a modified game or sport suitable for young children. Justify why the sport would be suitable for children and the aim of the game.

Be sure to include details such as the number of players (e.g. a number that allows for all to be safely involved and maximises participation), the dimensions of the playing field or court (e.g. a particular surface type), any equipment to be used or modified, and an outline of the rules associated with the game, including scoring.

ADULT AND AGED ATHLETES

Older people can gain as many benefits from exercising as young people can. These include maintaining a normal weight for their age, reducing the risk of **osteoporosis**, controlling diabetes and hypertension. Quality of life can be improved through improvements in strength, balance, coordination and mobility. If returning to exercise after an extended time frame, it is important for aged people to start slowly; even walking 10 minutes a day can provide great



Weblink

Investigate

Go to the Healthdirect website and investigate the physical activity guidelines for older adults. Or you can follow the link.



Weblink

Investigate

Visit the Heart Foundation website to find more tips on how aged people with cardiovascular disease (CVD) can stay active and manage their condition.

benefits. However, medical conditions associated with increasing age must be considered when participating in any kind of exercise activity.

The Australian Government's Department of Health has published recommendations on physical activity for older Australians. These can be found on the Healthdirect Australia website.

Heart conditions

Older people with heart conditions need to be aware of suitable options for exercising, and to what extent they can participate. Safety should always come first, and medical advice should always be sought to discuss any limitations. People with existing heart conditions should obtain clearance prior to beginning exercise to limit potential risks.

An aged athlete should begin exercise gradually and choose suitable activities to match personal capabilities, starting with easier exercises for shorter periods, and then increasing in time and intensity towards their goals. An adult or aged athlete with a heart condition should avoid high-intensity activity.

Some general recommendations for older people when returning to an exercise regime include:

- Undertake warm-up and cool-down periods to avoid placing the heart under any sudden stress resulting in changes that could burden it.
- Avoid holding breath during exercise.
- Get sufficient rest after exercise.
- Begin exercising on two to three alternating days a week. Daily exercise is not critical but a goal of four to five days a week is recommended.
- Begin with five to 10 minutes per exercise session; 30–60 minutes a day is considered an adequate goal. If a full hour is desired, total time can be divided into two sessions.
- Low- to medium-intensity activities are recommended, such as: walking, jogging, bicycling, low-impact aerobics, calisthenics, Pilates, yoga, beginning - to intermediate - level dance, water aerobics and stretches with elastic devices.

Ageing muscles and bones are more easily injured and take longer to recover; and as bone density decreases, muscles become less elastic. In order to maintain consistent good health and wellbeing, older people should be aware of the intensity of exercise in relation to the type and level of activity.

Fractures and bone density

A fracture refers to a break in the bone. A fracture is more likely to occur when bones are brittle or have poor bone density. Osteoporosis is the thinning of bone tissue and subsequent loss of bone density due to calcium loss. It is the most common type of bone disease in ageing adults and leads to loss of strength in bones, which become frail, brittle and more susceptible to breaks. Breaks are most common in the spine, hip and wrist and are often associated with minor falls. Minimising the risk of falls during activity is therefore important.

Osteoporosis particularly affects women in their middle and later years. Regular physical activity has been linked to increased bone mass, with the positive result of strengthening bones, making them less susceptible to breaks.

Athletes with bone loss or osteoporosis should seek medical advice before beginning any exercise program. It is also important to identify any potential fall risks; for example, as a result of balance problems.

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Figure 17.5 Exercise increases wellbeing.

Exercise should not be high impact, such as running and jumping. Activities such as these may put stress on the spine and lead to fractures in weakened bones. Gentler options include low weight-bearing-impact exercise such as walking, dancing, low-impact aerobics, swimming and gardening. Care should be taken with exercises that involve bending and twisting at the waist. This motion can increase the risk of a fracture. Resistance training can be beneficial for aged athletes to increase bone density.

Flexibility and joint mobility

Joint mobility and flexibility (the body's ability to move in a full range of motion) decreases with age due to the reduction of elasticity in the muscles, tendons and ligaments.

Common conditions include:

- **osteoarthritis:** the cartilage within the joint breaks down, causing pain and stiffness
- **rheumatoid arthritis:** inflammation of the joints, causing painful deformity and immobility
- muscle weakness and pain.

Many age-related changes to joints can be linked to a lack of activity. The cartilage found in joints does not have a blood supply and so relies on synovial fluid moving in and out of the joint to nourish it and take away wastes. This involves joint movement and some joint stress.

A sedentary lifestyle can cause the cartilage to shrink and stiffen, reducing joint mobility.

Exercise can have a positive effect on flexibility and joint mobility and can slow age-related changes to muscles, bones and joints. It can also reverse these changes. Adult and aged athletes with poor flexibility and joint movement can gradually increase their range of motion through regular exercise, starting with low intensity and gradually increasing as mobility increases, along with balance and stability, which also assist in the reduction of falls. Exercise programs need to be low impact and mindful of any limitations of the person doing the exercise. Low-impact activities include swimming, yoga, walking and aqua aerobics.

Survey

- 1 Go to the Exercise and Sports Science Australia (ESSA) website or click on the link.
- 2 What did the survey tell you? Were you able to identify any risk factors for each person?
- 3 How do you think the information gained from the survey could help to design an exercise program for older people looking to become physically active?
- 4 Would the survey help to prevent any potential injuries or health conditions?



Investigate

- 1 What activities for the aged are available in your local community?
- 2 Either in person or online, locate your local fitness or leisure centre and investigate their participation options and programs designed for aged adults and/or people with medical conditions.

FEMALE ATHLETES

A female athlete participating in competitive sports can use large amounts of energy, feel internal and external pressures to compete, and may require frequent weight checks or weight maintenance. Each of these situations can lead to associated health problems, such as eating disorders, as well as issues related to lower levels of iron and calcium. If a female athlete loses body weight or body fat by developing disordered eating patterns, this can potentially

lead to menstrual irregularities (amenorrhea) and an increased risk of loss of bone mass and osteoporosis. While most female athletes follow a training regime accompanied by a diet that supports health and performance, there are those who struggle with their weight. Some athletes like to train at one weight and then compete at another – possibly a lower – weight.

The female athlete triad

The triad (three interrelated conditions) is an exercise-related syndrome representing a continuum that spans from *healthy* to *unhealthy*. As shown in figure 17.6, the unhealthy end of the spectrum consists of:

- energy deficit/disordered eating
- menstrual cycle disturbances/amenorrhea
- low bone mass/osteoporosis.

Energy deficit and disordered eating

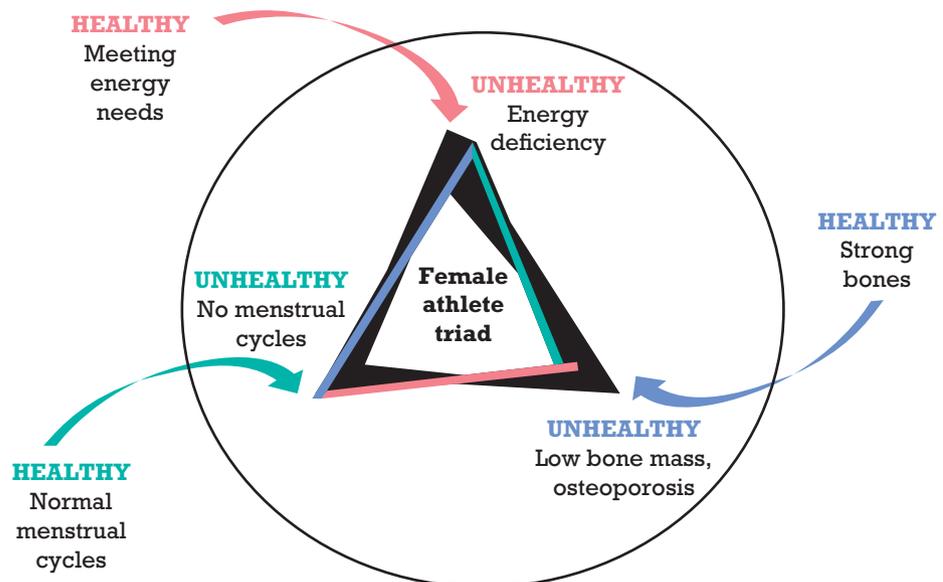
An energy deficit is an imbalance between the amount of energy consumed and the amount of energy expended during exercise. The primary cause of the female athlete triad is energy deficiency. Often, this can involve a conscious restriction of food intake, problems with body image and a high drive for thinness. Sometimes, these conditions can lead to disordered eating, or more serious eating problems, such as anorexia or bulimia.

Menstrual disturbances (amenorrhea)

The most serious menstrual problem associated with the triad is amenorrhea, defined as no menstrual period for three months or more. However, athletes who have irregular menstrual cycles are also susceptible to the effects of the triad.

Low bone mass (osteoporosis)

Women affected by the triad are at higher risk of low bone mass leading to weakened bones, which can cause an increased risk of fractures, including stress fractures.



Source: With permission of the Female Athlete Triad Coalition

Figure 17.6 Female athlete triad

Eating disorders

Athletes who follow unsupervised diets and excessive training programs are at greater risk of developing disordered eating patterns that may lead to eating disorders, such as anorexia nervosa or bulimia nervosa. Eating disorders can also cause other psychological difficulties, such as food or weight obsession, depression and anxiety. Eating disorders have been linked to sport and female athletes have been identified as being twice at risk, particularly in sports where athletes experience pressure to conform to an idealised body image. Eating disorders can negatively impact on nutritional intake and decrease performance. It has been estimated that over half of all female athletes who compete in sports that emphasise body shape and low body fat are at some point impacted by eating disorders.

Iron deficiency

Iron is essential for athletic performance, allowing haemoglobin to bind with oxygen in the blood in order to carry oxygen around the body and assist in waste removal from the muscles. If an athlete cannot deliver enough oxygen to the muscle they can experience lethargy, weakness and fatigue – all impacting negatively on performance and training. The brain also relies on oxygen and without enough iron an athlete can experience irritability and lack of concentration, which can impact on decision-making. Iron is also needed to maintain a healthy immune system and an athlete with insufficient iron may be prone to more frequent infections. Unfortunately, iron deficiency is a common problem for female athletes, with studies routinely finding that they are often iron-deficient or anaemic. Anaemia refers to abnormally low levels of iron in the blood – less than 11 grams per 100 mL of blood.

A combination of the following factors may place an athlete at risk of iron deficiency:

- Inadequate supply of dietary iron
- Hard training stimulates an increase in red blood cells and blood vessel production, and so increases the demand for iron. (Iron turnover is highest for endurance athletes training at high intensity.)
- Blood loss through injury or menstruation
- Iron is lost in sweat; heavy sweating can lead to increased risk of iron deficiency.

Iron can be absorbed through the consumption of foods containing haem iron, which can be found in red meat, poultry and fish. Non-haem foods also provide access to iron absorption but are not as effective. These include legumes, nuts, grains, cereals and leafy green vegetables. Some female athletes may also need to take iron supplements in order to maintain healthy levels of iron if dietary intake is inadequate.

Bone density

Bone density refers to the relative strength of bones and is linked to calcium. This is of concern to females when an athlete's *oestrogen* (a hormone which helps to absorb and digest *calcium*) levels drop due to issues such as eating disorders or post-menopause. A lack of minerals leads to increased fragility of the bones and potential fractures. The dietary and exercise habits of female athletes can help to manage bone density-related issues. A balanced diet with an adequate calcium intake is recommended. Sources of calcium include dairy products such as milk, cheese and yoghurt, along with leafy green vegetables and fish with bones, such as sardines. The recommended daily intake (RDI) is 1000 mg (two serves per day) but this increases after menopause to 1300 mg per day. Exercise recommendations include regular light to moderate intensity exercise in order to decrease risk of osteoporosis. For sufferers of osteoporosis a thorough and specific warm-up is recommended prior to exercise as well as post-exercise management that includes the use of ice to reduce inflammation.



Weblink

Investigate

For more information on eating disorders, visit the Sports Dietitians Australia website, or follow the link.



Weblink

Investigate

For more information about iron and iron depletion in athletes, visit the Sports Dietitians Australia website.



Weblink

Investigate

For more information about exercise and osteoporosis, visit the Osteoporosis Australia website, or follow the link.

Calcium deficiency

- 1 How can calcium deficiency affect bone density in women?
- 2 What impact could this have on performance?
- 3 In your opinion, does it prevent some female athletes from signing up to teams? Give reasons.

Pregnancy

Pregnancy is a natural condition and unless there are complications, it is possible to enjoy sport and physical activity throughout most of a pregnancy. Important factors that female athletes should consider before continuing to play sport during pregnancy are the health and risk status of the pregnancy, the stage of pregnancy, the type of sport played, the degree of exertion required during play, the risk of overheating and the risk of injury during play. Benefits of exercise include: maintaining fitness levels, muscle tone, weight control and mental wellbeing. Exercise can also assist in the control of gestational diabetes.

During the first trimester (the first 12 weeks of a pregnancy), the baby is small enough to be protected by the pelvic bones. As the pregnancy progresses, the growing baby is no longer shielded by the pelvis, which puts it at direct risk if the mother falls or if there is heavy contact by another player. Therefore, contact sports or sports with a high risk of falling should be avoided during the later stages of pregnancy, particularly given that some athletes may experience a shift in their centre of gravity as a result of redistribution of weight during pregnancy. During pregnancy the ovaries produce the hormone **relaxin** to assist with childbirth by softening ligaments to increase flexibility at the joints. This can result in an increase in the range of movement experienced at the joints, which can increase the risk of joint injuries, particularly when combined with additional body weight placing extra strain on joints and muscles.

Some considerations for pregnant women wishing to participate in a sport follow.

Discussion

Should pregnant women compete in sport?

Pregnancy can be a controversial issue in sport and there is divided opinion in regards to participation. Critically analyse how pregnancy can affect participation and performance.

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Figure 17.7 Yoga is recommended during pregnancy. A growing belly can affect balance by pushing the centre of gravity forward.

Non-contact sport

Any sport that does not involve possible contact with another player, such as swimming, walking and jogging. In most cases, it is safe for pregnant women to play non-contact sports during the entire pregnancy, provided they consult closely with their doctor and do not overexert themselves.

Minimal contact sports

Sport that involves minimal contact, such as racquet sports and netball. These sports are considered safe during the first trimester, with the possibility of continuing into the second trimester depending on the circumstances, such as the level of competition, the fitness of the mother and the state of the pregnancy. Close consultation with a doctor is essential for an athlete who wishes to continue playing into the second trimester.

Contact and collision sports

Sports such as soccer and basketball are considered safe only in the first trimester.

Lifting and straining

Exercises that involve straining, such as lifting heavy weights, are potentially dangerous, particularly in the later stages of pregnancy, and are not recommended.



Weblink

Investigate

For more information about pregnancy and exercise visit the Victorian Better Health Channel website, or follow the link.

Discuss

Should pregnant women compete in sport?
Support your opinion with at least two reasons.

CHAPTER SUMMARY

- Children suffering from medical conditions such as asthma, diabetes and epilepsy should participate in sport and physical activity and it is important that all coaching staff and officials have knowledge of such conditions.
- Resistance training can be beneficial for children as long as it is under strict adult supervision.
- Exercise for adult and aged athletes has many positive benefits. Pre-screening and medical advice is essential for heart conditions, fractures/bone density and flexibility/joint mobility issues.
- Factors that can affect female sport athletes include eating disorders, iron deficiency, bone density and pregnancy.

CHAPTER REVIEW ACTIVITIES

WS

Extra
exam-style
questions

- 1 There are a number of major issues concerning the participation of children in sport. **Outline** three issues and provide evidence as to how each one can be prevented.
- 2 **Identify** the two significant issues associated with physical activity and the aged, and **outline** how each of these can be addressed to facilitate safe participation.
- 3 How can iron deficiency affect bone density in women? What impact could this have on performance? In your opinion, does it prevent some athletes from signing up to teams? **Discuss** and give reasons.
- 4 **Discuss** why it is important for female athletes competing at an elite level in sport to have a balanced diet.
- 5 **Outline** the factors that coaches should consider in order to reduce the risk of injury to children who are competing or training in extreme weather conditions.



CHAPTER 18

Preventative actions in athlete wellbeing

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PHYSICAL PREPARATION

When you have read this section you should be able to analyse different sports and determine preventive strategies for each priority. You should also be able to explain how adequate preparation helps to prevent injuries.

There is no guarantee that an athlete will not incur an injury when participating in sport. However, with suitable care, the risk of injury can be minimised. Physical preparation is vital to help the body cope with the demands of sport but mental readiness is also important. Both are the responsibility of the sports coach and the participating athlete. Factors that contribute to the prevention of sports injuries include the coach knowing the athlete's history through pre-screening, the coach and athlete developing skills and technique, and the athlete wearing appropriate clothing and protective equipment. In addition, both should ensure a suitable fitness level for the sport and apply the correct warm-up, flexibility and cooling-down procedures.

Pre-screening

Pre-screening an athlete provides a coach with information about their history, capabilities and any pre-existing medical conditions. The athlete's training methods and skill development are based on this information. The purpose and benefits of the screening are to:

- highlight any predisposing factors that may lead to injury
- reveal risk factors to injury so that personalised interventions can be used to rectify any musculoskeletal problem areas and reduce the likelihood of future injury



Weblink

Pre-screening exercise tool

To view and download the complete Adult Pre-Exercise Screening System visit the ESSA website.

- ensure that athletes are fit and injury-free for competition prior to an event
- assess any current injuries
- assess any musculoskeletal factors that may impact on performance
- design individual injury prevention programs based on results
- review previous experience in the sport
- investigate level of development (technical and tactical skills) as well as level of physical fitness
- discuss goals and aspirations.

EXERCISE SCREENING IS ESSENTIAL

Exercise & Sports Science Executive Officer, Anita Hobson-Powell, believes recent media attention around John Singleton cancelling plans to walk the Kokoda Trail following a health check, highlights the importance of exercise screening for those considering a similar challenge.

Reports state that the 70-year-old, who was set to walk the trail with a group of friends including Tommy Raudonikis, was forced to cancel plans when a scan revealed a problem with his heart.

'We can't emphasise the importance of pre-exercise screening enough, particularly when people are considering something as physically challenging as the Kokoda Trail which has taken a number of victims due to health-related issues in the past few years,' said Ms Hobson-Powell.

'We are well aware that adventures such as these are often embarked upon as a group of friends following a physical and emotional journey, but this often presents a risk as not everyone in the party is on a par with regard to health and fitness.'

Exercise & Sports Science Australia (ESSA) joined forces with Fitness Australia and Sports Medicine Australia (SMA) last year to develop the Adult Pre-Exercise Screening System (APSS) which is now recommended to their registrants, members, government and associated organisations.

The purpose of this system is to ensure that pre-exercise screening and ongoing

management is consistently administered before providers such as fitness professionals, exercise physiologists, other allied health practitioners and general practitioners prescribe physical activity or exercise.

'Essentially anyone embarking on an exercise program should be screened to ensure there are no health risks in their planned activities and that they achieve the best possible outcomes,' said Ms Hobson-Powell.

'Deciding to embark on a challenge such as the Kokoda Trail is a great way to get active and enjoy the physical endurance these adventures require. We just want to encourage people to follow John Singleton's example of checking up before checking in.'

For more information on where to get your health check, please visit www.essa.org.au or contact your local exercise physiologist.

Source: FreshPRM Marketing: <http://www.freshprm.com.au/exercise-screening-a-must/>

Questions

- 1 Why is it important to undergo pre-screening prior to embarking on a fitness campaign or exercise challenge such as walking the Kokoda Trail?
- 2 Why do you think the importance of pre-screening increases with age?
- 3 What could have been the consequences for John Singleton if he had not undergone a health check prior to participating in the Kokoda Trail walk?

Skill and technique

An athlete's lack of skill development and poor technique in their chosen sport can contribute to an increased risk of injury during play. The understanding and development of skills related to a chosen sport are of utmost importance to prevent injury. Some examples of these are:

- correct tackling technique in rugby league to prevent head, neck or shoulder injury
- correct technique when 'packing into a scrum' in rugby union to prevent neck injury
- correct catching technique in netball to prevent finger injuries

- correct technique in the basketball 'jump shot' to prevent knee and ankle injuries
- correct vault landing technique in gymnastics to prevent ankle injuries.

As the athlete's skill development and technique increases, along with the level of competition, they will become more experienced in playing situations, and so will reduce the risk of incidence of injury to both themselves and other athletes they may come in contact with.



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Figure 18.1 Poor technique can contribute to an increased risk of injury.

Physical fitness

Physical fitness helps athletes to prepare for dealing with the physical stress associated with competition. This includes not only having the ability to compete without getting fatigued, but also involves a balance of all the components of fitness – both health- and skill-related – and can vary depending on the nature of the activity or sport.

Health-related components of fitness

Health-related components are factors that relate to how well the body systems work. These include:

- **cardiovascular fitness:** the ability of the circulatory system (heart and blood vessels) to supply oxygen to working muscles during exercise
- **body composition:** the relative percentage of body fat compared to lean body mass, such as muscle, bone and water
- **flexibility:** the range of movement possible at various joints
- **muscular strength:** the amount of force that can be produced by a single contraction of a muscle
- **muscular endurance:** the ability of a muscle group to continue muscle movement over a length of time.

Skill-related components of fitness

Skill-related components are aspects of fitness that form the basis of successful sports participation. These include:

- **speed:** the ability to move quickly from one point to another
- **agility:** the ability of the body to change direction quickly

- **balance:** the ability to maintain an upright posture while still or moving
- **coordination:** the integration of hand and/or foot movements with the input of the senses
- **reaction time:** the amount of time it takes to respond to a stimulus
- **power:** the ability to do strength work at an explosive pace.

If specific areas of fitness are inadequately prepared for, there is an increased risk of injury. Some sports will require a greater emphasis on aspects such as muscular endurance and cardiovascular fitness (such as long-distance running), while others will focus more on flexibility and coordination (such as gymnastics). It is important to remember that returning to play after an injury, pre-season training or general all-year-round participation in physical activity requires constant maintenance of all components of fitness to minimise the risk of injury.

Warm-up, stretching and cool-down

Before beginning any exercise or sport, it is important to do an appropriate warm-up that includes stretching exercises, and complete the session with a cool-down (sometimes referred to as a warm-down). These vital components of a session can help the body prepare for activity, decreasing the likelihood of injury. It is essential that the warm-up is specific to the needs of the sport and begins with general whole-body movements, increasing in intensity to match the requirements of performance. The purpose of a warm-up is to increase blood flow and oxygen to the muscles to assist in a gradual increase of body and muscle temperature, allowing muscles to lengthen and reduce tension.

Warm-up

The benefits of a warm-up include:

- **improved flexibility:** the soft tissues of the muscles increase in elasticity
- **improved strength:** the motor units of the muscles are stimulated and prepared for a heavy workload
- **increased blood flow:** exercise-related problems are reduced by the increase in coronary blood flow and blood to the muscles
- **reduced fatigue:** warm-ups prevent early lactic acid build-up and fatigue that could shorten the training or playing time
- **improved mental preparation:** mentally prepares the athlete for the event by clearing the mind, increasing focus, reviewing skills and strategy. Positive imagery can also relax the athlete and build concentration.

Stretching

Stretching forms an important part of any training program and helps to both increase flexibility and reduce the risk of injury. A range of stretching exercises is available to the athlete, including dynamic, static, ballistic and proprioceptive neuromuscular facilitation (PNF). Two of the most widely used are dynamic (which involve motion) and static (which involve no motion). Further details of stretches are:

- **dynamic stretches:** slow, controlled leg and arm swings and PNF stretches with a partner before activity are common examples. In game-specific warm-ups, a skill session is also valuable in the warm-up phase to promote preparation for the competition ahead.
- **static stretches:** more appropriate to the cool-down phase because they help muscles to relax and increase their range of movement.
- **PNF stretches:** often performed with a partner and follows a pattern – static stretch followed by an isometric contraction followed by a relaxation phase holding the lengthened muscle in position.

Cool-down

An appropriate cool-down is an important phase of the training session or game. A well-designed cool-down session will:

- aid in the dissipation of waste products, including lactic acid
- reduce the chances of dizziness or fainting caused by the pooling of venous blood at the extremities
- reduce the level of adrenaline in the blood
- reduce the potential for delayed onset muscle soreness (DOMS). Muscle soreness that occurs 24–48 hours after intense exercise usually involves eccentric contractions. These cause increases in intracellular pressure, which irritates the nerve endings, producing swelling and local pain. The soreness can be an indication of potential muscle adaptation to follow, but if it persists or gets consistently worse, this could indicate overtraining and large muscular tissue damage.

GARETH BALE WILL BE DEVASTATED BY NEW INJURY SAYS WALES'S CHRIS COLEMAN

Chris Coleman had just delivered his pre-match instructions at the Stade de France when he got a whisper in his ear. He may have been hoping Antoine Griezmann or Kylian Mbappé had been pulled out during the pre-match warmups in Paris, but instead the news was about another blow for Gareth Bale.

The Real Madrid forward had suffered a fresh thigh injury just days after returning to training after more than a month out with a calf injury and is likely to be out for the rest of the year. This will be his 19th layoff during his four years at the Bernabéu.

'I don't know the full extent of it,' Coleman said. 'He'll be devastated. We haven't had dialogue with Real Madrid, but we'll speak with Gareth in the next few days and find out exactly what it is. It's bad luck, bad news, and he'll be gutted.'

'The harder you try to get back you get a setback and sometimes you have to go through that. He'll get over and he'll be back. He just needs to get settled again and get his fitness. He needs to take his time and not rush himself back.'

Ryan Giggs also had his international career interrupted by injury before he retired from Wales duty in 2007. He went on to wear the red shirt of Manchester United for another seven years, setting a Premier League appearance record and becoming the most decorated footballer in English football history. But his injury woes did not just disappear by chance. Giggs began practising yoga in his



Figure 18.2 Gareth Bale's injury will be his 19th layoff during his time at Real Madrid

late 20s before undergoing acupuncture and using ice baths to give his muscles the best opportunity to recover during the day-to-day grind.

'Some players as they get older they change their schedule,' said Coleman, whose side face Panama at the Cardiff City Stadium on Tuesday. 'That's up to him and Real Madrid. When he's with us all our players have different programmes at different times of the week because we know what they do with their clubs. We have to make sure we taper that in with the way we work.'

Bale has missed 40 of Real Madrid's last 60 matches and has been absent for Wales in crucial World Cup qualifiers against Serbia, Georgia and the Republic of Ireland.



But Coleman gave a glimpse into the future when he unleashed Ben Woodburn and the debutants David Brooks and Ethan Ampadu off the bench during Friday night's 2-0 defeat by France. 'Between now and the next campaign we need to get these boys as much experience as we can. They will get better, stronger, and in 12 months' time the squad that will be available will be better than the one we

took to the Euros. It's not all doom and gloom.'

Source: www.theguardian.com, 12 November 2017.
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Questions

- 1 Why is physical preparation and recovery so important to athletes?
- 2 What might be the implications of returning to play too soon or of not preparing correctly?

Planning

In small groups, design a flow chart to outline the steps of physical preparation in sport, and strategies to prevent injury. Give examples of each strategy.

Group strategy

In small groups, design a flowchart outlining the steps of physical preparation for a particular sport and strategies to prevent injury. Give examples of each strategy and if possible locate any existing documentation that could be used to support your strategy.

Are you prepared?

Why is it important to be physically prepared to participate in sport? Outline the steps of physical preparation in sport and discuss the importance of pre-screening for adult athletes. The ESSA pre-screening checklist will assist you.

SPORTS POLICY AND THE SPORTS ENVIRONMENT

When you have read this section, you should be able to critically analyse specific sports policies, rules and equipment and decide whether or not they promote adequate safe participation.

Governing sporting bodies in Australia provide guidelines, policies and rules to which schools, sporting organisations and associations, clubs, coaches, administrators and other support staff have a responsibility to adhere, in order to promote a safe playing environment for participants.

All sport and recreation organisations have the responsibility to provide a fair and safe environment for players, coaches, referees and spectators. This is important in order to meet legal duties of care and reduce the potential for injury. Risk management planning has become common practice in the sport, recreation and physical activity sector.

Rules in sport and activities

The rules or laws that govern an organisation are in place to protect all participants and spectators. Besides the policies set out by governing bodies of organised sport and recreation, clubs are also required to have a set of rules and regulations that include the club's constitution and policies, inclusive of codes of conduct for all involved. This is designed to promote fair play and to minimise the risk of any harm or injury. Rules cover many aspects of sport and can

include field boundaries, duration of play, and welfare of athletes. This includes drinks breaks, equipment considerations and safe play.

HIGH TACKLES: WORLD RUGBY CHANGES RULES OVER HEAD CONTACT

Sports organisations such as World Rugby are working with the medical profession to establish new guidelines and law changes to ensure the safety of players. Guided by evidence-based research, World Rugby has redefined what is considered a 'high' or illegal tackle in order to protect players from unnecessary contact to the head. The decision to make the law change (including increased penalty sanctions) was based on data indicating that in rugby, more than 74 per cent of players requiring a head injury assessment (HIA) had sustained their injury as a result of a tackle and that the tackle height was the significant contributing factor. It is hoped that the law change will lead to a behaviour change in the game and become a part of a safer culture associated with a contact sport such as rugby. The change in laws will be supported by a worldwide global education program, focusing on player welfare.



AAP Image/AP/Rick Rycroft

Figure 18.3 The rule change affects all levels of the game.

Questions

- 1 Why is it important that sporting bodies such as World Rugby work closely with medical professionals when creating new rules for their sport?
- 2 Why did World Rugby make this particular rule change?

Modified rules for children

Where children are concerned, applying simplified or **modified rules**, especially for juniors, has the potential to contribute to a safer and more enjoyable sporting experience. Modifications made to sports to accommodate children's participation include:

- a decrease in the size of the playing field or court
- smaller, and sometimes softer, playing equipment
- rule changes
- shortened game times
- increased use of body protection and/or protective equipment
- matching of opponents
- encouragement awards
- an increased number of drinks breaks.

Modifying rules to cater to children's specific needs allows for increased levels of individual participation and enjoyment, thereby increasing the likelihood of young people staying in sport and developing positive lifelong habits. Modifying rules for children reduces any excessive physical demands placed on them if they use adult equipment or field size. The emphasis is on fun and promoting participation and skill development rather than competition. This also reduces the likelihood of domination by physically stronger or early maturing players. Modifying a sport so that it still resembles the original means it is safer for young people, while still challenging

them and encouraging skills that are a relevant base or foundation for progressing to the parent sport. Modified sport decreases the risk of injury for children by teaching them the correct rules and skills in a safe environment. Through encouragement, with an emphasis on fun and enjoyment, children should continue playing sport in the longer term.



Weblink

The New South Wales Department of Education has implemented a range of sport-specific guidelines designed to promote children and young people's wellbeing and safety in sport. These can be viewed on its website; search for school sport: sport safety guidelines.

Resources have been developed to support teams and organisations to apply and abide by governing bodies' external laws, rules and community standards of behaviour. The *Play by the Rules* website is an excellent source of information and covers a range of issues relating to sport and children's participation.

Matching of opponents

Growth and development, skill level

Physical activity is required for normal growth and development, and for young people to reach their potential in muscle and bone development. Sport is an ideal way to provide this necessary activity because it also brings psychological and social benefits to young people. However, not all children develop at the same stage or rate and in order to promote safety it is sometimes appropriate to match opponents on a basis other than age; for example, by weight, skill or sex.



Alamy Stock Photo/PA Images

Figure 18.4 The matching of opponents by weight or height is one way that sports associations can help to reduce the risk of injury for children and young athletes.

When choosing teams, children should be evenly matched on weight, height, size, skill and ability, rather than age because this will encourage participation in a balanced competition. Certain sports associations (such as rugby union and league) advocate 'weight for age' competitions, where players compete within weight-based categories rather than age, to reduce the incidence of injuries associated with size and contact. Combat sports such as boxing and judo are also examples where competitors are grouped based on weight category.

Use of protective equipment

Protective safety equipment has been developed and recommended for many different sports and physical activities to help prevent and reduce the severity of injuries. Protective equipment is not only designed for the athlete, but also for sports officials, such as baseball and cricket umpires.

The type of protective equipment an athlete wears depends on the type of sport being played. In team sports this also includes consideration of position of the player in the team – catcher in baseball, wicket keeper in cricket, goal keeper in hockey. Protective equipment includes appropriate footwear; wrist, elbow and knee guards; shin pads; shoulder padding and

body protectors; helmets; ankle taping and braces; gloves; mouthguards; boxes; and, for hot conditions, sunscreen, sunglasses and a hat.

Protective equipment should be worn at all times, including at training sessions. It should be correctly sized and fitted to meet standard regulations, regularly checked and maintained, tested before competition and used according to the manufacturer's guidelines.

Safe grounds, equipment and facilities

People are more likely to participate in physical activity if equipment and environments are safe and their needs are met. It is in the interest of the whole community to ensure that facilities and equipment are maintained in order to promote maximum participation.

Local councils have the responsibility for playing fields and courts, which includes maintaining playing surfaces and permanent equipment, such as goal posts, netball rings, and associated amenities. Councils are also responsible for recreational facilities (children's playgrounds, aquatic centres and backyard pools), while clubs and associations are responsible for the safety of equipment (gymnastics apparatus or smaller equipment such as bats and balls). Playing fields and courts need to be both maintained and designed to ensure minimum risk of injury. This includes ensuring that surfaces are safe for play, free of divots or holes and slip hazards; that permanent fixtures are secured and adequately padded, and that sidelines have adequate space and fencing to protect both players and spectators. Equipment needs to be regularly serviced and checked to ensure it is in working order. Equipment also needs to be checked to guarantee that it is appropriate for the athlete in regards to size and weight in order to decrease risk of overuse injuries.

Protective measures

- 1 Investigate the protective equipment for the following sports, and describe how each is used to prevent injury.
athletics baseball basketball cricket cycling
fencing soccer ice hockey motor sports netball
rugby league snowboarding squash
- 2 In a small group, research the laws relating to junior players in walla, mini and midi rugby union as provided on the Australian Rugby Union website.
- 3 Discuss how the new scrum laws prevent player injuries and how the laws of the game change for varying age groups.



ENVIRONMENTAL CONSIDERATIONS

When you have read this section you should be able to evaluate strategies that a specific athlete could best use to support their body's temperature regulation mechanisms. You should also be able to analyse the impact of climatic conditions on safe sports participation.

The impact the environment has on athletes is an important consideration when preparing for an event. Climatic conditions can severely impact on performance and must be understood in order to promote and maintain an athlete's wellbeing and safety.

Temperature regulation

The body has a normal core temperature of 37 °C and can tolerate relatively small variations. To maintain an internal temperature of 36–38 °C, there needs to be a balance between heat gain and heat loss. Heat gain can result from muscular activity, metabolism of food, shivering and hot environmental conditions. There are four ways in which the body experiences heat loss.

Make a flyer

Prepare a flyer to be available at the start of (and throughout) a particular event such as the City to Surf, outlining strategies to reduce overheating while competing.

Convection

Convection is movement of air or water adjacent to the skin that transfers heat away from the skin. Convection occurs as an athlete moves (running) through the air. Cool windy conditions increase the loss of heat and, conversely, if the air passing over the body is warmer than the body gains heat. Convection accounts for approximately 12 per cent of heat loss during exercise.

Conduction

Conduction can only occur with direct contact with a colder object, such as water or ice. When the environment is cooler than the body, heat flows away from the body. Conduction accounts for a relatively small percentage (3 per cent) of heat loss.

Evaporation

Evaporation happens when body heat is lost from the skin when sweat is vaporised. During exercise evaporation can account for up to 80 per cent of heat loss as opposed to approximately 25 per cent at rest.

Radiation

In radiation, heat is transferred from the body to the surrounding environment. At rest, radiation accounts for 60 per cent of the body's heat loss.

Environmental conditions impact the way an athlete's body controls its temperature and this can affect their performance when they participate in a sports event. In hot climates, heat stress creates cardiovascular strain and can lead to thermal injuries, such as heat cramps, heat exhaustion, or potentially fatal heat stroke. Evaporation of sweat is the most important method of temperature regulation in hot environmental conditions. In colder climates, athletes such as snow skiers must ensure that they wear appropriate clothing to prevent body heat being lost.

Climate conditions

Weather conditions (heat and cold) should be carefully assessed before participating in any physical activity or sports event.

Wind, rain and cold

In cold and windy conditions, participants should dress in layers to trap heat and prevent heat loss. Individual athletes can remove layers as necessary according to exercise levels and conditions. Windproof clothing as well as head, face and neck coverings can also reduce heat loss, and any wet clothing should be removed as soon as possible to prevent heat loss.

Humidity and heat

In hot conditions the temperature and humidity can affect body temperature and athletic performance. To prevent sunburn, dehydration and heat illness, athletes should take advantage of shaded areas, wear light-coloured and lightweight clothing to cover exposed skin, wear broad-brimmed hats and sunglasses, and apply SPF 30+ sunscreen. If conditions are too hot or humid, activity should be postponed or cancelled.

Altitude

The higher the atmosphere, the thinner the air becomes due to less oxygen being available. Thinner air means there is less air resistance, so athletes who sprint, jump or cycle will perform better at high-altitude venues. But thinner air provides less oxygen, so the pace of hard endurance training and competition – which depends on high rates of oxygen consumption – gets slower.

Red blood cells

The most important adaptation for the endurance athlete is an increase in the number of red blood cells, which are produced in response to greater release of the hormone **erythropoietin (EPO)** by the kidneys. Red blood cells carry oxygen from the lungs to the muscles. So when there are more red blood cells, blood can carry more oxygen, which partly makes up for the shortage of oxygen in the air. To successfully compete in an endurance event at high altitude, the athlete should live at that altitude for several weeks before the event in order to acclimatise.

Pollution

Air pollution levels are a growing concern for physical activity. Weather conditions can increase the levels of pollution and inhibit participation and performance by irritating the respiratory system. Pollutants such as carbon monoxide (found in vehicle emissions) can reduce oxygen delivery to working muscles. Strategies to reduce discomfort to the athlete include: being aware of personal sensitivity to air pollution; paying attention to local information on air quality; changing physical activity patterns when appropriate; and following medical advice to protect health and to care for any respiratory or other illnesses.



Shutterstock.com/Fernanda Paracizio

Figure 18.5 A triathlete passes through a drink station during an Ironman event. Staying hydrated is particularly difficult in endurance events such as Ironman triathlons.

POLLUTION STOPS PLAY AT DELHI TEST MATCH AS BOWLERS STRUGGLE TO BREATHE

A cricket Test match between India and Sri Lanka was repeatedly interrupted on Sunday with claims players were 'continuously vomiting' due to hazardous pollution levels in the Indian capital.

Airborne pollution levels 15 times the World Health Organization limits confronted players on the second day of the third Test at the Feroz Shah Kotla stadium in Delhi on Sunday.

As the haze worsened, many Sri Lankan players returned from lunch wearing face masks before complaining to umpires, who halted play for 20 minutes to consult with team doctors and match officials.

'There aren't too many rules regarding pollution. What we are going to do tomorrow is in the hands of the match referee. They will have meetings tonight to put in some sort of a precedent if it happens like this tomorrow.'

The Indian bowler Kuldeep Yadav was also seen sporting a face mask as he brought drinks to teammates on the field.

The extremely poor air in the city is the result of a combination of road dust, open fires, vehicle exhaust fumes, industrial emissions and the burning of crop residues in neighbouring states. Indian weather agencies also blame dust storms that originate in the Gulf.

Source: Michael Safi, *The Guardian*, 4 December 2017.
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Reuters Pictures/Stringer

Figure 18.6 Heavy pollution in the Indian city of New Delhi forced players to wear face masks when fielding.

Questions

- 1 When considering environmental issues and sport, how can high levels of air pollution (such as the levels described during the India and Sri Lanka Test match) cause concern for athletes?
- 2 Do you think the game should have been played?
- 3 What physical impact could high levels of air pollution have on an athlete?
- 4 Who do you think should be responsible for deciding if it is 'safe' to play in the conditions described in the article?

Climatic conditions

- 1 In pairs, choose a sport and research how climatic conditions could impact on an athlete's performance.
- 2 Choose ONE condition to explore in depth, and prepare a report outlining how this condition can be managed, i.e through particular clothing.

Guidelines for fluid intake

Proper hydration is especially important during exercise. Adequate fluid intake for athletes is essential to comfort, performance and safety. The longer and more intensely the athlete exercises, the more important it is to drink the right kind of fluids.

Excessive sweating places demands on the body's fluid reserves. Sweat is over 99 per cent water, with most of the water derived from blood plasma, which is 91 per cent water. When the body sweats during exercise, it reduces blood volume and creates dehydration; if fluids are not replaced, the body's core temperature may rise to dangerous levels. Fluid replacement maintains plasma volume so that circulation and sweating can work at optimal levels. The Australian Institute of Sport (AIS) highlights that fluid requirements vary remarkably between athletes and between exercise situations. They advise that fluid losses are affected by:

- genetics: some people innately sweat more than others
- body size: larger athletes tend to sweat more than smaller athletes
- fitness: fitter people sweat earlier in exercise and in larger volumes
- environment: sweat losses are higher in hot, humid conditions
- exercise intensity: sweat losses increase as exercise intensity increases.



Weblink

Fluid

For further information regarding guidelines for fluid intake visit the AIS website, and search for its fact sheets on fluid.

SUMMARY OF AIS FLUID GUIDELINES

- Begin each exercise session in fluid balance. This requires drinking regularly throughout the day leading up to training or competition. Have a drink with all meals and snacks.
- Immediately, before exercise commences, consume 200–600 mL of fluid.
- Develop a plan for fluid intake for all exercise sessions longer than 30 minutes. Aim to match previous fluid losses as closely as possible (within 1 per cent of body mass). Take into account all the opportunities within the sport.
- Begin drinking early in the exercise session and continue to

drink small amounts regularly. Sports drinks or water are the best options. Replace any residual fluid deficit after exercise. You will need to drink 150 per cent of any fluid deficit in the 4–6 hours after exercise to account for ongoing sweat and urinary losses. When fluid losses are high and/or rapid rehydration is required, sodium replacement may be required. Sports drinks, oral rehydration solutions and salty foods can all contribute to sodium replacement.

Source: AIS Sports Nutrition, last updated July 2009. © Australian Sports Commission

Acclimatisation

An athlete preparing to exercise under extreme conditions (hot, cold, altitude) should include a period of acclimatisation to the conditions in order to develop a level of tolerance. This is especially important if the athlete is competing in conditions different to their regular training or competition environment. Factors that affect an athlete's ability to acclimatise include age, sex, physical fitness and the humidity level of the climate. Acclimatisation to altitude facilitates physiological adaptations such as increased ventilation and cardiac output in the short term, and longer-term adaptations such as increased haemoglobin production, all of which allow the body to perform and function more efficiently.

Acclimatisation in hot/humid conditions will facilitate climate adaptation to help prevent the athlete's performance from deteriorating and will prevent the athlete suffering from heat illness during later competitions. Repeated exposure to hot environments causes the athlete's body to progressively adapt to thermal stress. It results in an improved capacity for the body to sweat, leading to cooler skin and core temperature, so that a decreased level of skin blood flow is required to regulate body temperature. Sixty minutes of acclimatisation activity each day for seven to 10 days prior to an event provides substantial preparation for safe exercise in the heat, whereas adaptations for altitude will take longer and require two to three weeks, depending on the level of elevation. It is important to note that the gains made with altitude acclimatisation disappear two to three weeks following return to sea level.

TAPING AND BANDAGING

When you have read this section you should be able to demonstrate taping and bandaging techniques on a classmate, including taping the ankle, wrist and thumb. You should also be able to discuss the role that taping plays in prevention of injury and in its treatment.

Taping and bandaging can be used:

- to both manage and prevent injury
- to isolate, through the immobilisation and support of a bone or joint injury
- for immediate treatment of an injury – compression bandaging to control bleeding and swelling from trauma.

How to strap an ankle injury

- 1 Anchors are applied (green). Their function is to firmly attach the stirrups (red = first stirrup).

(All images this page) Beiersdorf Health Care Australia Pty. Ltd. Manufacturers of Elastoplast and Leuko Sports Medictne products



- 2 Three stirrups are generally applied (blue = stirrups 2 and 3). These attach to the anchors, going from the medial (inside) to the lateral (outside) in a U-shape.



- 3 Figure 6s are applied to further counteract the inversion movement that causes injury. These are applied from the medial to the lateral side, returning to the medial side after crossing the front of the foot (first '6' = red; second '6' = blue).



- 4 A half-heel lock is applied to provide further support to the posterior ankle area. Begin the heel lock on the anterior lateral aspect of the lower leg (green), and move inferiorly across the medial aspect of the ankle (not visible) towards the front of the heel. Pass the tape under the foot and across the lateral aspect of the heel at a 45° angle (pictured). The tape then passes back to the medial side of the ankle to finish the lateral aspect of the lower leg, where it started. Another half-heel lock may be applied in the opposite direction, following the same technique.



Weblink

Investigate

To find further information and videos of strapping and taping, visit the Elastoplast website.

Preventive (prophylactic) taping

Strapping or taping with adhesive tape (non-elastic/rigid) is important to prevent joint injuries (such as the ankle and wrist) and is essential during early treatment management of injury and rehabilitation. An injured athlete who wears supportive taping is less likely to have a recurring injury when they recommence training. Preventative taping aims to support and protect the joint during movement in order to provide an increased level of protection. The tape also provides immediate sensory feedback to the athlete to control the level of excessive movement at the joint. Athletes in a variety of sports use taping to prevent injury, this includes the taping of ankles in sports such as soccer where explosive changes in direction are required, placing significant strain on the joint. Tape is generally applied in two stages: the first is an underlay of a thin, porous and foam-like material, often referred to as pre-wrap. The tape, an adhesive, is then applied over the pre-wrap in thin strips. There are several taping methods, each individually designed to suit a specific athletic need.

Taping for isolation of injury

The primary objective of taping is to provide additional support for the specific joint, by limiting the degree of movement. Following injury to a joint, taping can help to prevent further damage from occurring and aid in recovery by isolating the joint and increasing stability, thereby helping an athlete return to play. Taping can also assist in ensuring that injured joints remain in place during activity and reduce levels of inflammation through providing compression.

Taping techniques

- 1 Follow the weblink and use the interactive assistant and video about taping techniques to practise them in the following scenarios:
 - a ankle injury
 - b shoulder injury
 - c knee injury
 - d thumb injury.
- 2 When you have successfully taped each joint (while you still have the tape on, to help you think) consider how taping each of these joints could either prevent injury from occurring or help to promote treatment.
- 3 Record your thoughts (for example, does the joint feel more stable?) to share as part of a class discussion.



Bandaging for immediate treatment of injury

Bandaging is used both in administering first aid to an injury and for ongoing treatment. Bandaging is the immobilisation and compression aspect of the RICER (compression) treatment (see table 16.2 in chapter 16). It is commonly administered in the event of a soft tissue injury or to restrict bleeding. When compression is properly administered, it should be tight without restricting blood flow while still providing support. When bandaging an open wound to stop it bleeding, ensure that a sterile pad is first applied to the wound.



Weblink

Protective measures

- 1 Select **THREE** sports from the following list:
athletics baseball basketball cricket cycling fencing soccer
ice hockey motor sports netball rugby league snowboarding squash

Investigate what protective equipment is available for each chosen sport, and describe how this equipment can be used to prevent injury.

- 2 Select a sport and research the rules relating to junior players. For example, in rugby union there are specific rules relating to modified versions, such as walla, mini and midi rugby union. Discuss how rule variations for modified games prevent player injuries.
- 3 Visit the Elastoplast website to view the interactive video sessions on strapping techniques (if you didn't do this earlier) and explain the role of taping in both the prevention and treatment of injury.



CHAPTER SUMMARY

- Injury prevention can be increased by ensuring physical preparation through appropriate pre-screening, developing skill and technique, developing all components of physical fitness, and a thorough warm-up, stretch and cool-down.
- Modified games, matching opponents, protective equipment and the safety of sports grounds and facilities are the responsibility of clubs and organisations in order to decrease the risk of injury to participants.
- Environmental conditions, such as weather conditions and acclimatisation, and their impact on body temperature and fluid intake, need to be assessed for all sport participation.
- The use of taping is effective to both prevent injuries and to provide support and isolate existing injuries.

CHAPTER REVIEW ACTIVITIES

- 1 **Identify** the safety factors that need to be considered during the physical preparation of an athlete.
- 2 **Identify** two sports where fatigue can contribute to the risk of injury. Outline strategies to decrease this risk.
- 3 **Discuss** how an effective warm-up and cool-down session can decrease the risk of injury during training.
- 4 Why is it important to modify games for children? Using TWO examples, **explain** how this strategy can reduce the risk of injury to children.
- 5 **Outline** why protective equipment should be properly fitted to the body.
- 6 **Describe** how poor technique can increase the risk of injury to an athlete. Provide TWO examples.
- 7 **Analyse** the risks associated with inadequate fluid intake during activity. Why is this an important consideration for endurance athletes, such as long-distance runners?





Getty Images/Stock/Getty

CHAPTER 19

Injury rehabilitation

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REHABILITATION PROCEDURES

When you have read this section you should be able to examine and justify rehabilitation procedures used for a range of specific injuries, such as a hamstring tear or dislocated shoulder.

The aim of rehabilitation is for the athlete to return to play or activity as soon as safely possible. Returning too soon could lead to further, and possible permanent, damage. Athletes recover from injury at different rates and returning to physical activity is determined by how soon the injury recovers, not by how many days or weeks have passed since the injury occurred. It also depends on how serious the injury is. For example, if reconstructive surgery was required, the recovery period will be longer.

Progressive mobilisation

After the initial RICER (Rest, Ice, Compression, Elevation and Referral) treatment of an injury, the aim is to restore movement to the injured site as soon as possible in order to begin the process of increasing the range of motion for both muscles and ligaments. It is important for the athlete to commence rehabilitation with a gentle range of motion exercises, and then progress to stretching and strengthening exercises until full functioning returns. This should be a gradual and progressive process with pain being an indicator of the limits of movement. Progressive mobilisation involves both *passive* and *active* movement.

Graduated exercise

Graduated exercise involves stretching, conditioning and total body fitness.

Stretching

As an injury is healing, scar tissue will form. It is important to mobilise the injury so that it can cope with the directions of stress placed on the joints. After the first 72 hours most of the initial swelling will have subsided and gentle active rehabilitation techniques can begin. Stretching improves flexibility, increasing the range of motion at a joint and increasing muscle and tendon length. Often, graduated exercise begins with light, gentle, static and passive stretching before progressing on to more extensive proprioceptive neuromuscular facilitation (PNF) stretching exercises. These are sometimes partnered with heat and massage treatment to help speed up the recovery process.

Conditioning

Following injury, muscles can experience atrophy through lack of use. Conditioning involves returning muscles to pre-injury levels. Rehabilitation programs need to take into account the individual athlete's needs and be specific to both the injury and the athlete. The process must be gradual to allow for adaptations to occur (overload). Further resistance should be applied to allow for increase in strength, endurance or power as required. Careful monitoring is crucial during this process.

Total body fitness

During recovery, it is important that the athlete continues a total body fitness program to maintain fitness levels, provided that the recovery (conditioning) program is not compromised. For example, riding an exercise bike in the recovery of an ankle injury (because it is less weight-bearing) promotes cardiovascular endurance throughout the recovery process. Physical and mental considerations should also be included in the program, which should be designed by a health professional (such as a physiotherapist).

Training

Following treatment for injury, a well-structured training program should progressively increase the demands on the athlete's injured tissue. Training should be varied, catering for the extent of the injury and maintaining motivation and interest. Both team and individual skills covering the

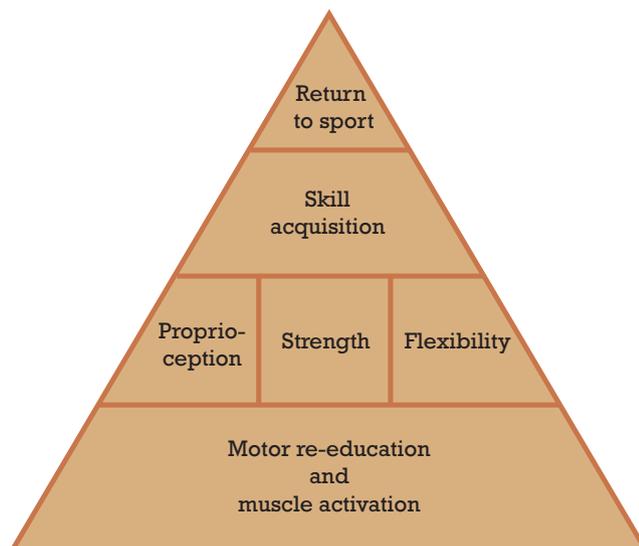


Figure 19.1 Progressive rehabilitation program

athlete's sport need to be gradually built up to pre-injury levels, with an awareness of any signs of pain or discomfort that could aggravate the injury.

An athlete should only commence competitive and contact training under the guidance of a health professional. They should be able to complete a full competitive training session, without pain, before returning to play. Focus should be on sport-specific skills and fitness requirements as well as ensuring that the athlete's mental state (such as having the confidence to return to play) is not overlooked.

Use of heat and cold

The RICER regime is used to effectively manage swelling in an acute injury as an immediate response (see table 16.2 in chapter 16). For the first 24–48 hours, applying ice to the injured site is very important (at 15–20 minute intervals). Equally important is avoiding contact with heat on the injured area. The use of cold for acute treatment helps to reduce swelling and bleeding. The pain management is often carried out in combination with compression and elevation. Heat helps to promote blood flow, and in the initial 24–72 hours, heat will further increase bleeding and swelling. However, after these initial stages, heat can be used to effectively manage swelling and other symptoms.

After 72 hours, applying a heat pack on the swollen area will help increase the overall blood flow to remove waste products with each cycle around the body – therefore reducing the swelling and improving the availability of fresh blood. Fresh blood brings fresh nutrients that will improve the quality of the athlete's rehabilitation and decrease scar tissue formation.

Heat is also effective in helping decrease the intensity of muscle spasm and tightness that is generally associated with more chronic long-term injuries. Applying heat can improve blood flow and muscle fibre flexibility, decrease tension and lead to an overall reduction in pain levels. Sufferers of chronic back and neck pain will often find applying a heat pack to the affected area allows greater freedom of movement and reduces aching.

Other heat therapy methods include massage, hydrotherapy, contrast baths, ultrasound, shortwave and microwave machines.

Science Photo Library/Life in View



Figure 19.2 A physiotherapist using an ultrasound device to treat a patient's injured knee.

Sport rehabilitation plan

Select an injury site (e.g. shoulder) and prepare a sports rehabilitation plan, using a table similar to the one below.

Injury	Acute care/initial treatment	Injury management	Return to play	Preventive techniques to reduce likelihood of re-injury
Shoulder	TOTAPS RICER Immobilisation (sling)	Rehabilitation – physio Cold/heat Stretching/ strengthening/ increased activity	List of sport specific tests	Taping (detail) joint, type of tape, etc. Physical preparation for return to play – concentrate on strengthening and flexibility exercises during training



RETURN TO PLAY

When you have read this section you should be confident to research and evaluate skill tests and other relevant physical tests of readiness to return to play. You should also be able to critically examine policies and procedures that regulate the timing of return to play, considering issues such as:

- indicators of readiness for return to play (physical tests)
- presence/absence of pain, degree of mobility
- monitoring progress (pre-test and post-test)
- psychological readiness
- specific warm-up procedures
- return to play policies and procedures
- ethical considerations.



Figure 19.3 Basketball player Lauren Jackson sits on the sideline following an injury. Playing with injury potentially led to her retirement from the sport.

Indicators of readiness to play

Following treatment and rehabilitation there are key indicators that must be observed in order for an athlete to be deemed ready to play. These include being pain free and the degree of mobility (full range of motion). For example, before an athlete with a grade 2 torn ankle ligament can return to play, the injured ankle should have full movement and flexibility with little or no discomfort. To allow for functional retraining, the athlete should be able to effectively perform the specific motions and actions required for their sport before returning to activity. For example, retraining after an ankle injury from football should involve the athlete being able to run, stop, change directions, jump and strike the ball. Sport-specific tests should indicate a return of strength, and the injured ankle should be about equal to the opposite one before return to full activity (90–95 per cent).

Monitoring progress (pre- and post-test)

The athlete's progress during rehabilitation should be continually monitored. The severity of the injury will depend on the intensity of the process, and clinical tests may need to be administered to ensure that progression is occurring at an optimal rate. Pre- and post-testing is promoted to gauge the progress of the injury. A severe ankle injury test will initially involve measuring the range of movement at the joint, its strength and mobility without pain. Progress should be monitored during all training sessions. Prior to returning to competition sport, the athlete should be put through a series of tests that involve sport-specific movements. Response elements for strength, power, endurance and proprioception (the joint's awareness of its position) should be analysed during these testing performances.

Psychological readiness

The longer the athlete is away from training and competition, the more likely they are to lose confidence in their ability to get back on top of their physical fitness and mental game. During this time, the athlete and coaching staff would benefit from assistance from a sports psychologist to work with them in identifying specific aspects of the sport in which the athlete has lost confidence. This information will be included in a progressive program of performance simulations, training

tests and other assessments to evaluate the strength and durability of the rehabilitated body injury and the readiness of the athlete. The evidence will help restore the athlete's confidence, or otherwise identify areas that still warrant attention.

Specific warm-up procedures

As a part of return to play, specific warm-up programs are often developed to assist an athlete to achieve maximum recovery and minimise risk of re-injury. Consideration of the injury site may include a longer, and more specific stretch and warm-up routine to ensure adequate blood flow, increased flexibility and readiness for activity. Warm-up routines for returning athletes are developed in collaboration between the athlete, coach, trainer and/or other health professional such as a physiotherapist.

Getty Images/William West



Figure 19.4 Socceroos captain Mile Jedinak (right) warms up with teammates Tim Cahill (centre) and Mark Bresciano (left) during a Socceroos training session.

Return to play policies and procedures

The decision to return to activity and playing sport after an injury depends on the type of injury and its severity. For adult athletes, the decision is often made in consultation with the team sports coach, trainer or medical practitioner. For children and young adults, returning to active sport is a decision made by their parents.

Many sports have specific return-to-play policies (such as rugby league and boxing concussion rules) and protocols developed in conjunction with medical bodies, which are all designed to protect the athlete's wellbeing.

Recommended procedures for returning to play include:

- establishing a chain of command regarding decisions to return an injured athlete to training or competition
- communicating the return-to-play process to athlete, family, certified trainers, coaches, administrators, medical personnel and other healthcare providers
- establishing a system for documentation
- establishing protocols to release information regarding an athlete's ability to return to training or competition following an injury.

It is essential that return-to-play policies address the:

- safety of the athlete
- potential risk to the safety of other participants
- functional capabilities of the athlete
- functional requirements of the athlete's sport
- federal, state, local, school and governing body regulations related to returning an injured athlete to training or competition.

Your opinion

Read the article by Erin Byrnes, 'Counting the cost of low pay: are female athletes at a higher risk of injury due to their bank balance?' (7 April 2016) on the SBS Zela Women in Sport website, or follow the link. The article discusses the issues and pressures to play with injury faced by female athletes.



Weblink

Ethical considerations

Pressure to participate

When is the right time to return to play? Numerous pressures can be placed on an athlete to return to play. These can be external in the form of coaches, sponsors and fans, or internal due to high levels of motivation to succeed. In high-profile competitive sport, elite athletes on lucrative contracts or with major competitions ahead may experience certain pressures to compete. Large amounts of money are spent to get the athlete back to competition level because the athlete may feature heavily in the team coach's game plan. Adults, parents and inexperienced coaches or trainers can cause additional injury if they apply undue pressure on children and young adults to return to play when they have not fully recovered from their injury. Some injuries, regardless of ethical issues, require following documented procedures before returning to participation.

If concussion occurs, the Sport Concussion Assessment Tool (SCAT5) should be used to assess the player and seek medical advice. The test includes a memory, cognitive and neurological screening test. If an athlete suffers a head injury, this is far too serious to apply any pressure to return to participation. For more information, visit the web page of the Sport Concussion Assessment Tool (fifth edition – SCAT5), or follow the link.



Weblink

Use of painkillers

Pressure on the athlete, such as fear of losing their position on a team, or striving for a particular external reward, could lead to them using painkillers or other drugs so they can continue playing. This is dangerous if the athlete is inexperienced and disregards medical advice in their urgent quest to participate in their chosen sport. By ignoring the warning signs associated with pain and continuing to compete, the athlete may dramatically increase the risk of further injury.



Getty Images/Ian Walton

Figure 19.5 Alana Boyd suffered an ankle injury during practice before the pole vault finals at the 2016 World Indoor championships in Portland, Oregon.

Readiness to play

Sport-specific tests

Design and develop a range of sport-specific tests that could be used to determine readiness to play in a chosen sport. You need to include:

- the sport
- the injury and injury site
- a list of skills involved in the game
- the type of body action required to complete the skills
- warm-up activities
- sport-specific training activities
- a description of each test, reflecting the skills and fitness needed in the sport
- a description of how the test reflects an athlete's readiness to return to play.

Return to play policy

As the administrative committee of a newly formed contact sport club (such as a rugby union or league club), design a return-to-play policy for the athletes. Consider who will be responsible for deciding when an athlete returns to play and what types of medication and preventative treatments will be used.





Concussion strategy

The administrative committee of a newly formed rugby league club is designing a concussion strategy as part of their return-to-play policy for the athletes. Consider who will be responsible for deciding when and if a player returns to play and what types of preventative treatments will be used. What are the potential ethical issues that need to be considered?

Injury management plan

A netball player suffers a grade 2 sprain of the ankle. Develop an injury management plan to assist the athlete in the recovery process. Design a rehabilitation program for their return to play, ensuring that they will be able to maintain total body fitness during rehabilitation. What indicators can be used to tell if the player is ready to return to competition?

Debate

Develop an argument that can be used to debate the statement: 'An elite, professional athlete should not be rushed back to play'.

CHAPTER SUMMARY

- Rehabilitation procedures for athletes should be undertaken on the advice of a medical practitioner, before commencing training or competing programs. Pain and flexibility should be the indicators for returning to participation.
- Many factors determine when an athlete should return to play, including considerations such as physical and mental state and ethical issues.

CHAPTER REVIEW ACTIVITIES



Sample
Assessment
tasks
Option 3
Extra
exam-style
questions

- 1 **Discuss** why it is important that rehabilitation programs be created in conjunction with a medical professional.
- 2 **Evaluate** the necessity for skills tests before an athlete can return to play. Why should they be specific?
- 3 **Analyse** the safety implications that need to be considered when using either cold or heat treatments on injured sites.
- 4 **Discuss** the importance of psychological readiness in an elite athlete returning to competition.
- 5 **Discuss** the benefits of using both pre- and post-tests during rehabilitation.



OPTION 4: IMPROVING PERFORMANCE

CRITICAL QUESTIONS

How do athletes train for improved performance?	286
What are the planning considerations for improving performance?	303
What ethical issues are related to improving performance?	319

Source: Personal Development, Health and Physical Education Stage 6 Syllabus © NSW Educational Standards Authority for and on behalf of the Crown in right of the State of New South Wales, 2012

OUTCOMES

When you have read this section you should be able to:

- 1 explain how a variety of training approaches can be used to improve performance
- 2 gather data and devise a training program for particular activities, selecting appropriate training methods.

KEY TERMS

aerobic	micro cycles
anabolic steroids	modified
anaerobic	off-season
biomechanical	overtraining
analysis	peaking
consequences	performance enhancing
diuretic	periodisation
dynamic	physiological
elements	plyometric
ethics	psychological
flexibility	static
hydraulic	strength
innovation	sub phases
isometric	tapering
lethargy	technology
macro cycles	
mask	



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CHAPTER 20

Training for improved performance

IN THIS CHAPTER

Strength training	286
Aerobic training	291
Anaerobic training (power and speed)	294
Flexibility training	297
Skill training	299

The exceptional achievements of today's athletes are the result of an integration of many factors, such as genetics, training, physiology, psychology, biomechanics and skills. Training programs need to be appropriate and specific to each athlete (individual or team member) to ensure improvement in their athletic performance.

Athletic performance is measured by results and when planning for improvement, it is essential to monitor and measure adaptation indicators from specific programs, make appropriate changes to training programs and focus on conditioning.

In constructing performance evaluation indicators it is important to make sure they measure the key factors being tested. Tests should be:

- specific: designed to assess an athlete's fitness for the activity in question
- valid: designed to test what they propose to test
- reliable: able to produce a consistent result irrespective of the tester.

STRENGTH TRAINING

At the end of this section you should be able to analyse two of the training types and draw 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.

The reasons that athletes choose to undertake **strength-training** programs include: losing weight, gaining muscle mass, rehabilitating from injury and developing power or strength. The basic principles of strength training consist of an overload manipulation of the number of repetitions, tempo, sets, repetition maximum (RM), force applied and exercise types. The manipulation and control of the routines are important in order to achieve effective improvement in endurance, strength and size (hypertrophy) or shape of the muscles.

The combinations of repetitions, exercises, sets, force and resistance depends on the goals of the athlete performing the strength training and the specific activity. In order to maximise the benefits of the strength program, these can all be manipulated to achieve overload for the athlete. Strength training can be either isotonic, isokinetic or isometric. Usually, all three types of training appear in some form of strength training program, depending on the individual and their personalised programs.

Table 20.1 Outline of a general strength-training program during phases of a training year

	Priority	Strength training goal
Off-season	High	Hypertrophy and maximal strength
Pre-season	High–medium	Sport-specific power and strength endurance
In-season	Medium–low	Maintain power and strength endurance
Transition	Low	Active rest

The classifications of strength are:

- **maximum (absolute) strength:** the greatest force that is possible in a single maximum contraction
- **elastic strength (power):** the ability to overcome a resistance with a fast contraction
- **strength endurance:** the ability to express force many times over.

Resistance training

Regular resistance training not only strengthens muscles but also strengthens bones by increasing their density. Strength-training programs will benefit the athlete most if the principles of training are adhered to, enabling the athlete to develop and ultimately improve performance (see chapter 5).

Resistance training can also be achieved using hydraulic or elastic resistance.

Elastic resistance

Elastic resistance (resistance bands) gives the greatest resistance towards the end of the movement, while hydraulic resistance gives a fixed amount of resistance throughout the entire exercise, depending on the speed of the movement.

Elastic resistance bands are inexpensive and convenient because they can be used in limited spaces. Smaller muscle groups that are hard to train with more traditional free-weight exercises can be targeted with resistance bands. This makes elastic resistance particularly appealing for athletic conditioning.

Elastic resistance bands are an excellent form of equipment for rehabilitation purposes due to their ability to work specific parts of the body. They are easily adapted to each individual's requirements and are extremely cost effective. This makes them very suitable when athletes travel.



Figure 20.1 Resistance bands can replicate all types of resistance training.

Resistance bands are available in a range of colours that relate to their stiffness or resistance. Colour-coding varies between the brands but, typically, it is as follows:

- yellow (thin)
- red (medium)
- green (heavy)
- blue (extra heavy)
- black (special heavy)
- silver (super heavy).

Sometimes the bands are produced with handles that allow for easier grip. This then allows for more flexibility in how they are used – unlike machine or hydraulic forms of resistance, which have set ranges of motion.

Table 20.2 Resistance training regimes

Purpose	Load	% of RM	Reps	Sets	Speed	Rest
Strength endurance	light/medium	40–60	12–30	15+	fast	minimal
Body mass	medium/heavy	70–90	6–12	3–10	slow	2–4 min
Strength	heavy/very heavy	90–100	1–5	3–5	slow/medium	30 sec–2 min
Power	medium/heavy	80–90	2–6	3–5	fast	30 sec–2 min

Hydraulic resistance

Using **hydraulic** resistance equipment (isokinetic machines) makes it possible for an athlete to perform strength training and cardiovascular training at the same time. Hydraulic resistance can involve exercising in water, where each effort is opposed by the density of the water; or using hydraulic cylinders or equipment where resistance is a function of speed; that is, the faster the movement, the greater the resistance.

Weight training

Weight training is a form of isotonic resistance training involving a manipulation of the number of repetitions (reps), sets, tempo, exercise types and weight used to help increase desired strength, endurance, size and shape. The duration of the resting period and the weight used determine the specific energy system that is used by the body. The types of equipment used in weight training include barbells, free weights, dumbbells, pulleys and stacks in the form of weight machines, and the body's own weight in the case of chin-ups and push-ups. Elite athletes prefer this type of weights because they can isolate particular muscle groups; for example, AFL players can develop their shoulder muscles for strength when catching the ball.

Weight training can be one of the safest forms of exercise. However, as with any form of exercise, improper execution in the use of weights can result in injury.

When the exercise becomes difficult towards the end of a set, an individual may be tempted to cheat; that is, to use poor form to recruit other muscle groups to assist the effort. Poor technique can result in serious injuries, such as lower back injuries when performing a squat with weight. To avoid potential injury, weight-training exercises must be performed with correct technique. Potential injury can also occur when athletes engage other muscle groups to assist heavy weightlifting, putting pressure on different parts of the body; for example, placing undue stress on the lower back by swinging it for bicep curls.

Free weights

Using free weights targets particular muscle groups and engages other muscles to assist in the work. Once the muscles are conditioned, the assisting muscles help to increase the weight used in training the target muscles in order to stimulate the most growth in muscle fibres.

Weight machines

Weight machines (stack or pin-loaded weights) are usually preferred over free weights because there is often uncertainty about the appropriate range of motion (ROM) and risk of over-extending or under-extending with free weights. Injuries are much more likely to occur when the joints go out of the body's preferred range of motion and weight machines help to ensure that this does not happen. There are many ways the athlete can use the weights and overload the system to achieve maximum growth; they include exercising with suspension straps.

Weight training versus resistance training

Resistance training involves the application of elastic or hydraulic resistance to muscle contraction, rather than gravity. Weight training provides most of the resistance at the beginning, initiating joint angle of the movement, when the muscle must overcome the inertia of the weight's mass. After this point the overall resistance alters depending on the angle of the joint.



Figure 20.2 Hydraulic resistance. This exercise works the agonist and antagonist muscles and is often used in wrestling and rugby league training.

In comparison, hydraulic resistance provides a fixed amount of resistance throughout the range of motion, depending on the speed of the movement. Elastic resistance provides the greatest resistance at the end of the motion, when the elastic element is stretched to the greatest extent.

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Figure 20.3 Suspension straps are a good way to use body weight when exercising.

Isometric training

The primary objective of isometric training is to increase strength in selected muscle groups. Isometric training can be used in addition to basic training and involves the static contraction of muscles: the maximum tension of the muscles without changing their length while providing no movements in the joints. There will be an increase in the use of force by more motor units in the exercise and increased muscle tension. Benefits of isometric training to the athlete include:

- ability to focus
- efficient use of time and energy
- simplicity of required equipment
- ability to apply it at home (no gym equipment necessary)
- rapid increase in muscle mass and strength.

Isometric training, however, is not sufficient on its own to improve

performance and needs to be combined with isotonic training. This is because muscles rarely need particular strength in one area during sport, so isotonic contractions give a bigger range of motion when training.

Weight training versus isometric training

Isometric exercise provides a fixed amount of resistance based on the force output of the muscle. This strengthens the muscle at the specific joint angle at which the isometric exercise occurs, with some lesser gains in strength also occurring at proximal joint angles.

In comparison, weight training strengthens the muscle throughout the range of motion the joint is trained in, causing an increase in physical strength from the initiating through to terminating joint angle.

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Figure 20.4 The plank is an isometric exercise.

Table 20.3 Strength training exercise examples for specific muscle groups

Muscle group	Compound	Isolation
Latissimus dorsi	pull-down bent-over row	pull-over
Pectoralis major	bench press (incline/supine) push-ups wide-grip chin up	fly pull-over
Deltoids/trapezius	upright row shoulder press	lateral raise shoulder shrug
Biceps		bicep curls hammer curls preacher curls
Triceps	parallel bar dip	push-down triceps extension overhead triceps extension
Gluteals	stiff-legged dead-lifts squats lunges	hip extension
Abdominals	leg raise	crunch
Lower back	back extension good morning	
Quadriceps	squat leg press dead-lift lunge	leg extension
Hamstrings	lunge	leg curl
Calves		standing calf raise seated calf raise

Activity

- 1 If possible, visit a fitness centre and participate in a beginner training session for one of the following: elastic resistance, hydraulic resistance, weight session (machine or free weights), suspension straps or isometric session.
- 2 Analyse the potential dangers of weight training and recommend preventative measures.

AEROBIC TRAINING

Aerobic training is often performed on equipment such as a treadmill, stair master, stationary bicycle or elliptical machine. However, there are various other means to maintain a weekly training program, including jogging, swimming, brisk walking and playing a range of sports. Aerobic training is only beneficial if the cardiovascular system is overloaded.

Continuous and uniform training

This is a form of aerobic endurance training that involves sustained, low-intensity exercise at a steady rate. It places stress on the aerobic energy system and develops the endurance of the cardiovascular and respiratory systems, rather than speed. Some examples of this form of training are jogging, cycling and swimming. This type of training is good for long endurance events such as marathon running. In order to increase the aerobic capacity, it is essential for the athlete to train closer to the anaerobic threshold, thereby building a greater tolerance to lactic acid. This training program is around 80–90 per cent of maximum heart rate.

The sub-divisions of exercise intensity given in table 20.4 have slightly different effects upon the energy pathways.

Table 20.4 Exercise intensity for aerobic endurance training

Intensity	Energy system	Effects	Duration	Event
50–60% of maximum heart rate or 20–35% of VO_2max Very easy pace	aerobic	metabolises fat	60 minutes plus	slow jogging ultra marathons
60–70% of maximum heart rate or 30–50% of VO_2max Slightly faster pace	aerobic	burns glycogen and fat; improves cardiovascular system – capillarisation	45–90 minutes	marathon
70–80% of maximum heart rate or 50–70% of VO_2max 10 km pace	aerobic	improves cardiovascular system – capillarisation – glycogen burning	30–45 minutes	10 km and marathon
80–90% of maximum heart rate or 65–80% of VO_2max 5 km pace	lactic/aerobic	improves cardiovascular system – capillarisation – glycogen burning – lactate tolerance and removal	10–20 minutes	5 km to marathon
90–100% of maximum heart rate or 80–100% of VO_2max 800/1500 m pace	anaerobic/lactic	improves glycogen burning – lactate tolerance and removal	1–5 minutes	800 m to 5 km



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Figure 20.5 Running on a treadmill is a great way to do continuous training.

Fartlek

Fartlek was developed in the 1930s and is a Swedish word meaning ‘speed play’. Fartlek is traditionally an unstructured type of training performed over natural terrain. Used as continuous and interval training, fartlek allows the athlete to run selected distances and speeds varying the intensity, and occasionally running at high intensity levels. This type of training stresses both the aerobic and anaerobic energy pathways.

Long distance

Long-distance runners (from 1500 metres to 10 kilometres) benefit from more structured sessions. For example, running hard for five minutes (above race pace), then jogging slowly for one minute to recover, and repeating that five or six times.

Multi-sprint

Sports that involve continual stopping and starting benefit from a program such as the following:

- 1 warm-up with a steady jog for 10 minutes
- 2 run hard (three-quarter pace) for 90 seconds
- 3 jog for 60 seconds
- 4 sprint for 15 seconds
- 5 jog for 45 seconds
- 6 run backwards for 30 seconds
- 7 walk for 30 seconds
- 8 run hard for 60 seconds
- 9 repeat 3–4 times
- 10 cool down at a steady pace for 10 minutes.

Fartlek training is valuable in the early pre-season phase of a sport. It is an ideal session for re-introducing athletes to more demanding endurance work after the off-season. During this time, one or two sessions per week of fartlek training combined with interval training is recommended.

Long interval

Aerobic interval training is beneficial for rapidly improving aerobic conditioning, and will build endurance faster than long-duration cardiovascular work. Interval training can be performed on almost any cardiovascular machine, such as the treadmill, stair machine, stationary bike and elliptical trainer. It is also suited to any type of cardiovascular exercise, such as running, cycling or swimming.

Interval training involves relatively long workout periods and shorter rest periods. Workout periods are generally two to five minutes long in this type of training. The idea is not to take it easy for that workout time, but to work at a speed that is challenging. Intensity will depend on the distance covered; for example, a two-minute interval pace is going to be significantly faster than a five-minute interval pace.

The rest interval for this type of training could be up to two minutes. Naturally, the shorter the rest period, the tougher the training will be. Too much rest will allow the body to recover too much, reducing the overall training effect of the exercise.

Examples of long interval training

Example 1

Distance: 400 m
Pace: 70–75% pace (approx 75–95s)
Repetitions: 9
Sets: 3 sets of 3 reps
Recovery between reps: 2 mins (walk 100 m slowly)
Recovery between sets: 4 min

Example 2

Start at corner of a soccer pitch
Jog to halfway, 80% pace to goal line, sprint across pitch width
Jog to halfway, 80% pace to goal line, sprint across pitch width = 1 lap
Repeat 10–12 times
Intensity can be increased by running more intervals or by reducing the length of the rest interval.

ANAEROBIC TRAINING (POWER AND SPEED)

Anaerobic training is shorter in duration than aerobic training (less than two minutes). Oxygen is not a limiting factor in performance and the body requires energy from anaerobic sources (ATP and lactic acid systems). Anaerobic training is all about shorter explosive movements and it helps to build power and speed.

Developing power through resistance/weight training

Power training enables an athlete to apply the greatest amount of their maximal strength in the shortest period of time. The type of power training employed should be sport-specific. Olympic lifts, such as power cleans, may be suitable for sports such as football and rugby. Some plyometric exercises are suitable for soccer and hockey. Dynamic exercises with medicine balls benefit basketball and volleyball. However, most sports benefit from a combination of anaerobic training types.

$$\text{Power} = \frac{\text{Force} \times \text{Distance}}{\text{Time}}$$

Power can be developed by overloading any of the three variables – force, distance or time – while keeping the other two constant.

The main factors to consider when training for power are determining which aspect of power (either strength or speed) is optimally required, and determining when (during competition) this aspect is required. It is important to remember that when time increases, power decreases.

$$\text{Speed} = \frac{\text{Distance}}{\text{Time}}$$

Speed

Speed is the quickness of movement of a limb, whether this refers to the legs of a runner or the arm of a shot-putter. Speed is an integral part of most sports and can be expressed as any one of, or a combination of, the following: maximum speed, elastic strength (power) and speed endurance.

For many sports, acceleration and speed over a short distance are very important; in particular, sports such as field hockey and basketball.

Some examples of training methods used in developing power and speed include plyometrics, resistance training, sports loading, over speed training and sprint training. These methods are designed to enhance fast-twitch fibres and improve explosive strength involved in the athlete's chosen sport. It is important that reps are performed fast to develop the fast-twitch fibres essential to improve power and speed; otherwise slow-twitch fibres will be recruited and the desired adaptation will not occur.

Plyometrics

Many athletes use plyometric exercises to build power and speed, improve coordination and agility and effectively improve sports performance. However, it is important to recognise that these are high-risk exercises, and if they are performed incorrectly they can increase the risk of injury.

Plyometric exercises are specialised training techniques used to develop athletic power – strength and speed. Plyometric training involves high-intensity, explosive muscular contractions that invoke the stretch reflex, which is stretching the muscle before it contracts so that it contracts with greater force. The most common plyometric exercises include hops, jumps and bounding movements. One popular plyometric exercise is jumping off a box and rebounding off the ground onto another higher box. Other examples include ladder drills where sprinting and bounding occur, and running in and out of witches' hats or markers.

The most important aspects of a safe and effective plyometric program are to ensure a safe landing area and develop a safe landing technique. This means that the athlete lands softly on the toes and rolls to their heels. Using the whole foot (and a larger surface area) for landing helps spread the impact on the joints. The other key to proper landing is to avoid any twisting or sideways motion at the knee.

Plyometric exercises

In small groups, choose a power or speed event and devise three plyometric exercises for a novice athlete. Participate in each exercise, after completing an adequate warm-up.



Plyometric exercises



Figure 20.6 Box jumps are a common plyometric exercise, involving high-intensity movements.

Short interval

Interval running is an example of **short interval training** that enables the athlete to improve the workload by combining heavy bouts of fast running with recovery periods of slower jogging. During the heavy fast run, lactic acid is produced and a state of **oxygen debt** is reached. During the interval (recovery), the heart and lungs are still stimulated as they try to pay back the debt by supplying oxygen to help break down the lactates. The stresses placed on the body cause an adaptation including:

- capillarisation
- strengthening of the heart muscles
- improved oxygen uptake
- improved buffers to lactates.

All the above lead to improved performance, in particular within the cardiovascular system. This method is extremely effective when training for sports that require all-out repeated efforts (such as football, soccer and hockey) because it promotes increased pace and recovery.

Before undertaking interval training, it is important to consider a few simple rules:

- Ensure an adequate warm-up is done.
- Ensure the various elements of the session are suitable for the athlete, such as:
 - the length of the work interval – the longer it is, the better the effect
 - the pace should be comfortable, raising the athlete's heart rate to the required percentage of maximum heart rate (MHR)
 - the number of repetitions should reflect the age and condition of the athlete
 - in the rest interval the athlete should be sure to bring their heart rate down to near 100–110 bpm.
- Variables can be gradually altered as improvements are made to increase intensity.
- Ensure the running surface is suitable and safe.

Circuit training

Circuit training is another common method of interval training and is an excellent way to improve mobility, strength and endurance. The circuit-training format uses a group of six to 10 strength exercises that are completed one after the other, each separated by a brief timed-rest interval. Each exercise is performed for a specified number of repetitions, or for a prescribed amount of time, before moving on to the next exercise. The total number of circuits performed during a training session may vary from two to six depending on whether the training level is beginner, intermediate or advanced; whether it is a preparation or competition period of training; and the training objective.

Circuit training is an approach to training that can be used to develop several aspects of fitness. Circuits can be designed to include many types of activity and equipment specific to a certain activity or sport.

Design a circuit

There are many factors involved in the preparation of an athlete for optimum performance.

- 1 Select either a power athlete or an endurance athlete.
- 2 Design a circuit-training program for this athlete, justifying the key features that would need to be included.

FLEXIBILITY TRAINING

Flexibility training involves maximising the ROM and stability of the muscles by performing a series of exercises. The benefits are improved blood flow in the athlete's muscles and a lower risk of injury when training or competing.

Flexibility requires that the muscles lengthen and is directly related to the number of muscle fibres engaged. The more fibres stretched, the more length will be developed in the muscle. All stretching movements need to be safe, even though the 'stretch reflex' mechanism will try to stop the muscles from over-stretching and tearing. There are three main types of stretching exercises that help accomplish these goals: static, dynamic or ballistic and PNF.

Static stretching

Static flexibility is the range of possible movement about a joint and its surrounding muscles during a passive movement. This type of flexibility requires no voluntary muscular activity. Static stretching is moving a limb to the end of its ROM and holding it in the stretched position for 15–60 seconds. Depending on the comfort and fitness level of the athlete the stretch may need to be held for shorter or longer durations.

Static stretches are often combined with dynamic stretches at the beginning of an activity. They help improve circulation and prepare the muscles for more vigorous activity, decreasing the chances for tearing or tendon stretching.

Static stretches are usually used in the cool-down phase of an exercise session to decrease the onset of muscular soreness (DOMS) by ridding the body of the lactic acid build-up from exercise.



Flexibility
exercises

Flexibility

- 1 Participate in a variety of flexibility tests; record and then evaluate your results.
- 2 a Find some video clips of flexibility exercises. There is a worksheet on your student website with 18 flexibility exercises.
b Design your own flexibility program to improve weaknesses and maintain flexibility.



Figure 20.7 Static stretching is the simplest and easiest form of flexibility training.

Dynamic stretching

Dynamic flexibility is the opposite of static; it requires voluntary muscle actions. Dynamic flexibility is about movement and the available ROM during active movements. Dynamic stretches are achieved by performing functional-based exercises, which use sport or traditional movement patterns to help the athlete prepare the body for the movements that will be executed at training or during competition. An example of dynamic stretching is controlled leg and arm swings that take the joints gently to the limits of the athlete's ROM.

Ballistic stretching

Ballistic stretching uses the momentum of a moving body or a limb – through a bouncing motion – in an attempt to force it beyond its normal range of motion. Ballistic stretches force the limb into an extended range of motion when the muscle has not relaxed enough to enter it. It involves fast, jerky movements where a double bounce is performed at the end of a range of movement. Ballistic stretching should only be used by elite athletes under supervision by a trainer.

This form of stretching has been found to be hazardous towards the body because of possible damage to the muscle reflex. A major concern is that it can injure vital muscles and nerves by applying sharp jerking movements. It is even possible for tissue to be torn off the bone. It is important not to confuse dynamic stretching with ballistic stretching.

Proprioceptive neuromuscular facilitation (PNF)

PNF is a form of stretching that involves a combination of passive and isometric exercise. It can help to maximise the range of movement to best prepare the athlete's body for the more strenuous exercise of a session.

In PNF, the muscle group is stretched under tension and then contracted for several seconds. These exercises are often carried out in pairs, with a partner applying resistance to inhibit movement and making the stretch more effective. If performed incorrectly, PNF can lead to muscle sprains or joint damage.



Celty Images/Klaus Vedfelt

Figure 20.8 PNF stretching can be done with a partner or with a resistance band (or both).

SKILL TRAINING

Skill is an athlete's ability to choose and perform the right techniques at the right time, successfully, regularly, and with a minimum of effort. Athletes use skill to achieve athletic objectives; for example, sprinting 100 metres in 10 seconds or scoring a penalty goal in football. Because skill is acquired, it has to be learned. There are three broad domains of learning a skill:

- **Cognitive skill (knowing):** involves the thought process of knowing and understanding the vital aspects of the sport.
- **Perceptual skill (feeling):** where success at the sport depends on mental attitude and developing psychological skills to cope with stress.
- **Psychomotor skill (doing):** where excellence in sport requires the execution of precise, fluent and effective movement patterns that require the combination of perceptual and motor skills.

The reason we engage in games is not to perform a skill or to display physical prowess, but to use the skills developed to play against the structures of the game and the challenges set by an opponent.

When planning skills practice a number of factors are taken into account, including:

- athlete's age and current skill level
- type of skill being trained for (how quickly the athlete will fatigue)
- how to keep the athlete motivated.

Drills practice

Drills are specific activities that replicate the skills used in a sport. The idea is to start with a basic drill or activity and as the athlete begins to gain a certain level of success, the coach adds or loads more components or requirements needed to complete the drill. This is intended to increase the challenge and thereby the level of development. The use of visual aids and demonstrations are important to show the correct skill technique before it is practised.

Drills can become repetitive and athletes, especially young athletes, can start to lose interest by continually doing drills during practice. In this instance, it is essential to provide continual feedback to the athlete to ensure that the correct technique is practised.

Drills are a vital part of the warm-up session to prepare the muscle movements for training or competition. The type of practice will have a huge effect on the participation rate of the athlete.



Alamy Stock Photo/Adrian Sherratt

Figure 20.9 Skill training is important from an early age.

Modified and small-sided games

Modified games are practices that focus on different aspects of team play through games. They are often undertaken in a defined space, such as a grid. In football, many variations can be used depending on the objective of the game; for example, 2 versus 1 or 2 versus 2.

Conditioned games can be used to develop the ability to retain possession (passing sequences), to create or reduce space (3 versus 2, etc.), or to develop contact or reaction skills. Modified scoring systems (such as target scores or time limits) and modified playing rules (such as one touch or two touches and have to pass) can be used to focus on particular techniques or aspects of decision-making.

Modified games apply the skills learnt to team situations. Players must make decisions on where and when to move in order to combine as an effective unit as in a real game situation. Such games encourage awareness of time and space but also help develop specific characteristics of team play, including supporting play and communication. By not limiting players to particular positions the coach allows each player to develop greater decision-making skills and tactical appreciation for different aspects of play.

Small-sided games

Small-sided games are an extension of fun and grid games, but are basically smaller versions of full games. Smaller numbers are used to ensure that there is plenty of ball contact for all athletes. Positions may be used, but it is advisable to allow individual players to play in as many different positions as possible over time. These modified games cater for individuals who may need certain advice in areas of the game; for example, while AFL 9s replicates AFL but without

the contact, the athletes must practise their defensive patterns and maintain the structure required for a real game.

Games for specific outcomes

Tactical awareness

Tactical awareness applies to individual and team sports. In a game situation, analysing tactics is based on five components of play, and these can be broken into two groups – initial and advanced components. The initial components contain three aspects:

Space

Where an object should be placed in the area of play and where a player should go in the area of play.

Time

When to execute a skill within a game, when to create time to play the object.

Force

How much and where to apply force on an object for height, directional control and distance.

The spatial component is the foundation of tactical awareness. Once players have learnt how and why to manipulate the use of space, then the time and force components become a natural progression to growing tactical awareness. The advanced components add the relationship aspect of tactical play.

Opponents use space, force and time to affect play and to create an unpredictability that keeps the outcome of play uncertain and tests the ability of opponents. This relationship focus is fundamental to making a game play. The advanced components that focus on the relationships between opponents are:

- in possession (offensive play)
- not in possession (defensive play)
- about to gain/lose possession (turn-over).

For instance, during a game of soccer both teams will be continuously in one of the three phases of play.

Decision-making

Small-sided games can promote decision-making and tactical awareness skills associated with each of these phases. The progression from practising the technique, through drills, to applying it in a game situation should be gradual, promoting success and confidence in the player. This altering of the dimensions of the game allows the athlete to experience something different but still maintain the same high level of skill required to execute skills in a game situation.

A small-sided game could include 7s touch rugby.

Training

- 1 Analyse potentially harmful training procedures when training for improved skill in young athletes, and recommend preventative measures.
- 2 There are many factors involved in the preparation of an athlete for optimum performance.
 - a Select either a power athlete or an endurance athlete.
 - b Design a training program for this athlete, justifying the key features that would need to be included.

CHAPTER SUMMARY

- The basic principles of strength training consist of an overload manipulation of the number of repetitions, tempo, sets, force applied and exercise types. The manipulation and control of the routines are important to achieve effective improvement in endurance, strength and size (hypertrophy) or shape of the muscles.
- Strength is developed by resistance, weight and isometric training methods.
- Aerobic training places stress on the aerobic energy system and develops the endurance of the cardiovascular and respiratory systems.
- Anaerobic training is all about shorter explosive movements and will help build power and speed; it can be developed through resistance or weight training, plyometrics and short-interval training.
- Flexibility training involves maximising the range of motion (ROM) and stability of the muscles by performing a series of exercises. The methods include static, dynamic, ballistic and PNF stretching.
- Skill training sessions need to be varied to provide motivation and enjoyment. A session should include drill practices, modified and small-sided games that promote game-specific outcomes.

CHAPTER REVIEW ACTIVITIES



Extra
exam-style
questions

- 1 **Analyse** potentially harmful training procedures when training for improved skill in young athletes, and recommend preventative measures.
- 2 **Webquiz: Research** the various types of strength training programs on the Internet.
- 3 **Compare** a resistance band-training program with a weight-based training program.
- 4 **Describe** the differences between the various types of aerobic training.
- 5 **Compare** the benefits of isotonic, isometric and isokinetic exercises in the design of resistance training programs.
- 6 **Compare** resistance training for strength with resistance training for endurance.
- 7 **Explain** how the results of a test for aerobic capacity can be analysed and used by a coach to plan for endurance training.
- 8 **Discuss** how athletes could use plyometric training techniques to increase power and speed. **Design** some plyometric exercises for a sport of your choice.
- 9 **Outline** the advantages and disadvantages of plyometric training.
- 10 **Define** DOMS (delayed onset muscle soreness).
- 11 **Outline** the differences between static and dynamic stretching techniques.
- 12 **Describe** how a coach could evaluate the effectiveness of the skill instruction element of a training session.
- 13 **Discuss** the benefits of a hydraulic activity such as a cool-down in a swimming pool for an elite sporting team.



CHAPTER 21

Planning for improved performance

IN THIS CHAPTER

Initial planning considerations	303
Planning a training year (periodisation)	308
Designing a training session	312
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When you have read this chapter you should be able to:

- explore the relationship between physiology and movement
- design training plans to improve athletes' performance
- gather information to design training sessions that allow safe participation.

Planning considerations for performance are vital to ensure that the athlete's training and competition requirements are adequately catered for throughout the short-term or long-term training cycles to effectively improve performance. This chapter looks at what needs to be planned so that performance can improve in training programs, how training sessions are structured to maximise learning, and how athletes maintain high levels of motivation so that skills can be learnt.

INITIAL PLANNING CONSIDERATIONS

The purpose of a training plan is to identify the work to be carried out to achieve an athlete's performance objectives. Training plans can be drawn up to identify long-term objectives (such as preparing for Olympic competition over four years), as well as for short-term plans for an athlete's forthcoming season.

The first stage in preparing a training plan, be it for an individual or a team, is to gather background information and the objectives for the forthcoming season. The kinds of information that should be collected are:

- personal details
- objectives and goals
- past experience
- competition information
- competition experience (club, county, national, country)
- competitors (knowing who the competitors are and their personal bests (PBs))
- athlete's other commitments
- time available for training
- medical history
- athlete's current skill level
- training facilities.

Athlete analysis process

Below is a sample template to use when analysing an athlete. This template is also available on your student website so you can customise it.



Scaffold

Athlete information

Name	Gender	Event	PBN
Age	Developmental age (if U21)	Training age	LTAD stage
Time you have coached the athlete	Training sessions/week	Other sports/interests	
Athlete's objectives for this season			
School/work hours	Support (family, friends, teachers)		

Athlete strengths and weaknesses

Component	Ideal	Current
Endurance	VO ₂ max (mL/kg/min)	
Speed	100 m (seconds)	
Anaerobic endurance	RAST max power range	
	Min power range	
	Fatigue index	
Strength (1RM)	Bench press (% of body weight)	
	Leg press (% of body weight)	
	Squat (% of body weight)	
	Leg curl Leg extension	%
Strength elastic	Sergeant jump test (cm)	
Core stability	Complete core stability test	





If this is not the first program generated for an individual or team, then it is important to analyse the last training program and do a SWOT analysis looking at strengths, weaknesses, opportunities and threats to the program.



Alamy Stock Photo/Sean Prior

Figure 21.1 Your training plans should be discussed with the coach and other athletes.

The first step when creating a training program is to identify the ideal attributes, such as body build, strength, endurance, speed, flexibility and skill ability, that will allow athletes to achieve agreed goals.

The next step is to compare the athlete against an ideal athlete in order to identify differences in their strengths and weaknesses. This is called the gap analysis. Addressing the gaps may require thinking in terms of long-term planning – four to eight years, for example.

Performance and fitness needs

Individual needs versus team needs

Performance and fitness needs vary according to the individual athlete or team's level of competition, goals and expectations. For example, an Olympic marathon runner is going to require more in-depth analysis and program design regarding performance and fitness achievements than an amateur or recreational athlete who enjoys fun runs to maintain health and wellbeing. While the amateur athlete trains and aims to achieve a personal best result and their training program is designed around their lifestyle, the elite athlete has the program as a priority.

This example can also be used to compare a local cricket team with the Australian cricket team. The aims of the athlete in an amateur team are to develop skills and fitness levels to enable them to compete to their fullest potential. A player in the Australian cricket team, however, is expected to maintain peak fitness and skill levels that enable them to integrate with a professional team. This player requires an individually designed training program (such as batting or bowling) that incorporates the training schedule and performance goals of the whole team.

This type of planning must take into account the age of participants because this will influence the activities undertaken in the training session. The level of competition is also important because it is difficult to plan for a division one session if the team is made up of division four players who do not have the skill level to complete the higher order skills.

While it is important to have skill practice as part of the session, it is also important to include fitness, meeting the needs of each athlete. Fitness forms a major part of pre-season training and, as the season gets closer, the skill training increases. While that does not mean that fitness training diminishes, it may become hidden in skill-based activities that form part of a match fitness scenario – both in training and through games played.

Table 21.1 An eight-week beginner 5 km training guide

Week	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
1	You choose: Rest, walk/ run or cross-train Notes:	2 km run Notes:	You choose: Rest, walk/ run or cross-train Notes:	2 km run Notes:	Rest	2 km run Notes:	30–60 min walk Notes:
2	You choose: Rest, walk/ run or cross-train Notes:	2.5 km run Notes:	You choose: Rest, walk/run or cross-train Notes:	2.5 km run Notes:	Rest	2.5 km run Notes:	35–60 min walk Notes:
3	You choose: Rest, walk/ run or cross-train Notes:	3 km run Notes:	You choose: Rest, walk/run or cross-train Notes:	3 km run Notes:	Rest	3 km run Notes:	40–60 min walk Notes:
4	You choose: Rest, walk/ run or cross-train Notes:	3.5 km run Notes:	You choose: Rest, walk/ run or cross-train Notes:	2.5 km run Notes:	Rest	3.5 km run Notes:	45–60 min walk Notes:
5	You choose: Rest, walk/ run or cross-train Notes:	4 km run Notes:	You choose: Rest, walk/run or cross-train Notes:	3 km run Notes:	Rest	4 km run Notes:	50–60 min walk Notes:
6	You choose: Rest, walk/ run or cross-train Notes:	4.5 km run Notes:	You choose: Rest, walk/run or cross-train Notes:	3 km run Notes:	Rest	4.5 km run Notes:	55–60 min walk Notes:
7	You choose: Rest, walk/ run or cross-train Notes:	4.5 km run Notes:	You choose: Rest, walk/ run or cross-train Notes:	3.5 km run Notes:	Rest	5 km run Notes:	60 min walk Notes:



>>	Week	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
	8	You choose: Rest, walk/ run or cross-train Notes:	5 km run Notes:	You choose: Rest, walk/run or cross-train Notes:	3.5 km run Notes:	Rest	Rest	Race day

Source: Medibank CC BY-ND 4.0 (<https://creativecommons.org/licenses/by-nd/4.0/>)

Schedule of events and competitions

Careful consideration must be given to selecting an athlete's events or competitions to ensure that they are not over-committed and inhibited in their performance. This is especially important for young athletes and it also avoids the onset of overtraining.

Planning should involve gathering competition information (such as dates), athlete's motivation, climate and demands of the sport, resource availability and required qualification times for competitions. In collaboration with the athlete and coaches, this information will be incorporated into the athlete's training plan in the most effective way to prepare for competition dates, the goal being to develop and enhance the athlete's abilities for best performance results. The schedule is best planned by working backwards from the competition date and allowing for **tapering** and **peaking** to occur.

Climate and season

Many athletes, especially elite athletes, train all year round with intensity increasing during pre-competition and competition periods. Catering for climatic and seasonal changes will have some impact on the athlete's training program design.

Australians are fortunate to enjoy good weather all year round and, because outdoor sports are generally seasonal (summer or winter), a specific training program is often designed with a focus on performance adjustments rather than weather effects.

Elite athletes may train in preparation for events in another country by acclimatising in similar conditions to that country. For example, an athlete who will be competing at high altitudes may train in a heat tent or a tent with lower levels of oxygen. Also, an alpine skier competing at the winter Olympics will need to train overseas because the Australian ski season only lasts a couple of months of the year.

Review activities

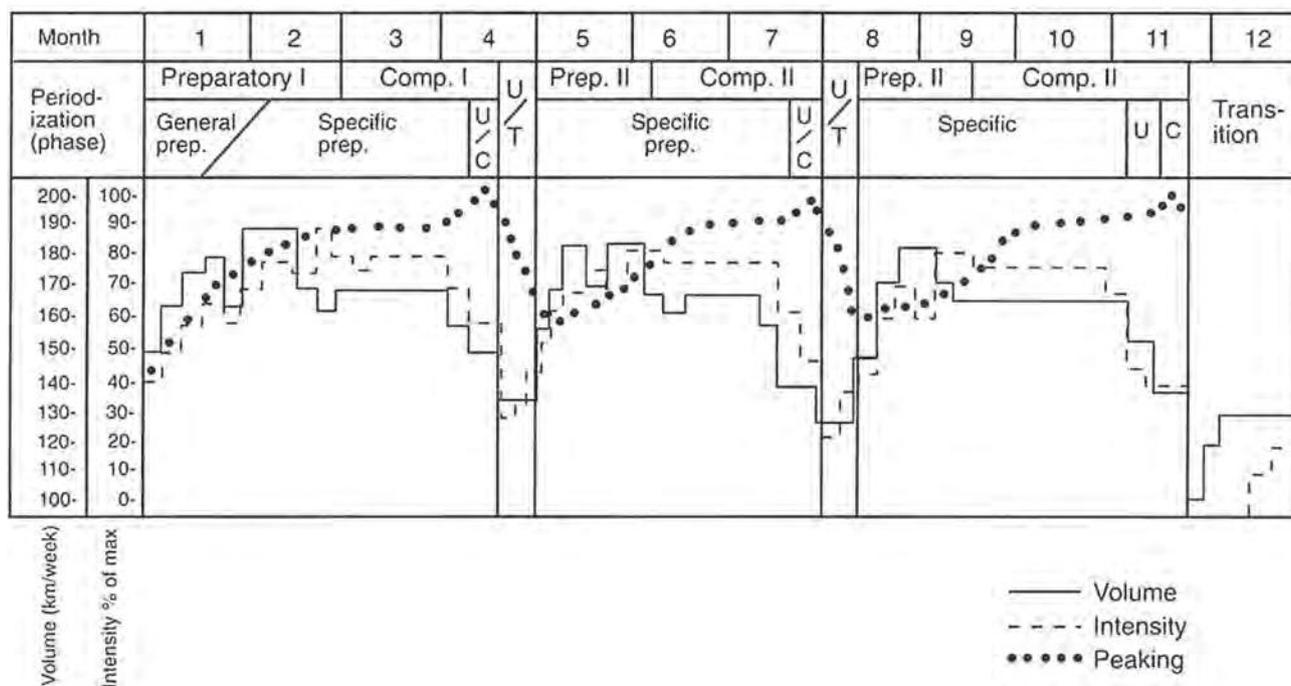
- 1 Describe the specific considerations of planning for performance in events/competitions.
- 2 How would this planning differ between elite athletes and recreational/amateur participants?
- 3 Compare the training programs of an endurance athlete and a beginner for a half marathon. Why would one program be planned in 'units of time' and the other in 'units of distance'? Locate training programs online.

PLANNING A TRAINING YEAR (PERIODISATION)

When you have read this section you should be able to develop and justify a periodisation chart of the fitness and skill-specific requirements for a chosen sport.

One of the major roles of coaching is to prepare an individual athlete or team for competition, generally over a year-long cycle. For elite athletes, this yearly plan is often incorporated into a longer-term plan with a goal of maintaining their fitness and skill levels.

Coaches design the annual training plan, which is usually separated into three periods or phases: pre-season (preparatory), in-season (competition) and off-season (transition). This scheduling method is called **periodisation**. These phases are further divided into subphases, incorporating macrocycles, and including mesocycles and microcycles, to form the training year.



Source: TO Bompá, *Theory and Methodology of Training: the key to athletic performance*, 3rd edition, Kendall/Hunt, Iowa, p. 211

Key: U refers to unloading or tapering phase before C, which is the competitive phase

Figure 21.2 Planning and periodisation graph for a track and field sport (two cycles). Note that the transition phase replicates the off-season and the peaking coincides with decreased volume and intensity. Power and speed are most important.

Phases of competition

The main focus of the pre-season phase is to develop resilience to injury and gain general strength to address athletic weaknesses. The competition phase should then focus on more sport-specific strength and power endurance. The transition phase is designed to unload the body from the stresses of the particular sport with an emphasis on cross-training and injury rehabilitation or conditioning.

Pre-season/preparatory phase

Pre-season can be divided into basic conditioning and specific conditioning phases. Basic conditioning emphasises the development of general physical performance capacities, which include

aerobic fitness, muscular endurance, strength and mental skills. The intensity of performance capacity increases from low to medium, and is adjusted where necessary to cater for individual needs.

Specific conditioning focuses on increased intensity and specialised training. The focus of this phase is on technical and tactical skill development, physical training that is more sport-specific, and mental skills. In particular, as part of the pre-season, specific energy systems that dominate the chosen sport are trained. The closer competition gets, the more training will shift from pure conditioning (that continued on from post-season) to skill-based activities replicating the game.

In-season/competition phase

The main objective during this phase is to compete consistently while maintaining fitness levels that enable good completion of skills. The overall training load is reduced with intensity increasing. Mental and tactical preparations replace physical and technical training, with the emphasis on individual or team strengths.

Tapering needs to be considered during this phase to ensure that peaking is achieved for best performances. Peaking for competition must be considered in various sports. While an elite tennis player must plan for many competitions on the Grand Slam circuit, a national rugby league (NRL) team prepares for the finals in September or October.

Off-season/transition

During the off-season, athletes aim to recover from the physiological and psychological stresses of intense training and competition. They focus on maintaining endurance, controlling body weight, undertaking specialised programs to work on weaknesses, and constructing future training plans based on the evaluation of results from the previous season.

Effective multi-year planning ensures that athletes come into the next year a step higher in physical conditioning than in their previous season.

Subphases

Macrocycles

Once the year begins, it is separated into macrocycles – preparatory, competition and transition. These phases could be anywhere from four to 12 weeks' duration depending on the competition length of season. Macrocycles can then be broken down into smaller mesocycles. These cycles of time are designed to achieve the goals of each macrocycle. For example, a 12-week-long, pre-season macrocycle may be separated into two mesocycles of six weeks, with each mesocycle having specific goals within the phases of basic conditioning and specific conditioning.

Mesocycles

Mesocycles can be further broken down into microcycles for the purpose of fine-tuning the training involved.

Microcycles

A microcycle is a shorter training period of about seven to 10 days and includes more detailed information on the intensity, frequency, duration and sequencing of a training session. These breakdowns in phases may appear complicated and time-consuming but they provide the framework to ensure that the athlete is continuing to develop their skill and is being motivated throughout the season. It is important to be aware of any issues that may arise during this time, especially injuries or intensity training being too high or too low, and to make the appropriate adjustments to cater for individual or team needs.

Table 21.2 Sample annual plan for a football team

Annual plan for _____												
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
			Pre-season	In-season								
Mesocycles	Conditioning		Conditioning	Unloading	Unloading	Unloading	Peaking		Transition		Conditioning	
Microcycles												
Macrocycles	Preparation			Competition				Finals		Transition		
Strength	General		Maximum	Maintain								
Speed	Develop running speed			Develop movement speed								
Endurance	Develop aerobic capacity			Maintain aerobic capacity								
Flexibility	Develop			Maintain					Maintain			
Skill	Improve specific skills			Develop skills under pressure					Improve basic skills			
Tactics	Implement			Consolidate					Devise and test			
Psychology	Goal setting			Simulate competition strategies				Increase motivation		Goal setting		
Training factors												
Volume												
Intensity												
Testing												
Conditioning												
Skill												
Tactical												

Adapted from TO BOMPA, *Theory and Methodology of Training: The Key to Athletic Performance* (3rd edition), Kendall/Hunt, Iowa, p. 211

Peaking

Athletes use the term peaking to describe being in the absolute best condition – physically and mentally – at a specific time for an event or race. Peaking is not easy to achieve and it requires a lot of experience and planning; however, there are phases that can promote peaking for an event.

Depending on the sport, an athlete may need to peak several times during the year and during the season, but most elite athletes aim for one primary event or goal, and plan the rest of the training season around that event. Recreational athletes can easily have multiple peaks of a lesser degree. This is common if the athlete is participating in many different ‘fun runs’ during the year. Team sports generally have a specific season and training is planned for athletes to continually improve and peak during the finals season.

The basic approach to performance peaking is relatively simple. In the weeks leading up to the major competition, training levels are increased until a couple of weeks prior to the event. Then the training tapers off to allow extra recovery. However, it is essential that the quantity of training is reduced and the intensity remains at its previous high level; the reduced period of training must still include adequate warm-up and cool-down time. With shorter training sessions, it is often possible to increase the training intensity without overtraining while allowing more recovery time.

When peaking occurs, the athlete will display physiological and psychological indicators, including:

- a state of excellent health
- efficient rate of recovery from training
- the body reflects a high state of functional synergism (acting together)
- technical and tactical preparation are optimal
- superior neuromuscular coordination
- heightened self-confidence and motivation
- quick adaptability to training stimuli.

Tapering

Tapering involves a gradual reduction in an athlete’s workout demands in order to allow the body to recover from the stress. Tapering reduces strain on fatigued muscles and allows all of the athlete’s systems to restore themselves after intensive training sessions. For example, a sprinter’s fast-twitch nerves and muscles may need a few days of rest in order to handle the demands of an upcoming competition. A long-distance runner’s slow-twitch nerves and muscles, however, may take several weeks to fully recover before a race. Different types of athletes require different tapering periods, since different muscle and nerve groups are used in competition.

The practice of tapering is a balance between a beneficial recovery period and a potentially damaging loss of fitness. A coach must be able to evaluate an athlete’s fitness level after intensive training and calculate an appropriate tapering time. Most athletes begin tapering anywhere from three weeks to three days before a competition, depending on the demands of the sport. Sports involving endurance or strength generally require a longer tapering period than sports involving speed or agility. Tapering is usually useful for getting rid of waste products in the system, healing injuries and freshening up the body in readiness for performance.

Tapering is a very common practice among runners, since the athlete does not want to be at the starting line of a race with heavy legs caused by overtraining. Other athletes want to be at peak form as the competition begins. At the elite level of athletic competition, such as the Olympic Games, the difference between first and second place can literally be a matter of properly timed tapering. In table 21.2 note the tapering of volume and intensity as competition gets closer and the athlete is peaking.

Sport-specific subphases

Mesocycles are often referred to as subphases and these are specific to the requirements of the sport. For example, specific conditioning in an annual plan for a marathon runner will be different to that for a hockey player.

First fitness, then skills, then fitness

The main emphasis of the phase is developing performance capacities and new technique levels to match the improved fitness components from the conditioning phase. Improving technical and tactical elements should be a focus of this subphase to prepare an athlete for competition. As the athletes move from one phase to the next (such as pre-season to in-season) there should also be a corresponding move from fitness-based activities to more skill-related activities. Consequently, when the season is over and in-season moves to transition or off-season, athletes move from skill-related activities to work on their fitness or conditioning.

Review activities

- 1 Design an annual training chart for a 1500-metre swimmer who will compete at regional, state and national meets throughout the year.
- 2
 - a Research the training demands of pre-season training and in-season training for a local netball team and a state team.
 - b Compare and justify the differences in training volume and training intensity for each level at each time of year.

DESIGNING A TRAINING SESSION

A training session for an athlete should be designed with a specific goal in mind, such as working on agility, speed, defensive tactics or ball control. A session without any structure or guidance will lead to unsatisfactory results. The key is not the amount of time spent training, but the quality and development that the athlete gains from the session. As a rough guide, the training session should be broken down into:

- session overview: 5 per cent
- warm-up: 10 per cent
- conditioning: 25 per cent
- skill instruction: 45 per cent
- cool-down: 10 per cent
- evaluation: 5 per cent.

Health and safety considerations

The safety and the health of athletes should be a coaching priority. Athletes should be free of illness and injury when training to prevent medical conditions arising. Climatic and environmental conditions must be considered and catered for, as well as the training surfaces and equipment.

A quality training session is planned and organised to prevent unnecessary injury to the athlete.

This should involve:

- scheduling appropriate warm-up and stretching time
- setting and supervising safety rules and using appropriate protective clothing and equipment
- using safe equipment and playing surfaces
- scheduling regular rest intervals, especially in hot conditions.

Provide an overview of the session to athletes (goal specific)

At the start of the training session, the athlete should be given an overview and be able to discuss the session's plan and objectives. In this way, they know what is expected of them. During the overview the coach should provide an open forum for athletes to evaluate past performances and raise specific issues that may need to be addressed, such as injuries, attendance or punctuality. The training session should involve clear, concise communication with the athletes.

The objectives of the session should be goal-specific, providing the athlete with a clear understanding of the instruction and methods that will be used to achieve the goal. For example, if the athlete is defending a short corner in hockey, they need to understand the positioning and tactics when the ball is played.

Warm-up and cool-down

An adequate warm-up and cool-down will improve an athlete's level of performance and accelerate the recovery process required before they train or compete again. An element of the warm-up program should include event-specific drills to stimulate the appropriate neuromuscular action for the specific range of movement for that sport. The warm-up should consist of at least 10 minutes of general aerobic activities, such as a dynamic warm-up, followed by specific stretching exercises.

The warm-up sets the tone for the session to follow, and a comprehensive dynamic warm-up is the most focused, effective and productive. Specific advantages of a dynamic warm-up compared with the more traditional 'sit and stretch' routine are that it:

- involves continuous movement, therefore maintaining warmth in the body and muscles. An athlete's core temperature may drop by two to three degrees after sitting and stretching for 10 to 15 minutes.
- prepares the muscles and joints in a more sport-specific manner than static stretching. A warm-up should end in a light sweat.
- enhances coordination and motor ability, as well as the nervous system
- prepares the mind for the workout ahead. Proper mental preparation for any sport is vital; 'sit-and-stretch' routines can be an excuse for daydreaming and chatting whereas a dynamic warm-up forces athletes to focus and concentrate on the task at hand.
- finishes with a 5- to 10-minute cool-down. Stretching at the end of a session is important to help rid the body of waste products and return the body to resting levels.



Alamy Stock Photo/Sean Prior

Figure 21.3 Static stretching can be used as part of a warm-up or cool-down.

Skill instruction and practice

The in-season training session is mainly concerned with skill instruction and practice. Skills can be taught by various methods, such as verbal instructions, demonstrations, video displays, diagrams and photo sequences. Whichever method is chosen, it must be clear and concise so that the athletes understand the concepts of the skill.

Some skills may need to be broken down into sub-routines and, as the patterning develops over time, the range of skills can be combined to allow for mastery of the whole skill. For example, the tennis serve can be difficult for young children, but if broken down into parts, such as ball toss and hitting the ball, it is easier for them to learn. The athlete can then go on to learn various serve techniques; for example, the 'top spin' serve.

The skill session should include a revision of previously learnt skills, any new skill instruction and strategies, and practice drills for skill development. It is important to prepare a variety of skill practices ranging from individual and group drills, through to competition-like situations and modified games. Depending on the age of the athlete, much of the skill instruction could take place as part of a modified game that also focuses on conditioning. In this way, while the athlete is focusing on skills they are also getting a conditioning workout.

Conditioning

It is essential to identify the most important fitness components for success in specific sports, and design sport-specific conditioning within training sessions that will enhance these fitness components and energy systems.

Sports conditioning and fitness training is stress – not mental stress, but adaptive body stress. The athlete's body needs to experience a certain amount of stress or overload in order to increase physical capabilities. In most cases, general training sessions are not enough to develop the progression of physical conditioning.

During pre-season training, the session time and intensity allocated to conditioning should be greater than that of the competitive or transition phases of the training program, in order to effectively prepare the athlete for competition.

The time allocated to conditioning during in-season training sessions should be 15 to 20 minutes, following the skill training session. However, some coaches prefer conditioning to follow the warm-up because the element of fatigue can simulate a real game situation while practising skills.

Evaluation

Good coaching methods include an evaluation of the training session. This allows the coach and the athlete to share feedback on the effectiveness of the session and discuss whether specific goals were achieved; for example, positional play in a short corner in hockey.

Athletes should be able to discuss their opinions about issues that may have resulted from the session. The coach can then adjust and plan effective training sessions based on the evaluation information. At the conclusion of the evaluation session, the coach and the athlete should discuss any information relating to the next training session, game or game preparation. Some coaches go to the extent of providing a coaching evaluation form to parents and athletes to gain their feedback on the effectiveness of coaching methods presented during the session. Each session should end with a discussion and review of what happened at training and what will happen in the future.

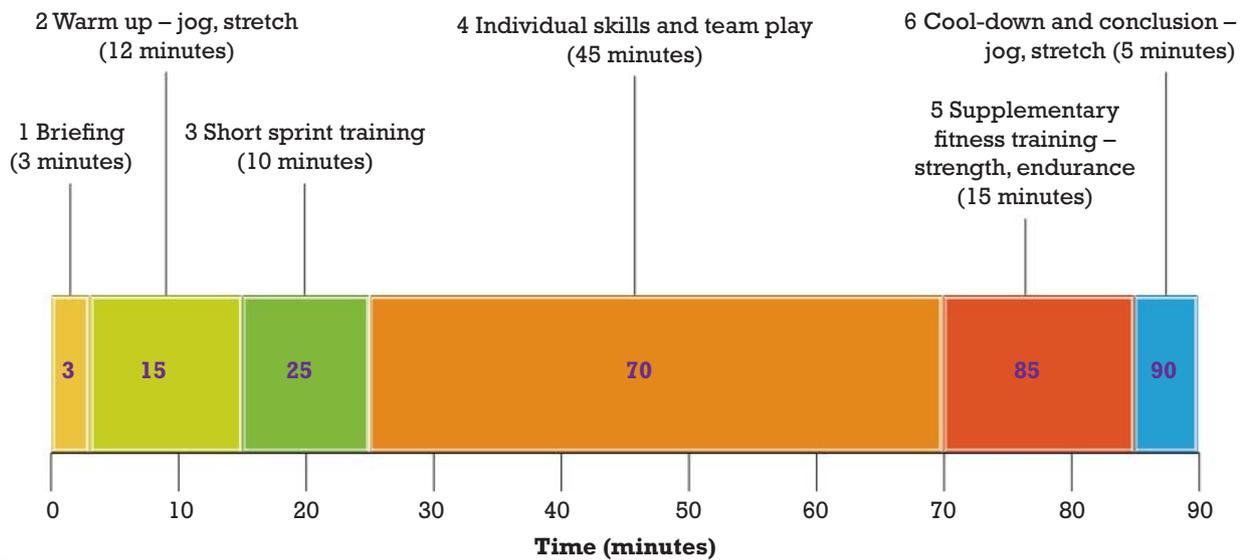


Figure 21.4 Sample training session for a time allocation of 90 minutes

Training session

- In pairs, choose either an individual or team sport.
 Design and carry out a 40-minute training session.
 If possible, vary the age and skill of the athletes.
 Using the following questions, briefly report to the class an evaluation of the session:
- Did the activities match the abilities of the group?
 - What was the reaction of the group?
 - How could the session be modified?
 - What was the most difficult aspect of planning and delivering the session?

PLANNING TO AVOID OVERTRAINING

Athletes must put their bodies under a certain amount of stress in order to increase their physical capabilities. Where the stress loads are appropriate, the athlete's performance will improve. However, if the stress loads are inappropriate, the athlete could experience a state of overtraining or burnout.

Symptoms of overtraining

Symptoms that indicate overexertion can be classified as movement coordination, condition or psychological symptoms.

Movement coordination symptoms

These include increased incidence of disturbances in movement (the reappearance of faults that seemed to have been overcome, cramp, inhibitions, insecurity) and a lack of ability to concentrate.

Condition symptoms

These symptoms include diminished powers of endurance, strength and speed; an increase in recovery time; loss of competitive qualities; reduced readiness for action; fear of competition; avoiding difficult situations; and confusion in competition.

Psychological symptoms

These symptoms include increased irritability, obstinacy, defiance, avoidance of contact with coach, poor incentive, anxiety, depression and insecurity.

Close observation can help to eliminate possible serious effects of overexertion. Coaches need to keep a constant eye on overloading, conduct performance checks and monitor competition pressures, address issues and make necessary adjustments to the athlete's training and competitive program.

Amount and intensity of training

Some training factors can accumulate and bring about a state of overtraining. These include:

- neglected recovery (mistakes in the build-up of training cycles, inadequate use of general exercise sessions for recovery)
- inappropriate increase in frequency of training or in density of loading
- demands being increased too quickly so that adaptation cannot be consolidated
- increase of loading being too rapid after forced breaks due to injuries or illness
- excess of loading at maximum and sub-maximum intensity.

Physiological considerations

Lethargy and/or injury

It is normal for an athlete to suffer from fatigue or muscle discomfort during training, especially at the beginning of pre-season training. However, coaches and athletes must be aware that prolonged periods of intense activity without adequate periods of recovery can result in overtraining.

To avoid overtraining it is important to monitor an athlete's physiological responses to training, and make appropriate adjustment to the training program if they are suffering consistently from the following symptoms:

- elevated resting pulse/heart rate
- frequent minor infections and increased susceptibility to colds and flus
- increases in minor injuries
- chronic muscle soreness or joint pain
- exhaustion
- lethargy
- weight loss and appetite loss
- insatiable thirst or dehydration
- intolerance to exercise
- decreased performance
- delayed recovery from exercise.

Psychological factors

Monitoring psychological conditions in an athlete is just as important as monitoring physiological factors. Intense physical training programs can greatly contribute to an athlete's mental and emotional state. By balancing motivational strategies and physical intensity, a coach can help avoid the onset of overtraining.

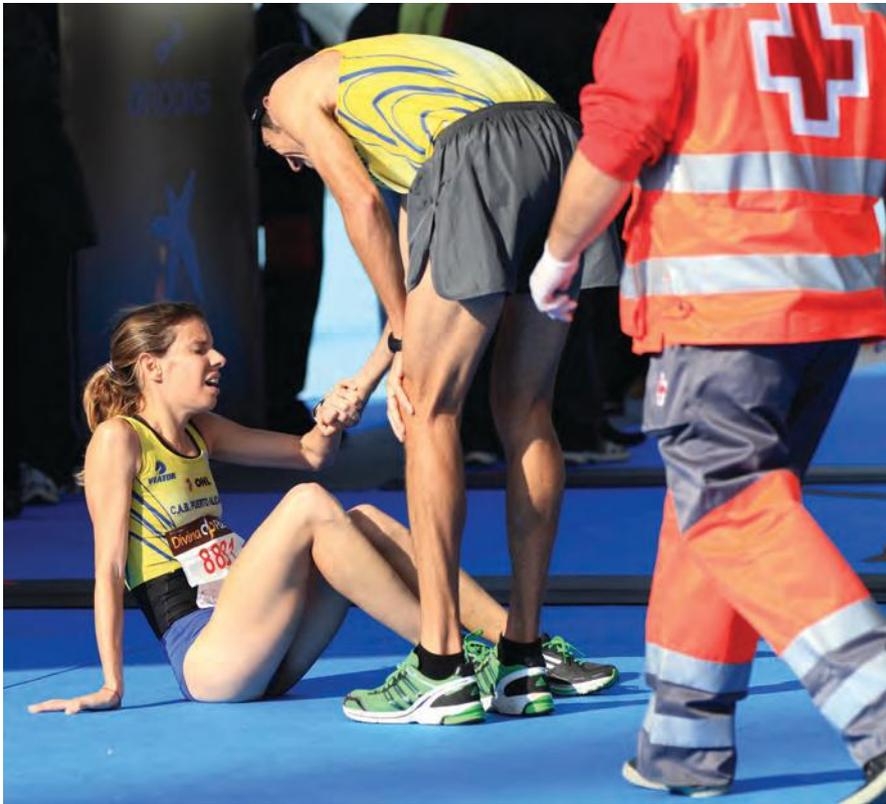
Psychological indicators of overtraining include:

- fatigue, tiredness, lack of energy
- reduced ability to concentrate
- apathy or no motivation
- irritability

- anxiety
- depression
- headaches.

Making small and gradual increases to an exercise program over time can reduce the onset of overtraining. Other contributing factors that prevent the onset of overtraining in an athlete are:

- eating a well-balanced, nutritious diet
- ensuring adequate recovery time and sufficient sleep
- modifying training to suit environmental conditions
- monitoring other stresses affecting lifestyle and making suitable adjustments
- avoiding monotonous training
- not exercising during an illness
- using psychological strategies to monitor psychological concerns (for example, relaxation, mental rehearsal).



Shutterstock.com/FCG

Figure 21.5 An exhausted runner is assisted by medical staff during a marathon. Overtraining can reduce performance levels due to lethargy and injury can occur as a result of lapses in concentration.

Overtraining

With a partner, analyse overtraining.

- 1 As you prepare your rationale, consider the following questions:
 - a How much training is too much?
 - b How do you identify an overtrained athlete?
 - c What do you do if you identify an overtrained athlete?
 - d How could overtraining be avoided?
- 2 Prepare a short verbal report on overtraining, with justifications for your final definition.

CHAPTER SUMMARY

- It is important to collect appropriate information when initially planning a short-term or long-term training plan for an athlete or team. Specific training programs can then be designed to develop the athlete.
- An annual training plan has a number of different phases or cycles. These are macrocycles, mesocycles and microcycles. This division is called periodisation.
- Peaking and tapering in preparation for competition need to be considered when designing an annual plan.
- When designing an effective training session, coaches need to ensure that activities match the abilities of the group and cover the required elements for development and injury prevention. Evaluation of the session is essential to make appropriate modifications if needed.
- Individual or team training programs need to address the development of skills, fitness, mental skills and strategies.
- Physiological and psychological indicators need to be considered to avoid overtraining.

CHAPTER REVIEW ACTIVITIES



- 1 Create or locate a pre-screening form or survey that could be used to help plan a team's training regime for a year.
- 2 Discuss the differences between short-term and long-term training plans. (Include reference to macro and microcycles.)
- 3 Outline the reasons for periodisation when planning an annual training plan.
- 4 Analyse the importance of modifying the elements of a training session to match the abilities of the training group in relation to improving performance.
- 5 Justify using individual training programs for athletes training for the same event.
- 6 Explain how the elements of a training session contribute to improving performance.
- 7 Outline the considerations needed to avoid overtraining in young athletes.
- 8 Describe the difference between tapering and peaking.
- 9 Describe the specific considerations of planning for performance in events/competitions. How would this planning differ for elite athletes and recreational/amateur participants?
- 10 Examine different methods of structuring training sessions.
- 11 Develop and justify a periodisation chart of the fitness and skill-specific requirements for a particular sport.



CHAPTER 22

Ethical issues related to improving performance

IN THIS CHAPTER

Use of drugs

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USE OF DRUGS

When you have read this chapter you should be able to justify why the use of drugs in sport is considered to be unethical, and list the risks they pose for the athlete. You should also be able to 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?

Modern sport is now influenced by business to a greater degree than it was in previous years. Athletic performances are not only related to personal achievements but also to how much money can be generated from sales of products deemed helpful to the performance. Athletes need to continue to improve performance in order to maximise their potential but they also need to continue to improve and push the boundaries of human performance to be the best at their event. In order to improve performance, today's athletes benefit from a combination of technologies, including biomechanics, as well as appropriate training and planning for events. Sometimes ethical concerns are raised about athletes achieving their best performance by whatever means available to them. When the chance to improve is offered from outside the normal training program, some athletes see opportunity before fairness. The use of performance-enhancing drugs (PEDs) and technology can sometimes accelerate what the body is truly capable of and create an unfair competitive advantage. The practice of using



Figure 22.1 Many athletes are subject to random drug tests that detect the use of performance-enhancing and other drugs.

artificial substances or methods to enhance athletic performance is called **doping** or using ergogenic aids. This practice is extremely unhealthy for athletes and is considered unethical by most international sports organisations, especially the International Olympic Committee.

The main issues of concern are:

- health threat of performance-enhancing drugs
- equality of opportunity for the athletes
- exemplary effect of ‘clean’ (doping-free) sports in the public
- illegal use in the general community.

The use of performance-enhancing products in sport goes back to Ancient Greece, and it was particularly evident in the 1960s.

Athletes today may choose to use performance-enhancing drugs in order to:

- build mass and strength of muscles and/or bones
- increase delivery of oxygen to exercising tissues
- mask pain
- stimulate the body
- relax
- reduce weight
- hide use of other drugs
- recover quickly from injuries.

Team physicians at both amateur and elite levels of sport need to understand the drugs in sport policy issued and monitored by the national government under the auspices of the World Anti-Doping Agency (WADA) and the Australian Sports Anti-Doping Authority (ASADA).

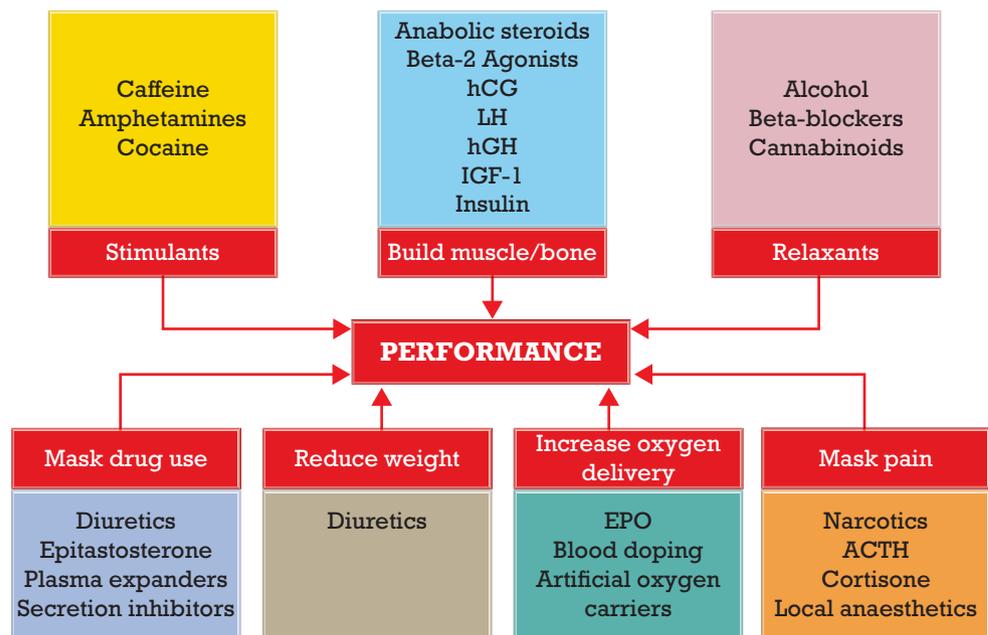


Figure 22.2 Types of banned substances and their effects

Several factors may contribute to an athlete misusing drugs. These factors include:

- drug: effects of the drug, physical dependence and availability
- person: dissatisfaction with performance or progress, easily influenced by others, ego
- environment: pressure to win from coach, parents, media, public; desire for financial reward; unrealistic qualifying standards or performance expectations.

Most of the drugs listed are banned outright in Olympic competitions. However, some, such as cortisone and local anaesthetics, are only restricted in Olympic competition because they have legitimate medical uses.

Dangers of using performance-enhancing drugs

Athletes face enormous pressure to excel in competition. They also know that winning can reap them more than just a gold medal. A star athlete can earn a lot of money and receive fame and attention, and they only have a short time to do their best work. Athletes know that training is the best path to victory but they also understand that some drugs (and other illegal practices) can boost their efforts and offer a shortcut, even at the risk of their health and athletic careers.

Some reasons athletes take drugs

There are a variety of reasons why athletes take drugs.

More likely to win

The lure of using drugs to improve performance at a faster rate and achieve their goals quicker than other athletes is sometimes too hard to resist.

Income

Winning can attract lucrative sponsorship deals and endorsements, leading to a greater financial reward for effort. Community and media attitudes and expectations of success in sport also put more pressure on an athlete to win.

Faster recovery

Some banned drugs can speed recovery from injury, which means athletes can be back training and competing more quickly.

Others do it

Some athletes believe their competitors are using drugs and that to be competitive, they need to take drugs as well.

For whatever reason an athlete wants to use drugs, performance-enhancing drugs carry serious risks for them, including suspension or banishment from their sport, stripping of their records, diminished reputation to the athlete and the sport, and life-threatening medical complications.

Performance-enhancing drugs have the potential to drastically alter the human body and its biological functions. This includes the ability to considerably improve athletic performance in certain instances. These drugs, however, can be extremely dangerous and, in certain situations, deadly.



Alamy Stock Photo/Jimmie48 Photography

Figure 22.3 Tennis player Maria Sharapova was banned from tennis for two years after failing a drug test at the 2016 Australian Open. She was found to have taken Meldonium, a banned performance-enhancing drug.

Signs of drug use

Signs that an athlete might be using a performance-enhancing drug include: sudden mood changes, sudden changes in performance levels (up and down), differing levels of motivation, anxiety, change in friendship groups and social support, insomnia, loss of memory and attention compared to normal, increased anxiety.

Table 22.1 Side effects of commonly used performance-enhancing drugs

Performance-enhancing drug	Why do athletes take them?	Side effects to athlete
Anabolic steroids	Anabolic steroids are similar in structure to the male sex hormone testosterone, so they enhance male reproductive and secondary sex characteristics, and are commonly used in strength and power events.	<ul style="list-style-type: none"> • Mood swings, stimulation of hair growth on the face and body • Suppression or interference with menstrual cycle, possibly leading to infertility • Thickening of the vocal cords, which causes the voice to deepen, possibly permanently • If pregnant, interference with the developing foetus • Acne • Male pattern baldness • Liver damage* • Premature closure of the growth centres of long bones (in adolescents) which may result in stunted growth* • Increased aggressiveness sometimes resulting in criminal behaviour, often referred to as ‘Roid Rage’ • Breast tissue development* • Shrinking of the testicles* • Cessation of breast development • Growth of hair on the face, stomach and upper back* <p>* Effects may vary by individual but can be permanent.</p>
Erythropoietin (EPO)	EPO is used to increase oxygen absorption, reduce fatigue and improve endurance by increasing the rate of red blood cell production. It is also believed that EPO increases the metabolism and healing process of muscles because the extra red blood cells carry more oxygen and nutrients.	<ul style="list-style-type: none"> • Can lead to increased thickening (or viscosity) of the blood, causing clotting, thrombosis, heart attack and stroke • Hypertension • Blood cancers/leukaemia • Anaemia • Pulmonary embolism • Nausea
Human growth hormone (HGH)	HGH stimulates the growth of muscle, cartilage and bone, and so increases muscle size.	<ul style="list-style-type: none"> • Acromegaly (protruding or enlarged jaw, brow, skull, hands and feet), enlarged internal organs, especially heart, kidneys, tongue and liver • Heart problems • Thyroid problems • Severe headaches • Loss of vision • High blood pressure and heart failure • Diabetes and tumours • Crippling arthritis



>>	Performance-enhancing drug	Why do athletes take them?	Side effects to athlete
	Diuretics	Masking agents. Can be used to control weight or mask the use of other drugs.	<ul style="list-style-type: none"> • Dehydration • Dizziness • Cramps • Heart damage • Kidney failure
	Stimulants	Stimulants treat conditions such as attention deficit disorders (ADD/ADHD) and asthma.	<ul style="list-style-type: none"> • Insomnia • Anxiety • Weight loss • Dependence and addiction • Dehydration • Tremors • Increased heart rate and blood pressure • Increased risk of stroke and heart attack • Nervousness and irritability, which make it hard to concentrate on the game • Insomnia, which can prevent an athlete from getting necessary sleep • Dehydration • Addiction or tolerance, meaning that athletes need greater amounts to achieve the desired effect, so they will take doses that are much higher than the intended medical dose • Heart palpitations • Heart rhythm abnormalities • Weight loss • Mild high blood pressure (hypertension)
	Beta blockers	Control hypertension, cardiac arrhythmias, angina pectoris (severe chest pain), migraine, and nervous or anxiety-related conditions. They are used in sports such as archery and shooting to calm the heart rate down.	<ul style="list-style-type: none"> • Lowered blood pressure • Slow heart rate • Sleep disorders • Spasm of the airways
	Blood doping	Blood doping is used to increase the red blood cell mass in the body. Since the red blood cells carry oxygen to the muscles, this allows the body to transport more oxygen to working muscles and therefore can increase aerobic capacity and endurance.	<ul style="list-style-type: none"> • Increased stress on the heart • Blood clotting • Stroke • With blood transfusions, there is an increased risk of infectious disease such as AIDS or hepatitis

Based on data from the U.S. Anti-Doping Agency (USADA)

Using drugs for strength

Human growth hormone

Human growth hormone (HGH) is produced naturally by the body in the pituitary gland. HGH stimulates the body's synthesis of the proteins that form bone and muscle tissue, decreases body fat and increases testosterone levels. It is sometimes used medically to treat growth issues in young people.

HGH stimulates the growth of muscle, cartilage and bone, thereby increasing muscle size. As there is a correlation between muscle size and strength, competitors in events that require power and short bursts of explosive strength are most likely to benefit from HGH. It also allows tired muscles to recover more quickly, which enables the athlete to train harder and more often.

Side effects of HGH

The side effects of using human growth hormone include:

- overgrowth of hands, feet and face (acromegaly) because of the increased muscle and bone development in these parts
- enlarged internal organs, especially heart, kidneys, tongue and liver
- heart problems.

Anabolic steroids

A steroid is a chemical substance derived from cholesterol. Anabolic steroids build muscle and bone mass primarily by stimulating the muscle and bone cells to make new protein. These substances can be injected or taken as pills.

Athletes use anabolic steroids because they increase muscle strength by encouraging new muscle growth. Anabolic steroids are similar in structure to the male sex hormone testosterone, so they enhance male reproductive and secondary sex characteristics (testicle development, hair growth, thickening of the vocal cords). They allow the athlete to train harder and longer at any given period, and are commonly used in strength and power events.

Anabolic steroids have a number of possible and well-known side effects, including jaundice and liver damage (because these substances are normally broken down in the liver), mood swings, depression and aggression (because they act on various centres of the brain).

In males, the excessive concentrations of the steroids interfere with normal sexual function and cause baldness, infertility and breast development. In females, they cause male characteristics to develop and interfere with normal female functions. In women, the drugs can:

- stimulate hair growth on the face and body
- suppress or interfere with the menstrual cycle, possibly leading to infertility
- thicken the vocal cords, which causes the voice to deepen, possibly permanently
- if pregnant, interfere with the developing foetus.

Using drugs for aerobic performance

Erythropoietin (EPO) is a naturally occurring protein hormone that is secreted by the kidneys during low-oxygen conditions. EPO stimulates the bone marrow stem cells to make red blood cells, which increase the delivery of oxygen to the kidney.

Endurance athletes use EPO to increase oxygen absorption, reduce fatigue and improve endurance by increasing the rate of red blood cell production. It is also believed that EPO increases the metabolism and the healing process of muscles because the extra red blood cells carry more oxygen and nutrients.

Side effects

In someone who already has normal levels of red blood cells, the use of EPO can lead to increased thickening (or viscosity) of the blood, causing clotting, thrombosis, heart attack and stroke.

Blood doping

Blood doping refers to methods of increasing the oxygen-carrying capacity of blood to boost aerobic performance. This is typically accomplished by withdrawing blood, isolating the oxygen-carrying red blood cells in a solution, and then re-transfusing the cells prior to competition, thereby increasing the body's supply of red blood cells. Blood doping is used in endurance sports such as cycling, distance running and cross-country skiing. Blood doping mimics the effects of EPO and can increase the oxygen-carrying capacity of the blood, thereby reducing the effects of fatigue when performing.

Using drugs to mask other drugs

Masking agents are prohibited because they are products that have the potential to impair the excretion of prohibited substances, to conceal their presence in urine or other samples used in doping control, or to change haematological (blood) parameters.

Diuretics

Diuretics are classified as masking agents and can be used to control weight or mask the use of other drugs. They are used by athletes who participate in sports where there are weight restrictions, such as weightlifting, horse racing and rowing. Diuretics increase the amount of urine produced and have been placed on the prohibited list for some time for two reasons:

- diuretics facilitate weight loss via their ability to enhance rapid water loss via urine excretion
- diuretics have the potential to rapidly dilute the urine by increasing renal flow.

Diuretics can be used as a masking agent because they dilute the urine, which results in lower levels of the banned substance being excreted from the body. As a result, the laboratories conducting doping controls have greater difficulty detecting the diuretic. Drug testers need certain levels of concentration before they can register a positive test and if diuretics are taken this alters the levels and an invalid test is registered. If a diuretic is registered in the urine it is immediately recorded as a failed drug test for the athlete.

Side effects

Possible side effects from using diuretics include dehydration, dizziness, cramps, heart damage and kidney failure.

Alcohol

Many athletes perceive alcohol (ethanol) to be a stimulant drug; however, it is a depressant. It slows down activity in the central nervous system, including the brain. Depressants affect concentration and coordination, and slow the response time to unexpected situations. Alcohol can have the same masking effect as a diuretic by diluting urine. Alcohol is banned in competition because it is considered a risk-taking mechanism, meaning the athlete develops a heightened self-confidence and performs at a higher risk-taking level; thus making it an unsafe performance.

Alcohol is an ergolytic aid to sports performance. This means that it will detract from, rather than improve, exercise performance. Alcohol intake impacts negatively on a variety of psychomotor skills essential for successful performance, including reaction time, balance and hand-eye coordination. Studies have also shown that drinking alcohol does not improve power, strength or endurance.

It is important to note that in Australia, alcohol is banned in some sports during competition. These sports include archery, karate and modern pentathlon (with shooting).

Although few athletes take alcohol immediately before exercise, consuming alcohol in binges during the week or on weekends is likely to affect recovery from exercise and exercise performance on subsequent days and can result in slower decision-making and exacerbation of soft tissue injury.

Side effects

Some of the indirect effects on athletes from binge drinking following exercise include: being distracted from carrying out appropriate recovery strategies to help the body refuel, poor nutrition, poor rehydration and poor injury rehabilitation.

Investigate

As a class, investigate Australian athletes who have been found guilty of taking performance-enhancing drugs, and look at their loss of reputation (and loss of chances to compete).

Have any 'turned it around' to campaign against drugs?

If so, what success have they had?

Benefits and limitations of drug testing

Effective drug testing programs are difficult and extremely costly to maintain. One reason is that new performance-enhancing drugs are constantly being developed. The Balco Laboratories drugs in sport scandal of the 2000s only came to light because an anonymous coach presented a sample of drugs that were previously unheard of and untestable. Scientists are able to stay one step ahead of the drug testers. These drugs were produced in secret and were specifically designed to avoid detection by current testing methods.

Some performance-enhancing drugs are more difficult to detect than others. Elevated levels of EPO, for instance, do not remain in the blood for long, making it particularly hard to test for them. Both testosterone and EPO are naturally present in the body, which means that if an athlete has an abnormally high level of these chemicals due to certain physiological factors, the athlete may test positive even though no illegal drug was used.

ASADA is the primary anti-doping authority in Australia and is responsible for testing athletes for banned substances. The methods that ASADA officials use to collect samples vary according to whether they are conducting a urine or a blood test. In each case, strict protocols apply in relation to notifying athletes that they are required to provide a sample, how the sample is to be collected and the paperwork that needs to be completed. Athletes under the age of 18 years must be accompanied by a parent or guardian during testing, along with the ASADA representative.

Although there is limited statistical evidence on how widespread doping is, athletes and coaches stress that most competitors do not take drugs. Nonetheless, drug testing is becoming an increasingly integral part of sports competitions. As new performance-enhancing drugs are developed, new tests are developed to detect these drugs, and the struggle to keep sport clean continues indefinitely.

There are benefits and limitations to drug testing. It is conducted according to where the athlete finishes in an event, at venues where large numbers of athletes are competing and also at random. Recently WADA has announced that athletes will be required to provide their whereabouts and expect a tester to come to them within a one-hour timeslot. This ability to test has the advantage of creating a level and fair playing field for athletes; it promotes fair and safe play and protects athletes' reputations in the process. The limitations of the process

are that testing is expensive and the tests sometimes cannot keep up with the drugs athletes are using. The list of banned drugs is constantly changing and it is the responsibility of the athlete or their coach to make sure they are aware of what is legal and illegal. The case of Maria Sharapova in January 2016 highlights this point. There is also the point of privacy when giving a drug test because athletes need to be watched by the person testing as they give the sample. This requirement came about due to the fact that, in the past, athletes have passed off different clean samples when they were not being watched.

Due to many of these limitations, it is difficult to test at the amateur sport level, meaning there may be many athletes using performance-enhancing drugs that go unnoticed.

Drug report

As a member of the Australian Sports Anti-Doping Authority (ASADA), you have been asked to deliver a drug report to a professional sporting club, presenting the use of performance-enhancing drugs from a physiological and ethical perspective.

USE OF TECHNOLOGY

After reading this section you should be able to describe how technology has been used to improve performance, and to argue ethical issues related to technology use in sport such as:

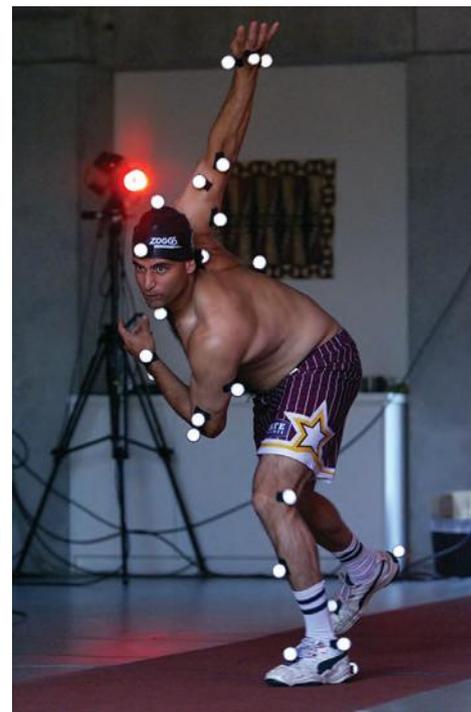
- Has technology gone too far?
- Has access to technology created unfair competition?

Sport is undergoing a global technological revolution. Each year, records are being broken, equipment becomes more sophisticated, and facilities improve. These changes are impacting on all areas of sport, from shoes to cycles and stadia. Is this making sport more exciting for participants and spectators? Or are talent and determination becoming secondary to money and technology, thereby devaluing honest competition?

The use of information technology has grown exponentially, to the point where a laptop can now be taken to training, the athlete filmed and feedback on the performance given immediately in order to enhance the training session. The opportunity exists to create all sorts of data, enabling the coach to get an idea of how the athlete is progressing at any point in time.

Training innovation – lactate threshold testing, biomechanical analysis

New training innovations develop every year, with what is regarded as the latest innovation becoming outdated in a very short period of time. Most innovations can be linked to computer technology. Coaches research, or in the case of elite athletes, have support staff to investigate the latest training methods and devices to improve athletic performance in power, distance and accuracy, and to prevent injury or aid in rehabilitation.



Getty Images/Phil Walter

Figure 22.4 Coaches are always on the lookout for innovative training methods to complement new training aids. In this image, a cricketer is fitted with receptors to analyse the biomechanics of spin bowling.

Lactate threshold testing

This is an innovative method that sport scientists, coaches and athletes use to measure lactate levels during training. It also enables them to accurately determine heart rate training zones and recovery. Lactate is a metabolic product that can be measured by taking a drop of blood from a fingertip, the same way diabetics monitor their blood sugar level. The blood lactate level increases with exercise intensity and shows clearly the transition from aerobic to anaerobic activity. The ability of the muscles to reach peak performance during an athletic event requires the energy systems to provide energy that is 'fine-tuned' or 'balanced' properly. This allows the athlete to generate the highest amount of energy per unit of time during a race. Proper training is what accomplishes this fine-tuning or optimal balance and it is lactate testing that lets the coach know if the balance has been obtained, or how each energy system must be trained so that the balance can be obtained. This form of testing is critical when training for sports that rely on the athlete performing close to the anaerobic threshold. When the lactic acid energy system is the predominant energy system for performance, it is extremely important for the coach to know how hard to push the athlete and what to expect from them in competition.



Alamy Stock Photo/aberCFC

Figure 22.5 A cyclist undergoes lactate threshold analysis.

Biomechanical analysis

Biomechanical analysis is another innovative method used to improve an athlete's performance. The results of a biomechanical evaluation provide valuable information for trainers, coaches and athletes. For example, walking, running, throwing, pitching, hitting, kicking, diving and golf swing mechanics can be compared to normative data in order to pinpoint flaws in the motion. As a result, performance improvements can then be based on scientific evidence.

Biomechanical analysis is valuable in the prevention of injuries. Data regarding joint stresses incurred during sport-specific movements, knowledge of joint mechanics and the magnitudes and rates of joint loads provide sports medicine practitioners with the information necessary to prescribe injury prevention and rehabilitation programs.

Sport scientists and sports medicine professionals can assist the athlete and coach in designing a comprehensive program targeted at injury prevention. All biomechanical evaluations should be completed with two goals in mind: improve performance and reduce the chance of injury.

Equipment advances

Tremendous improvements have been made in those sports where equipment is critical. However, the use of advanced materials in sports equipment presents some ethical questions; for example, on how performance can be enhanced by allowing the use of advanced materials. The question remains as to where we should draw the line on restricting the use of such advances. Also, to maintain an ‘even playing field’, it is important to consider how much money is spent on these technological advancements and who can afford them.

We now see golfers using GPS devices to tell them how far their next shot will go and this gives them vital clues about club selection. We are also seeing all sports using GPS devices on athletes (both during training and in competition) to monitor fitness and patterns of running. This feedback is extremely useful when planning tactics in team play that are based on people running certain patterns.

Innovations in sport that have been embraced by coaches include software analysis of performance and training, tacklesuits and ice vests for training and performance in the football codes, statistical analysis of each individual, compression clothing, and climate chambers.

Smart devices in sport

Search for ‘Smart devices help Leicester City and other world champions catapult to the top’ by Hannah Francis, *Sydney Morning Herald*, 16 May 2016 or follow the weblink to read an article about an Australian-made device that is at the forefront of data-collecting technology in sport.



Fairfax Photos/Josh Robenstone

Figure 22.6 Olympic 1500-metre runner Kaila McKnight wears a Catapult vest, which uses GPS technology and sensors to monitor her performance.



Figure 22.7 The Speedo LZR swimsuit was introduced in 2008, with the promise of less water resistance than comparable suits. It was subsequently banned from competition.

Swimsuits

There are numerous debates about equipment advances in technology but one of the most controversial was that of the Speedo LZR Pulse™ swimsuit. At the beginning of 2008, the suit was worn for nine out of nine world records broken in the swimming pool; this was by the end of March and before the start of the 2008 Olympics.

Characteristics of the suit that improved performance included:

- constructed water repellent material reducing drag by 5 per cent and increasing efficiency compared to older, slower swimsuits
- tighter, corset-like midsection reported to reduce fatigue at the end of races and improve body shape
- seamless style, consisting of special panels of the repellent material, further reducing drag.

This swimsuit is now banned from competition because its use created an uneven playing field.

Golf balls

Another debate in sport and technology centres on golf balls. Although they are small, their size and weight are regulated. Under standard rules, golf balls should weigh no more than 45.93 grams and have a diameter of no less than 42.67 mm. Golf clubs and golf balls are subject to standards set by the Royal and Ancient Golf Club of St Andrews (the primary governing body worldwide) and the United States Golf Association.

Within the rules established and maintained by these associations, manufacturers have sought to create superior golf balls by varying the materials, patterns and combinations on the surface.



Figure 22.8 A Callaway golf ball with its signature hexagonal dimples.

For example, why does a golf ball have dimples? Surely, a smooth surface would reduce friction on the ball as it travels through the air, reducing drag and helping it to go further? In actual fact, dimpled golf balls experience about half the drag as golf balls with no dimples. This is because the main source of drag is not friction but the movement of air around the ball. Analysts use computers to model how the air flows around a ball in flight, and can study how this flow is influenced by the size, pattern and depth of a golf ball's dimples. Dimples allow air to flow in a turbulent pattern around the golf ball, and this pattern has been found to be optimal for flight through the air.

As computer technologies and models are developed, manufacturing companies can develop new golf balls with new patterns, accompanied by new marketing campaigns overlaid with scientific jargon. For instance, Callaway Golf replaced traditional dimples with a hexagonal dimple pattern on its golf balls, which it claims further reduces drag for longer, more efficient ball flight. In addition, Callaway balls have core constructions with two, three or four layers designed to minimise spin and offer distance control. These tiny adjustments may offer advantages but they come at a price, not only exploiting the lucrative sports dollar but also creating an unfair platform for competition. Now, all golf companies are creating golf balls that are multilayered with a marketing catchcry that the ball will travel straighter. The extra price for these balls may be out of reach for the average golfer, thereby creating an unequal playing field. This aspect, coupled with the new technology surrounding the clubs used, leads to a distinctly unfair advantage for a golfer who can afford this kind of equipment.

Drug testing

- 1 Visit the ProCon.org website or follow the link, and outline the pros and cons of performance-enhancing drugs and why athletes would use them.
- 2 What is a biological passport?
Why is it important for athletes to know about this?
- 3 Describe what a drug testing procedure is by accessing the ASADA website and searching for 'testing' (or follow the link).
- 4 Select a sport and research its technological advances over the past 20 years.
- 5 Outline aspects that promote the performance of participating athletes.



CHAPTER SUMMARY

- Athletes face enormous pressure to excel in competition, and some use artificial substances or methods to enhance athletic performance. This is referred to as doping or using ergogenic aids.
- Innovative technology is constantly being used to improve athletic performance.

CHAPTER REVIEW ACTIVITIES



Extra
exam-style
questions
Assessment
tasks for
Option 4

- 1 Investigate** the processes used to administer performance-enhancing drugs. Outline the dangers associated with each process.
- 2 Discuss** the role society has played in the current situation with regard to drug use in sports today.
- 3 Investigate** high-profile athletes such as Lance Armstrong, Ben Johnson and Marion Jones who admitted to taking illegal substances in major sporting events. **Discuss** why they took these substances.
- 4 Discuss** the drug policies for mainstream sports such as AFL and rugby league.
- 5 Evaluate** the use of technology in training sessions that are designed to improve skill.
- 6 Analyse** articles on sport technology from the Clearinghouse for Sport website.
- 7 Explain** how technology can be used effectively to improve performance.
- 8 Using software to analyse performance in sport:**
 - a justify** reasons why drugs are considered to be unethical and carry a range of risks for the athlete
 - b argue** issues related to drug testing such as:
 - i** At what level of competition should drug testing be introduced?
 - ii** Which drugs should be tested for?
 - iii** What are the pros and cons of drug testing?
 - iv** What should be the consequences of drug use in sport?
- 9 Describe** how technology has been used to improve performance.
- 10 Argue** ethical issues related to technology use in sport such as:
 - a** Has technology gone too far?
 - b** Has access to technology created unfair competition?



OPTION 5: EQUITY AND HEALTH

CRITICAL QUESTIONS

Why do inequities exist in the health of Australians?	334
What inequities are experienced by population groups in Australia?	343
How may the gap in health status of populations be bridged?	363

Source: Personal Development, Health and Physical Education Stage 6 Syllabus © NSW Educational Standards Authority for and on behalf of the Crown in right of the State of New South Wales, 2012

OUTCOMES

When you have read this section you should be able to:

- 1 describe Australia's health priorities and choices
- 2 analyse the health status of groups at risk in Australia and describe current ways of dealing with this
- 3 discuss what causes health inequities to occur
- 4 explain how individuals, communities and governments address Australia's health priorities
- 5 argue ways in which health promotion can promote social justice
- 6 analyse the issues that affect Australians' health and suggest improvements
- 7 propose ways of gathering, interpreting and communicating information about health and physical activity.

KEY TERMS

access	intersectoral
advocating	collaboration
determinants	intervention
discrimination	mediating
empowering	mortality
enabling	skills
funding	social exclusion
health inequity	socioeconomic
inequities	status (SES)



CHAPTER 23

Inequities in the health of Australians

IN THIS CHAPTER

Factors that create health inequities

334

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FACTORS THAT CREATE HEALTH INEQUITIES

Health inequities are differences in health status between population groups that are an outcome of society. While they are beyond an individual's control and unfair towards certain population groups, they are modifiable.

Health inequity often occurs when social, economic and political influences limit a person's choices and opportunities to control factors that may influence their health. For example, while access to health care should exist for all members of society, not all population groups in Australia actually do have the same access. Governments do have the ability to address this issue but decisions are not always based on what is fair; decisions and policies can be based on financial costs and on where the greatest number of potential political votes will assist a party to be elected.

Age, gender and genetic make-up cannot be modified and where health is concerned, they can create health inequalities. For example, inequalities exist between aged and young people in areas such as mobility, morbidity and mortality.

Daily living conditions

A poor health status can result from daily living conditions, such as reduced access to nutritious foods, inadequate housing, lack of access to appropriate health care, lower income levels, stressful work conditions and frequent periods of extended unemployment.

Inequities exist in health status according to geographic location; that is, depending on whether people live in urban, rural or remote areas. The expenses for people living in urban areas may be high, resulting in them having fewer funds available for quality health choices. People living in rural or remote areas may have less access to health facilities and services, resulting in fewer opportunities for quality health options.

Housing represents the largest daily expenditure for most households. Housing costs include rent, mortgage, repairs, maintenance and the provision of services such as electricity, gas and water. Many low-income families spend a much greater proportion of household income on housing compared to families with higher incomes. High housing costs mean there is less money available for other items essential for good health, such as nutritional food and a hygienic living environment.



Figure 23.1 Housing costs can be overwhelming for low-income families.

The level of family income determines how daily health needs are catered for. These needs include food, shelter, warmth and the ability to be able to participate fully within the family and community. Income levels also influence decisions that parents make about their own and their children's health; for example, food that is cheapest or prepared the fastest is not always the best quality food. Low income can also affect where people live and where children go to school.

A link also exists between level of employment and health. People who have more control over their work circumstances and experience less stress are generally healthier than those who have no control and have high stress levels. Low job security has been shown to increase anxiety, depression and risk factors associated with heart disease.

Quality of early years of life

The experiences children have in the early years influence their learning, emotional and social development and health, and have a lasting impact on their future wellbeing. Children who experience a safe and loving environment with their parents or caregivers learn how to manage their behaviour and emotions, as well as build **resilience** for challenges that lie ahead. Experiences such as abuse, neglect and stress can seriously harm the way children grow and develop.

Communities that encourage development are places where children feel safe, happy and eager to learn. However, inequities can exist if parents are unable to meet their children's basic needs due to government policies; for example, a policy that reduces the amount of subsidy paid to parents to offset child care costs.

A growing number of children need to be cared for by people other than their parents. Parents who need to work full-time to cover their cost of living are likely to require external child care services for their child's early years of life. Children in single-parent families are more likely to spend a large amount of time in child care programs. With more women entering or returning to the workforce, a growing number of children spend their early years of life in day care. It is especially important for children to have quality child care during these early years because their developmental and health needs are particularly high at this time.



Fairfax Photos/Jonathan Carroll

Figure 23.2 High-quality child care is an important factor in children's overall development.

Access to services and transport

Access to suitable and reliable services and facilities such as health, education, social services, transport and recreational facilities are essential for preserving and improving health.

In Australia, inequity in access to services and transport is most apparent in preventative care services. The aged and people with disabilities have less access to services and transport due to lack of mobility, particularly if they are living independently and lacking social support. This inequity needs to be addressed by governments but often their budgets are spread thinly across all health areas.

People who are socioeconomically disadvantaged are more likely to need, but less likely to use, preventative health services such as dentists, immunisation clinics and cancer screening. They are more likely to delay seeking medical treatment, resulting in increasing hospital admissions. This issue is particularly evident in Indigenous and geographically rural and remote communities.

Access to transport is a significant issue. Government-funded infrastructure is predominantly focused on urban areas, leaving those in rural and remote areas with little option but to find their own way to services and facilities. The high cost of specialised services means they can only be provided effectively in a limited number of locations and this means people in geographically remote communities are often required to travel long distances for routine services.

The cost accumulates because they have to travel to the service, find accommodation and buy fuel and meals. For many people, access to transport and services is simply too difficult and the costs associated with accessing health needs may prevent them from fully participating in the social life of the community; for example, in events such as sport or the performing arts.



Weblink

Investigate

The MyHealthy-Communities website has recent data on GP/emergency department visits in your area, presented as maps.

Data analysis

Follow the link to the MyHealthyCommunities website and download the report 'Healthy Communities: Australians' experiences with access to health care in 2011–12'. Find the graphs on page 10 of the report: 'Average number of GP attendances per person by health status in metropolitan and regional Medicare Local catchments, 2011–12'. Use these graphs to compare GP attendances for metropolitan and regional areas in New South Wales.

Tamra speech

You have been invited to act as spokesperson for members of the (fictitious) geographically remote community of Tamra, a small town 200 kilometres from the nearest local health care service. Your role is to speak to government representatives about why it is essential that Tamra has improved access to health services.

Propose FOUR key issues you wish to convey in your speech.

Socioeconomic factors

On average, people in lower socioeconomic groups have shorter life spans and poorer health. They experience higher rates of death and disease, are more likely to be hospitalised and are less likely to use specialist and preventative health services. The higher a person's socioeconomic status, the more likely they are to be healthy.

The most disadvantaged groups have the poorest health and the highest exposure to health risk factors. People in low socioeconomic groups tend to have poorer nutrition, less physical activity in leisure time, increased levels of smoking and higher misuse of alcohol. Together, these factors create potentially dangerous health issues.

People in lower socioeconomic groups may also experience multiple forms of inequity, including exclusion from, or denial of, opportunities and choice. They may be significantly less able to participate in society economically, socially and culturally.

Children who grow up in poverty are more likely to demonstrate an increased number of behavioural disorders, high levels of chronic illness and an increased range of problems such as hyperactivity and emotional disorders.

Figure 23.3 demonstrates the cyclical nature of poverty. As can be seen, problems located at any one point can be traced back to previous stages in the life cycle. For example, a child born to poverty is likely to experience poorer living conditions and health. In situations where parents do not value learning, this may lead to the children being absent from school, leaving school early and having fewer employment opportunities, which may result in lower levels of income as well as poorer housing conditions and health. Eventually, this could lead to their own children being exposed to a similar lifestyle. Hence the cycle of poverty continues.

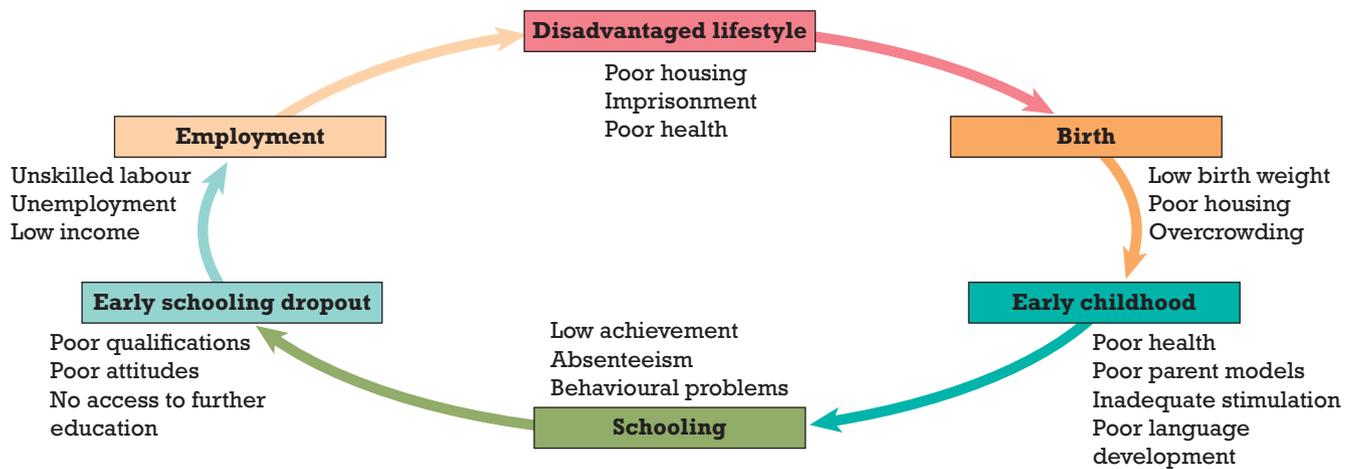


Figure 23.3 The cycle of poverty

Alternatively, a student who wishes to break the cycle can start by valuing education. Education increases opportunities for choice of occupation, for income and job security, and also equips us with the skills and ability to control many aspects of our lives. A person’s health will improve with increasing levels of educational achievement. Education can also increase a person’s ability to understand information, access health services and make better decisions about healthy lifestyle factors. Educational qualifications determine an individual’s employment position, which determines income, housing options and access to material resources.

Social attributes

Social exclusion

Social exclusion describes a process by which certain groups are systematically disadvantaged because they are discriminated against on the basis of their ethnicity, race, religion, sexual orientation, gender, age, disability or where they live.



Cetty Images/iStock/Highwaysstarz-Photography

Figure 23.4 Some groups may experience social exclusion and disadvantage.

Exclusion can frequently be understated and unintentional; for example, when minority groups are excluded due to language barriers. A person may not be socially excluded on purpose; it could be a case of people finding it difficult to include them. However, such experiences can result in a sense of powerlessness, lack of self-confidence and difficulty in facing up to exclusion.

Socially excluded people are often denied the opportunities available to others to increase their income and escape from poverty. Even though the economy may grow and income levels may rise, excluded people are likely to be left behind, adding to the proportion of those who remain in poverty.

Discrimination

Discrimination occurs in public and social institutions, such as the legal and education systems, within health services or even at home. It can be defined as the unfair treatment of a person or group, based on their race, ethnicity, age, religion or gender. Discrimination is a significant factor leading to health inequities, particularly for **ethnic** communities.

People who experience discrimination are more likely to suffer from poor mental and physical health consequences, such as cardiovascular disease, diabetes and hypertension. Repeated exposure to discrimination may result in stress, anxiety, depression, anger and low self-esteem, and can contribute towards economic uncertainty and poor educational opportunities.

Discrimination may lead to individuals experiencing restricted access to both human and non-human resources needed for basic health, such as education, housing and adequate health services. The outcome of discrimination could also result in further negative health behaviours such as the use of alcohol, tobacco and other drugs to attempt to cope with the stress and negative emotions.

Government policies and priorities

Governments have a responsibility to provide appropriate health, economic and social measures. This can be achieved through thoughtful and appropriate government policies and priorities.

Health

Governments aim to ensure public health and health care systems reduce health inequities and that their services are aimed at those whose need is greatest. Inequities currently existing within the health care system include health promotion programs, hospitalisations, medications and diagnostic testing.

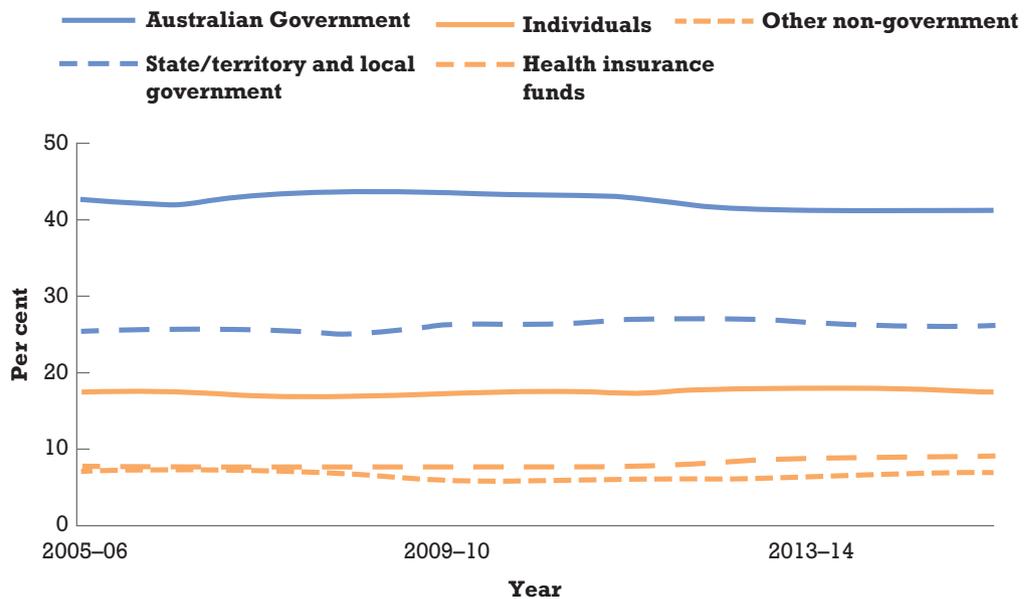
Health inequities impact on specific groups such as Aboriginal and Torres Strait Islander peoples, culturally and linguistically diverse people, people with disability and people of low socioeconomic status. The burden of health problems – such as infectious disease, drug misuse, mental illness and violence in disadvantaged groups – impacts on the community as a whole.

Governments can address existing health inequities through quality long-term planning and development of new health service provisions as well as the redevelopment of existing health services to accommodate new technologies.

When current governments are willing to adopt previous government initiatives (showing that political differences need not get in the way of long-term health planning) this goes a long way towards providing strong health policies and governance for the future. Policies also need to be supported by a motivated public sector.

Economic

Australia's health care system is funded by national, state, territory and local governments, as well as being supported by private health insurance.



Source: *Health Expenditure Australia 2015-16*, p. 24. © AIHW 2017. CC-BY 3.0 licence. (<http://creativecommons.org/licenses/by/3.0/au/>)

Figure 23.5 Sources of funds as a proportion of total health expenditure, 2005-06 to 2013-14

As can be seen in figure 23.5, expenditure from all sources of funds has increased over the past decade. Governments have remained the main source of funding for health in Australia, with the Australian Government continuing to provide most health funding. However, the federal government’s share of funding has declined along with the share provided by non-government sources, which includes individual out-of-pocket expenditure. The share provided by state and territory governments has increased.

In 2013-14, governments were responsible for \$105 billion, or nearly 68 per cent of the total health expenditure of \$155 billion in Australia. Of the government contribution, the Australian government contributed \$63.5 billion, or 41 per cent of total health expenditure, and state and territory governments contributed \$41 billion, or nearly 27 per cent of total health expenditure.

Governments need to address existing health inequities through structured long-term economic planning, appropriate infrastructure and meaningful funding. Examples of existing economic legislation driven by governments with positive health outcomes are excise taxes on tobacco and alcohol products, enforcement of non-smoking laws and development and implementation of safety standards for workers and products.

Government policies and priorities that generate a more balanced economic environment delivering services and opportunities for low socioeconomic groups will significantly influence health inequities currently experienced by some populations within Australia.

Examples of ways in which governments could offer economic support include increased funding for new technologies, a redirection of funding towards preventative health services, increased funding to public hospitals to reduce waiting times, extra payments to doctors willing to work in rural and remote areas, and cashback offers to people in rural and remote areas when they travel to their nearest health services.

Social priorities

Ensuring communities are socially engaged when making decisions affecting their health and wellbeing is essential to good health. This is primarily an issue for socially excluded people who may have also been politically excluded.

Social inequities are a significant cost to the whole community. The social costs combined with the health and economic factors of morbidity and mortality have led to a reduction in economic productivity.

Governments aim to reduce social inequity by addressing the social determinants of health, such as policy responses in the areas of income, welfare, employment, education, housing, infrastructure, transport and environmental sustainability.

A reduction in social inequity nationwide as a result of prioritised government policy directions is a crucial measure of Australia's advancement as a society. A key policy direction priority for the government must be to support local communities and governments in disadvantaged regions to improve social and environmental infrastructure and hence improve the health and wellbeing of people experiencing social inequity.

EFFECTS OF DISCRIMINATION

Bindi Cole is a photographer, curator and new media artist of Wathaurung and Australian descent whose work is held in various collections across the world. Much of her work deals with issues of identity. She writes in an article about the proposed repeal of Section 18C of the *Racial Discrimination Act* (RDA):

'Discrimination of any sort is just plain wrong. From personal experience, I've spent much time in tears, not wanting to leave the house, avoiding being in public and feeling a dark cloud of shame hanging over me ... Through the broad and powerful influence of public humiliation and discrimination, I've lost friends, acquaintances, community standing and professional opportunities.

All this has left a scar in my life. The worst part of this is that the discrimination has come from people who have never once met me, talked to me, talked to anyone who knows me, or even tried to make any sort of contact with me at all.'

Source: © Jens Korff, Creative Spirits (www.creativespirits.info)

Questions

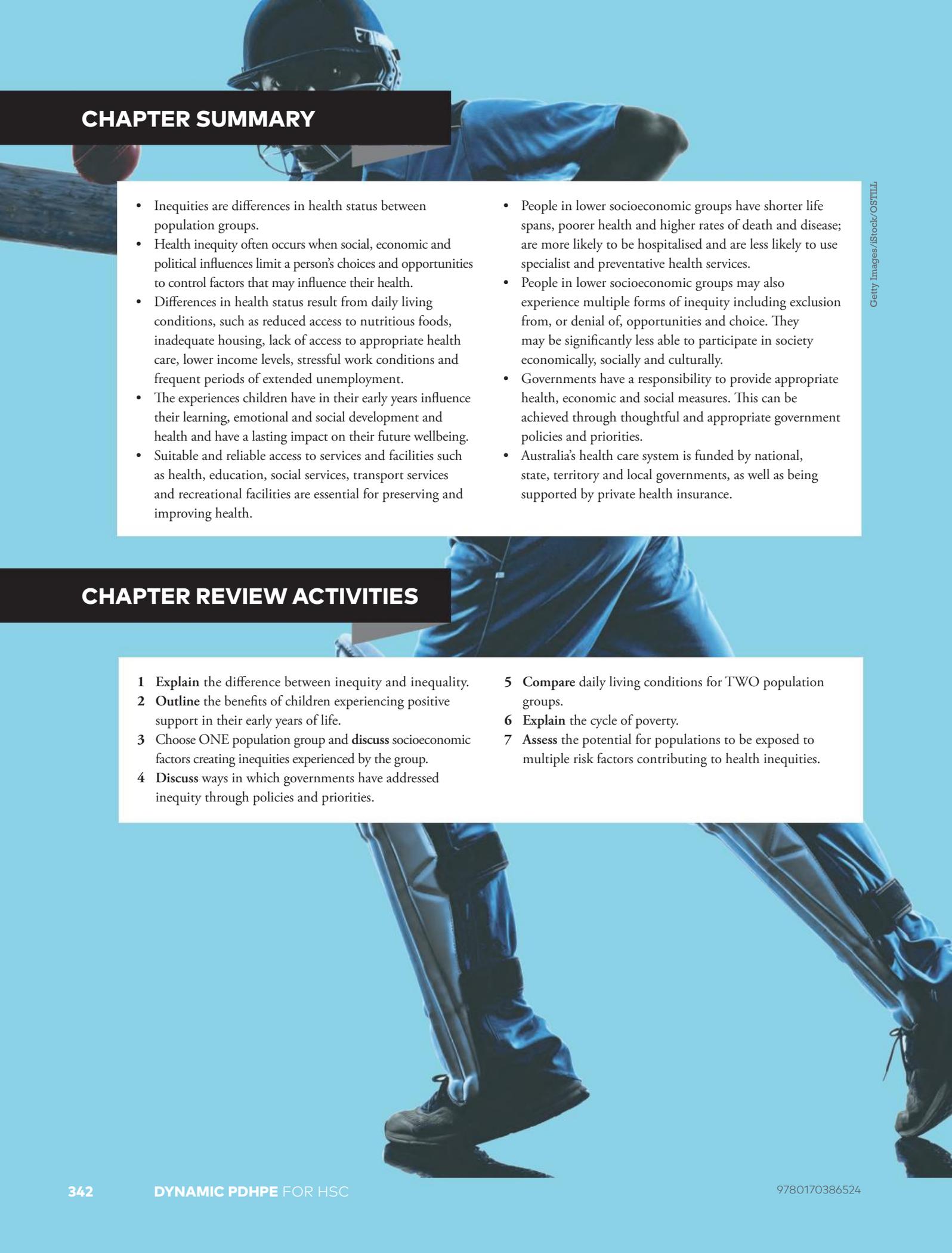
- 1 What are the effects of discrimination?
- 2 For each effect you listed, explain why this happens.
- 3 Check out Section 18C of the *Racial Discrimination Act*. How does it apply to Bindi's experience?
- 4 What would you suggest could help people like Bindi heal from such incidents?

Investigate: Jigsaw

- 1 The class is divided into five groups. Each group researches existing government policies and priorities that aim to reduce the level of inequity for ONE of the following population groups of people who are:
 - aged
 - homeless
 - living with HIV/AIDS
 - in prison
 - living with disability.Each group presents and shares their research with the class.
- 2 Conduct an in-class survey on the number and type of facilities and services that exist for population groups experiencing inequity, within your local community.
- 3 Imagine your family is moving to a new country where you will look different, speak a different language and have only the money and clothes you can carry with you.
 - a What are your needs and how will you try to address them?
 - b What barriers are you likely to experience?

LEARNING TIP

In this section, you need to understand that each of the individual factors that create health inequity may not be isolated for population groups. Often, they are combined, which results in a greater degree of inequity.



CHAPTER SUMMARY

- Inequities are differences in health status between population groups.
- Health inequity often occurs when social, economic and political influences limit a person's choices and opportunities to control factors that may influence their health.
- Differences in health status result from daily living conditions, such as reduced access to nutritious foods, inadequate housing, lack of access to appropriate health care, lower income levels, stressful work conditions and frequent periods of extended unemployment.
- The experiences children have in their early years influence their learning, emotional and social development and health and have a lasting impact on their future wellbeing.
- Suitable and reliable access to services and facilities such as health, education, social services, transport services and recreational facilities are essential for preserving and improving health.
- People in lower socioeconomic groups have shorter life spans, poorer health and higher rates of death and disease; are more likely to be hospitalised and are less likely to use specialist and preventative health services.
- People in lower socioeconomic groups may also experience multiple forms of inequity including exclusion from, or denial of, opportunities and choice. They may be significantly less able to participate in society economically, socially and culturally.
- Governments have a responsibility to provide appropriate health, economic and social measures. This can be achieved through thoughtful and appropriate government policies and priorities.
- Australia's health care system is funded by national, state, territory and local governments, as well as being supported by private health insurance.

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CHAPTER REVIEW ACTIVITIES

- 1 **Explain** the difference between inequity and inequality.
- 2 **Outline** the benefits of children experiencing positive support in their early years of life.
- 3 Choose ONE population group and **discuss** socioeconomic factors creating inequities experienced by the group.
- 4 **Discuss** ways in which governments have addressed inequity through policies and priorities.
- 5 **Compare** daily living conditions for TWO population groups.
- 6 **Explain** the cycle of poverty.
- 7 **Assess** the potential for populations to be exposed to multiple risk factors contributing to health inequities.



CHAPTER 24 Inequities in specific population groups

IN THIS CHAPTER

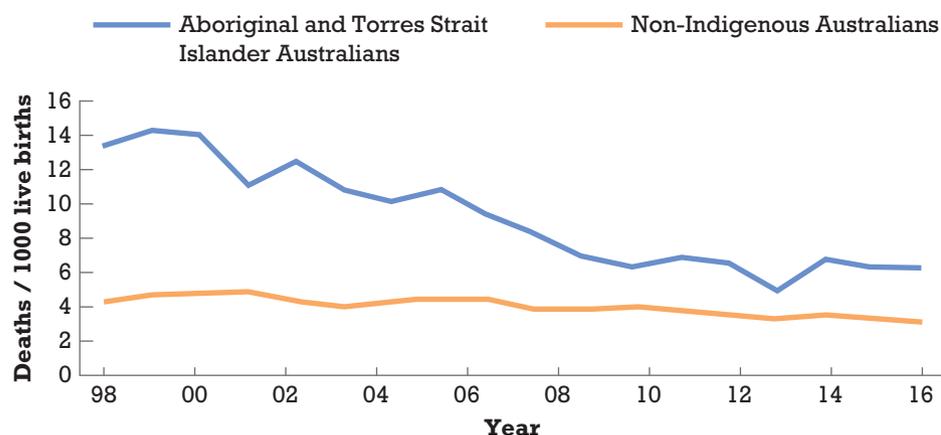
Aboriginal and Torres Strait Islander Australians	343
Culturally and linguistically diverse (CALD) people	352

ABORIGINAL AND TORRES STRAIT ISLANDER AUSTRALIANS

Areas of and changes in inequity

The health of Aboriginal and Torres Strait Islander Australians is improving on a number of measures, including significant declines in infant and child mortality and decreases in avoidable mortality related to cardiovascular and kidney diseases. Despite these improvements, significant disparities persist between Indigenous and non-Indigenous Australians. Indigenous Australians continue to have lower life expectancy, higher rates of chronic and preventable illnesses, poorer self-reported health, and a higher likelihood of being hospitalised than non-Indigenous Australians (AIHW, 2016).

As can be seen in figure 24.1, while figures continue to be high, the gap in mortality rates between Indigenous infants and children, and non-Indigenous infants and children is narrowing. There were 10 396 infant deaths between 2001 and 2012, of which 1315 (13 per cent) were Indigenous infants. The rate of Indigenous infant deaths fell by 62 per cent between 2001 and 2012 and by 23 per cent for non-Indigenous infants. However, Indigenous child death rates fell by 30 per cent from 2001 to 2012 compared with 22 per cent for non-Indigenous children (AIHW, 2017). Indigenous children aged 0–4 died at more than twice the rate of non-Indigenous children in 2012 (165 per 100 000 compared with 77 per 100 000 population).



Source: ABS (cat no. 3302.0) and AIHW analysis of National Mortality Database. Creative Commons By 3.0 (CC-BY 3.0) licence.

Figure 24.1 Infant mortality rates per 1000 live births, by Indigenous status, NSW, Qld, WA, SA and NT, 1998–2016

The estimated life expectancy at birth for Aboriginal and Torres Strait Islander Australians is estimated to be 69 years for males and 74 years for females. In contrast, the average life expectancy at birth for all Australians is 80 years for males and 83 years for females. Between 1998 and 2015, the mortality rate for Indigenous adults fell 15 per cent and the rate for Indigenous children fell 33 per cent.

Indigenous adults are twice as likely as non-Indigenous adults to rate their health as fair or poor, and one-third of Indigenous Australians report having three or more long-term health conditions (AIHW, 2014). Table 24.1 contains data about the rate of specific health conditions.

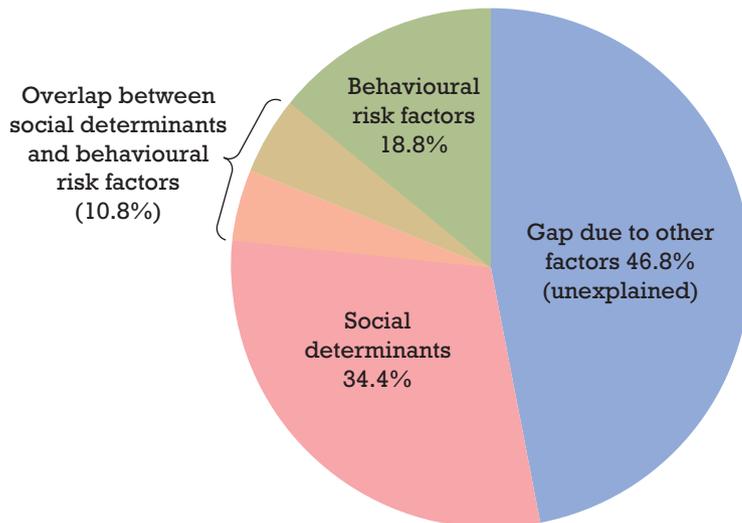
Table 24.1 Age-specific prevalence of long-term conditions for Indigenous Australians, 2012–13

Rank	Age group						
	0–14 %	15–24 %	25–34 %	35–44 %	45–54 %	55–64 %	65+ %
1	Respiratory diseases 20.9	Respiratory diseases 29.9	Respiratory diseases 36.9	Eye diseases and vision problems 46.7	Eye diseases and vision problems 87.2	Eye diseases and vision problems 92.4	Eye diseases and vision problems 33.4
2	Eye diseases and vision problems 8.8	Eye diseases and vision problems 22.0	Eye diseases and vision problems 27.4	Respiratory diseases 39.8	Musculoskeletal diseases 47.0	Musculoskeletal diseases 59.8	Respiratory diseases 31.0
3	Ear diseases and hearing problems 7.1	Musculoskeletal diseases 12.7	Musculoskeletal diseases 21.8	Musculoskeletal diseases 35.3	Respiratory diseases 42.6	Endocrine, nutritional and metabolic diseases 47.4	Musculoskeletal diseases 19.9
4	Skin and subcutaneous tissue diseases 3.3	Ear diseases and hearing problems 8.3	Nervous system diseases 13.7	Cardiovascular disease 18.9	Endocrine, nutritional and metabolic diseases 31.2	Cardiovascular disease 41.9	Ear diseases and hearing problems 12.3
5	Nervous system diseases 2.6	Nervous system diseases 8.3	Cardiovascular disease 12.2	Endocrine, nutritional and metabolic diseases 16.5	Cardiovascular disease 28.2	Respiratory diseases 40.7	Cardiovascular disease 12.0

Source: Australia's Health 2016, AIHW, p. 231, CC-BY 3.0 licence.

Analysing the impact of the health determinants

As can be seen in figure 24.2, social determinants were calculated to be responsible for 34.4 per cent of the health gap compared with 18.8 per cent for behavioural risk factors. Interactions (overlap) between social determinants and behavioural risk factors were estimated to explain 10.8 per cent of the health gap, and together, the factors explained 53.2 per cent of the gap.



Source: Aboriginal & Torres Strait Islander Health Performance Framework 2017 Report
© AIHW, (CC-BY 3.0) licence (<http://creativecommons.org/licenses/by/3.0/au/>)

Figure 24.2 Proportions of the health gap explained by social determinants and behavioural risk factors, 2011–13

Income and unemployment

Indigenous people are more likely than non-Indigenous people to be in the lowest income bracket. Similarly, Indigenous people are more likely to rely on income from government pensions and allowances.

The National Aboriginal and Torres Strait Islander Social Survey (NATSISS) was conducted from September 2014 to June 2015 with a sample of 11178 Aboriginal and Torres Strait Islander people living in private dwellings across Australia. The following statistics relating to the survey were published by the ABS:

- Fewer than half (46 per cent) of Aboriginal and Torres Strait Islander people aged 15 years and over were employed – 27.7 per cent working full-time and 18.3 per cent working part-time.
- Aboriginal and Torres Strait Islander males were more than twice as likely as females to be working full-time (37.9 per cent compared with 18.4 per cent), and were less likely to be working part-time (13.7 per cent compared with 22.6 per cent).
- Almost half (49 per cent) of Aboriginal and Torres Strait Islander people aged 15 years and over in non-remote areas were working, compared with 35.6 per cent in remote areas.
- The unemployment rate for Aboriginal and Torres Strait Islander people aged 15 years and over was 20.6 per cent nationally (27.4 per cent in remote areas compared with 19.3 per cent in non-remote areas).

Compared to non-Indigenous Australians, Indigenous Australians experience lower employment rates due to lower levels of education, poorer training and skills, poorer health, discrimination, and poorer job retention.

Issues of cost and affordability have been strongly connected with reduced levels of access to services and facilities and, due to lower income levels, Indigenous Australians are at greater

risk of being deterred from seeking health care assistance. Cost and affordability have become an issue for many Indigenous Australians when seeking specialist health care outside public hospitals, for services such as physiotherapy, psychology and dental care. Many of these health services now involve out-of-pocket costs (that is, costs not covered by Medicare).

Living conditions

The National Aboriginal and Torres Strait Islander Social Survey also found that in 2014–15, the proportion of Aboriginal and Torres Strait Islanders aged 15 years and over who were living in a dwelling that was overcrowded (requiring at least one more bedroom) was 18.4 per cent, down from 24.9 per cent in 2008 and 25.7 per cent in 2002. Between 2008 and 2014–15 there were significant improvements to this figure in both remote areas (down 10.3 per cent) and non-remote areas (down 4.3 per cent).

Overcrowding can place increased demands on bathroom, kitchen and laundry facilities as well as on sewerage systems (such as septic tanks in rural areas). This can, in turn, lead to the spread of infectious diseases such as meningitis, tuberculosis, respiratory diseases and skin infections.

Just over two-thirds (67.3 per cent) of Aboriginal and Torres Strait Islanders aged 15 years and over were living in a rented property, 19.4 per cent in a dwelling that was owned with a mortgage and 9.3 per cent in a dwelling that was owned without a mortgage. Around one in seven (14.9 per cent) Aboriginal and Torres Strait Islander Australians aged 15 years and over were living in a dwelling in which facilities were not present or did not work (27.7 per cent in remote areas and 11.2 per cent in non-remote areas).

A third (29.1 per cent) of Aboriginal and Torres Strait Islanders aged 15 years and over had experienced homelessness during their lifetime (32.1 per cent in non-remote areas compared with 18.4 per cent in remote areas).



Alamy Stock Photo/david hancock

Figure 24.3 There have been significant improvements in the living conditions of Aboriginal and Torres Strait Islander people in recent years.

The 2011 Census found that 28 per cent of all homeless people in Australia were Indigenous. The rate of homelessness for Indigenous Australians was 14 times higher than the rate for non-Indigenous Australians. Despite making up just 3 per cent of the population, Indigenous people represented about 20 per cent of clients of specialist homelessness services in 2012–13 (AIHW, 2014).

Nutrition

Poor nutrition contributes to many health problems experienced by Indigenous Australians but this can be improved through education and programs targeting Indigenous women during pregnancy, parents and carers, adolescents, and children. Priorities for prevention of nutrition-related disease include:

- improving access to good-quality affordable fresh fruit and vegetables
- increasing levels of physical activity
- improving maternal and child health.

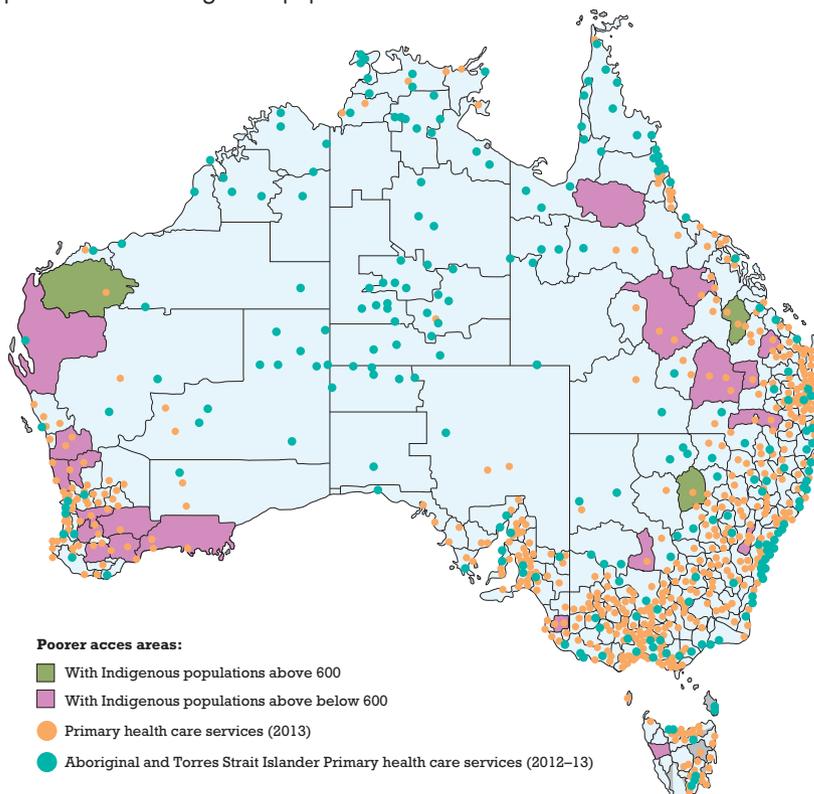
Education programs need to be culturally relevant to individual communities in different regions of Australia.

Dental health is often overlooked among the many serious health problems experienced by Indigenous people. The incidence of decayed, missing and filled teeth in Indigenous children is almost double that of non-Indigenous children.

Access to services

Indigenous people experience lower levels of access to timely and effective health services compared to the non-Indigenous population. Reasons for this include lack of transport, distance to the service, affordability, waiting periods to access a GP and lack of cultural understanding by health practitioners.

Identifying areas where access is poor can help to inform policy decisions and planning of health services. The AIHW has mapped access to primary health care services (Indigenous-specific primary health care services and other GP-based primary health services) relative to the distribution of the Indigenous population. This has revealed areas where critical primary health care service gaps exist for the Indigenous population.



Source: *Australia's health 2016*, AIHW, p. 2, CC-BY 3.0 licence

Figure 24.4 Areas where Indigenous Australians have poor access to primary health care services

For Indigenous people, access to private general medical practices, which are the first point of contact with the health care system for most Australians, is limited. While the average Australian sees a GP five times per year, Indigenous people average fewer than two GP consultations a year. Apart from barriers such as cost, transport and distance, education level can also affect a person's understanding of their health needs. Some individuals may also experience mental health barriers such as anxiety and stress when attempting to access mainstream health services.

These factors also lead to fewer referrals to hospital and a greater likelihood of Indigenous people developing increased levels of morbidity because their initial health issue was not addressed at an earlier stage.

In some areas, specific Indigenous health services have been established to address these barriers. A network of Indigenous community-controlled health services across Australia has been created to provide culturally and clinically appropriate health care to Indigenous patients.



Alamy Stock Photo/Hilke Maunder

Figure 24.5 Lack of access to transport, distance and prohibitive cost can be barriers to accessing health services for people in remote communities.

Education

The National Aboriginal and Torres Strait Islander Social Survey, conducted in 2014–15, found that most (96 per cent) Aboriginal and Torres Strait Islander children aged 4–14 years usually attended school. Almost two-thirds (63.2 per cent) of Aboriginal and Torres Strait Islander children aged 4–14 years were being taught about Aboriginal and Torres Strait Islander culture at school. Just over one in five (21.5 per cent) Aboriginal and Torres Strait Islanders aged 15 years and over were enrolled in formal study (24.2 per cent in non-remote areas compared with 11.8 per cent in remote areas).

Across Australia the average National Assessment Program – Literacy and Numeracy (NAPLAN) scores for Indigenous students continue to be significantly lower than for non-Indigenous students.

Retention rates of Indigenous students are improving. Data for 2013 show that the apparent retention rate of full-time Aboriginal and Torres Strait Islander students from Years 7/8 to Year 10 was 98 per cent compared with full retention for non-Indigenous students. In the same year, the apparent retention rate of full-time Aboriginal and Torres Strait Islander students from



Fairfax Photos/Glenn Campbell

Figure 24.6 Retention rates for Indigenous students are improving.

Years 7/8 to Year 12 was 55 per cent compared with 83 per cent for non-Indigenous students. The apparent retention rate of full-time Aboriginal and Torres Strait Islander students from Year 11 to Year 12 was 71 per cent compared with 87 per cent for non-Indigenous students. The apparent retention rate for Aboriginal and Torres Strait Islander females was higher compared with males across all year groups of school retention.

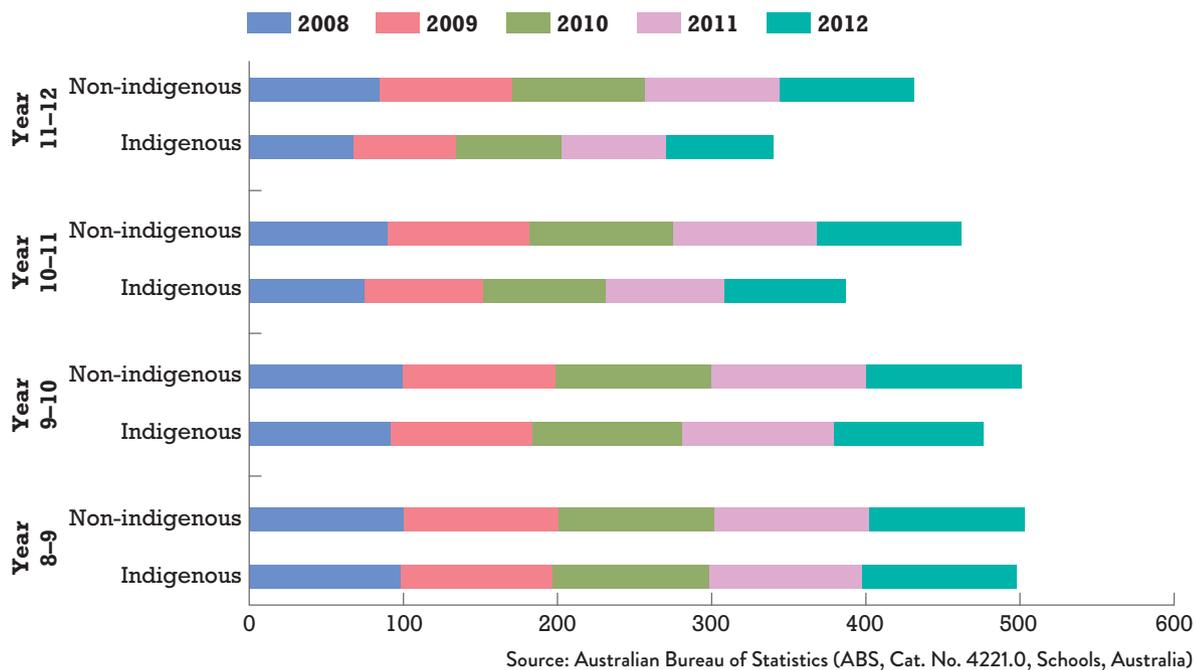


Figure 24.7 Comparative Indigenous and non-Indigenous apparent grade progression rates (%), Australia, 2008–12

Examining the media’s role in influencing social attitudes and public policy

The media is a powerful tool. It can be used to educate Indigenous individuals and communities about risks to health and ways to reduce these risks. Further, the media can be a political tool, used to target and pressure policy-makers for social change.

The media has been used extensively to contribute to improvements in Indigenous health literacy and has been influential in changing some health, social and environmental policies. Early expectations were that paid advertising campaigns would be sufficient to bring about changes in Indigenous health behaviours. An understanding that advertising campaigns need to be integrated with a wider set of intervention strategies has led to the development of social marketing campaigns and public policy. Examples of campaigns that address the health issues of all Australians are the quit smoking, road safety and alcohol campaigns.

Challenging generalisations about populations experiencing inequities

A generalisation involves using one or a couple of facts to form a wider, more general statement. Below are generalisations made about Aboriginal and Torres Strait Islander (ATSI) people and responses to these inaccurate statements.

- ‘ATSI people all get drunk and become violent’.
Consuming alcohol is certainly a part of Australian culture. Alcohol abuse has been a thread throughout Australian history and remains a problem for many communities.

As a proportion of each population, more Indigenous than non-Indigenous people do not drink alcohol at all. It has been found that those Indigenous people who do drink, do so in more dangerous quantities than non-Indigenous Australians. Adding to the perception of high levels of Indigenous alcohol use is that some Indigenous social drinking has been conducted in highly visible public places such as parks.

- ‘ATSI people all live in the outback’.
More than half of the Indigenous Australian population live in urban locations.
- ‘ATSI people are constantly trying to claim more land’.
Indigenous people can only claim vacant government-owned land (‘Crown land’) under the Native Title Act and they must prove a continuous relationship with this land. ‘Freehold title’ is land owned by individual owners, companies or local councils. In New South Wales and the Northern Territory, claimable land needs to be unoccupied and ‘not likely to be needed for residential purposes’. Returning land to Aboriginal people will always be a difficult process because Aboriginal interests are in competition with commercial interests.
- ‘ATSI people are uneducated, lazy and live off welfare payments’.
This social attitude arises in part from a lack of awareness of the factors contributing to high levels of unemployment. For example, in remote Aboriginal communities the unemployment rate is often a reflection of the low levels of employment opportunities, as well as the limited educational and training opportunities combined with lingering bias among non-Indigenous employers.

The media can play a positive role in promoting Indigenous health by creating a degree of importance within the community and developing a groundswell of support to evaluate and change public policy. It can also be an effective means of promoting positive public relations.

Evaluating government interventions

Government initiatives for Indigenous Australians

The Closing the Gap campaign aims to reduce Indigenous disadvantage. All Australian governments have committed to achieve Indigenous health equality within a generation. In 2008, the Council of Australian Governments (COAG) set targets in health, education and employment to measure improvements in the health and wellbeing of Aboriginal and Torres Strait Islander Australians.

The Closing the Gap timeframes reflect the complexity of the targets. The targets are:

- Close the gap in life expectancy within a generation (by 2031)
- Halve the gap in **mortality rates for Indigenous children** under five within a decade (by 2018)
- 95 per cent of all Indigenous four-year-olds to be enrolled in **early childhood education** (by 2025)
- Close the gap between Indigenous and non-Indigenous **school attendance** within five years (by 2018)
- Halve the gap for Indigenous children in **reading, writing and numeracy achievements** within a decade (by 2018)



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- Halve the gap for Indigenous Australians aged 20–24 in **Year 12 attainment** or equivalent attainment rates (by 2020)
- Halve the gap in **employment outcomes** between Indigenous and non-Indigenous Australians within a decade (by 2018).

NSW Aboriginal Child, Youth and Family Strategy

The NSW Aboriginal Child, Youth and Family Strategy is a preventative and early intervention strategy that aims to provide the best start in life for Aboriginal families with children.

The strategy has a particular focus on supporting Aboriginal families that are expecting a baby or that have children aged up to five years. This is underpinned by a strong body of evidence demonstrating the importance of the early years in a child's development and the long-term effectiveness of supporting parents and children during these years.

The strategy funds five types of service for Aboriginal children and families. These are:

- **Aboriginal supported playgroups:** providing opportunities for parents to share experiences of parenting and for children to socialise, play and learn in a structured and positive environment
- **parenting programs:** providing parents with effective activities, information and coaching to assist them to build positive parenting skills
- **Aboriginal family worker:** working to improve the outcomes and wellbeing of Aboriginal families with children aged 0–5 by providing support for parenting, facilitating informal support groups and access to appropriate services
- **community capacity building:** community-based projects aiming to strengthen the connections community members make with local services available to them
- **partnership and network projects:**
 - supporting service providers to work collaboratively to improve conditions in the local community
 - improving prevention and early intervention approaches by making local connections between services. This will improve people's access and engagement with services, and improve results for clients.

The Indigenous Advancement Strategy, funded through the Department of the Prime Minister and Cabinet, consolidates the many different Indigenous policies and is delivered by the Australian government into five overarching programs, making it easier for organisations delivering local services.

The Australian government has set the following three clear priorities to make sure efforts are effectively targeted:

- 1 The positive impact that education has on the future success of individuals, families and communities is clear. Children who go to school have better life outcomes.
- 2 Employment, economic development and social participation improve the lives of families and communities. The right conditions and incentives need to be in place for Indigenous Australians to participate in the economy and broader society.
- 3 Growing up in a healthy and safe home and community is essential for families to thrive and reach their full potential. In particular, the violence that too many women and children face must be addressed.

The **Indigenous Australian Government Development Program (IAGDP)** is an entry-level employment and development program for Australian Aboriginal and Torres Strait Islander people who are interested in working in the Australian Public Service. The IAGDP is a well-established program that was awarded the 2014 APS Diversity Council Award for Indigenous Employment. This award recognises the program's significant contribution to improving employment opportunities, experiences and outcomes for Indigenous Australians in the Australian Public Service.



NewsPix/Hannah Millerick

Figure 24.8 Children who go to school have better life outcomes.

The Children and Schooling Programme supports activities that nurture and educate Aboriginal and Torres Strait Islander children, youth and adults to improve their pathways to prosperity and wellbeing. This includes improving family and parenting support; early childhood development, care and education; school education; youth engagement and transition; and higher education. The program has a critical focus on increased school attendance and improved educational outcomes that lead to employment.

The Children and Schooling Programme complements a range of federal, state and territory, and government programs that aim to improve the education outcomes and positive development of Indigenous Australians. The program provides opportunities to fill gaps between existing services, enables innovation and leverages further grant funding.

CULTURALLY AND LINGUISTICALLY DIVERSE (CALD) PEOPLE

Examining health data to determine areas of inequity

The Australian Bureau of Statistics defines CALD by three variables:

- 1 Country of birth
- 2 Language other than English spoken at home
- 3 English language proficiency.

In the Australian context, individuals from a CALD background identify as having a specific cultural or linguistic connection to their place of birth, ancestry, ethnic origin, religion, preferred language or language spoken at home.

Australia is one of the most culturally and linguistically diverse countries in the world, with more than a quarter of its residents born overseas. Some three million Australians speak a language other than English at home, with more than 200 language groups represented overall.

Since 1945, more than 7.5 million people have come to Australia as new settlers. Australia has received:

- more than two million **migrants** since 2000
- more than 900 000 migrants during the 1990s
- 1.1 million in the 1980s
- 960 000 in the 1970s
- 1.3 million in the 1960s
- 1.6 million between 1945 and 1960.

The purposes of migration are to reunite family, support the labour market and build Australia's economy. There are three broad categories under which people can now migrate to Australia.



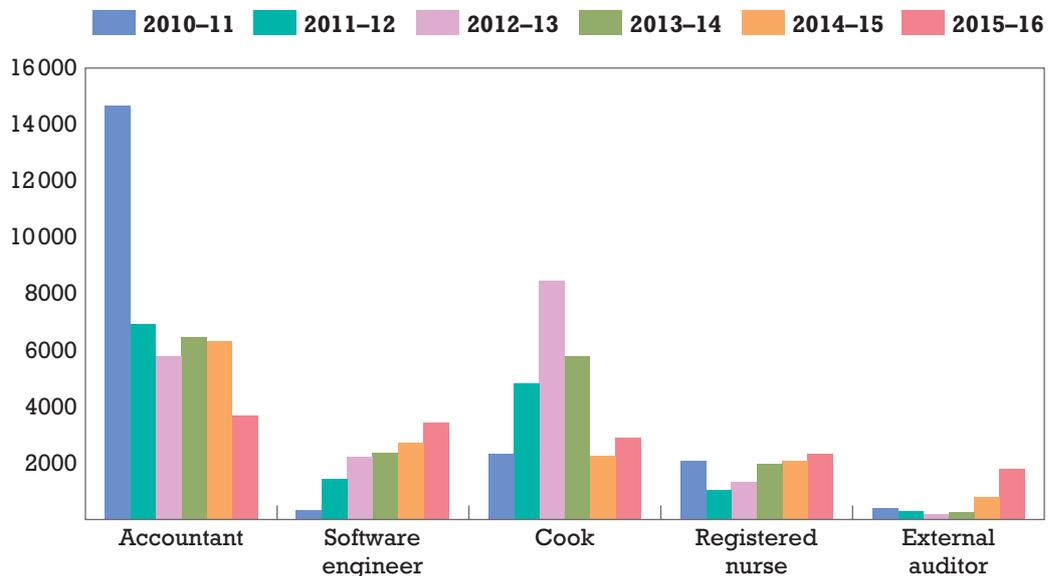
Fairfax Photos/Sandy Schellema

Figure 24.9 New migrants holding their Australian citizenship certificates

Skill stream migrants

These migrants are chosen according to their occupation, age, education, work experience and English language ability. According to the Department of Immigration and Border Protection (2016), 68 per cent of people migrating to Australia are skilled migrants.

Figure 24.10 shows the top five occupations of skill stream migrants over the past five years. Accountants have been the top migrant group since 2013–14, with the number of cooks reducing over the past three years of comparison. Technology roles fill two of the top five along with a steady migration of skilled nurses.



Source: 2015-16 Migration Programme Report. Department of Home Affairs. CC BY 3.0 Australia licence

Figure 24.10 Top five occupations of skill stream migrants

Family stream migrants

These migrants are chosen according to their relationship with a sponsor, who must be a close family member and an Australian resident or citizen.

Refugee and humanitarian program

Migrants in this category are chosen because they are the victims of persecution or substantial discrimination amounting to gross violation of human rights.



Weblink

‘Australia’s Brutal Treatment of Migrants’

Follow the weblink to read this editorial from the *New York Times* of 3 September 2015. As a class, discuss the validity of this article and how it relates to the Australian Government’s current humanitarian program.

In 2014-15, net overseas migration reflected an annual gain of 168 200 persons, which is 9.8 per cent less than in 2013-14. At 30 June 2015, 28.2 per cent of Australia’s estimated resident population (6.7 million people) was born overseas.

Mortality

Mortality rates among Australians vary substantially by country/region of birth. On average, overseas-born residents have lower death rates than Australian-born residents. According to the AIHW Mortality Database (2014), compared to Australian-born residents, mortality rates were 36 per cent lower for Asian-born Australian residents, for both males and females; 15 per cent lower for resident males born in the north-west, southern and eastern regions of Europe, and 24 per cent lower for resident females born in these countries.

The four leading causes of death for all countries/regions of birth were coronary heart disease, cerebrovascular diseases, dementia and Alzheimer’s disease, and lung cancer.

People born in the United Kingdom and Ireland had similar causes of death to Australian-born residents, with greater rates of lung cancer, dementia and Alzheimer’s disease, and lower rates of colorectal cancer and heart conditions. People born in other European countries

experienced lower rates for most leading causes of death compared to Australian-born residents, and Asian-born residents experienced lower rates for all ten leading causes of death except liver cancer, which was twice the rate of Australian-born residents.

Analysing the impact of the health determinants

Access to services

Geographical disadvantage, or where people live, can affect an individual's ability to improve their life situation by denying them access to social supports or preventing them from purchasing nutritious food. Even travelling short distances can make accessing care difficult for people without adequate and secure transport.

Examples of major barriers impacting CALD people and their use of health services include:

Cultural

- Attitudes to family and caring responsibilities, such as the role of women
- Beliefs, such as views on health practitioners and services
- Communication, such as language difficulties

Structural

- Lack of awareness of Australian health care system

Services

- Inability of a health care service provider to communicate with CALD people, which has an impact on the quality of care received and decreases the likelihood of follow-up
- Cultural appropriateness displayed by health service providers
- Lack of experience using (or failing to use) interpreters
- Negative attitudes by service providers towards CALD people
- Lack of health information available for CALD people – materials about health care options, services available and health issues

Lack of data

- Absence of accurate information about health status and health care needs of CALD communities can prevent effective planning for service provision.

A major issue that has emerged in CALD populations is access to mental health services. There is a reluctance to voluntarily access both hospital and community-based mental health services, primarily due to difficulties in understanding and accessing mainstream systems of care and lack of access to services that are culturally safe and appropriate.

The **stigma** of accessing a mental health service, lack of information about mental illness, health professionals who may not display cultural awareness, and poor communication have acted as significant barriers. This lack of timely access reduces the effectiveness of early intervention, which is crucial in relapse prevention. This then leads to further hospitalisations that could have been avoided.

Therefore, health services must look to reduce the stigma of mental illness among CALD populations and encourage families to develop support and education networks to reduce the chance of further illness.

There is a need for health services to be meaningful to CALD people to ensure that they willingly access them. Ways of doing this include:

- providing services that reflect the diversity of the community being served
- using CALD community members as 'experts' on how they can best be served
- working in partnership with the CALD community and consulting regularly on service delivery planning and evaluation



WebLink

Watch

Watch personal stories of culturally and linguistically diverse (CALD) people living with health issues on the MH i MA website (Mental Health in Multicultural Australia).

- increasing opportunities for health providers to learn about the cultural and ethnic variations in health beliefs and behaviours that exist within communities and subgroups
- allocating extra health service funding for more comprehensive interpreting and translating services as well as written information.

Living conditions

Evidence suggests that differences exist in health status according to place of residence – depending on whether it is urban, rural or remote. Many CALD families live as extended families with three generations under one roof. This may lead to a lower level of living conditions.



Getty Images/kali9

Figure 24.11 An extended culturally and linguistically diverse (CALD) family

Further, quality and type of housing, cost of housing and level of overcrowding may impact directly on their health. Poor-quality housing is associated with increased prevalence of lung diseases (such as asthma), a higher incidence of falls and higher heating costs. The increased incidence of infectious diseases and the number of accidental deaths are also associated with high levels of overcrowding.

Housing represents the largest monthly expenditure for most households. Many low-income CALD families spend a much greater proportion of household income on housing costs than families with higher incomes. High housing costs leave less money for other budget items essential to good health. If health suffers as a result of these circumstances, the ability of low-income earners to support themselves may be compromised with further economic, physical and social costs to themselves, their families and the community.

A house is also a home, a place where people can feel secure, a place to keep things that are important and a place to develop a sense of identity and belonging. CALD people who have insecure access to housing, and are required to move frequently, are less able to integrate and contribute to the community, which in turn has implications for their psychological health, as well as increasing social isolation.

Income and unemployment

Income is one of the most important conditions determining whether individuals stay healthy or become ill. At a material level, it provides the means of obtaining basic needs such as shelter, food and warmth. When people have an income they have a sense of identity that enables them to participate fully in their families, communities and the broader society.

There is also a link between level of employment and health. Job uncertainty has been shown to increase anxiety, depression, self-reported ill health, heart disease and risk factors associated with heart disease. Job insecurity causes stress and has been linked to increased absence from work due to sickness. Unemployment can also affect people's physical and mental health and the inability to speak English can be a cause for unemployment.

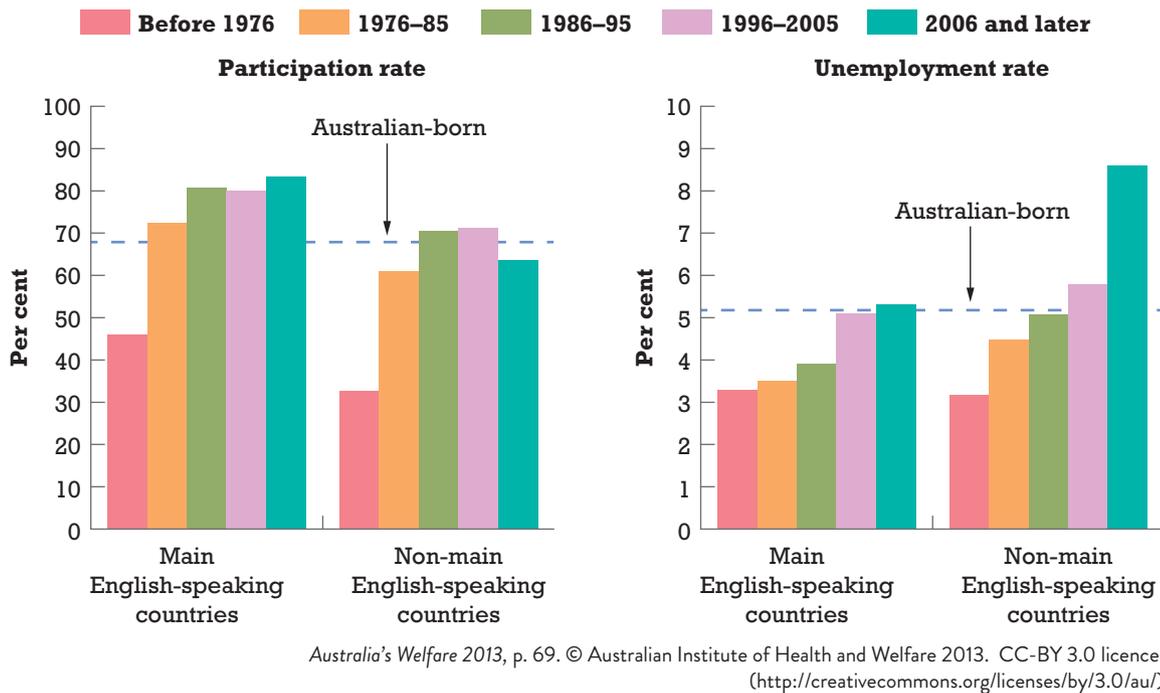


Figure 24.12 Labour force participation and unemployment rates, by country of birth and year of arrival in Australia, 2012

As can be seen in figure 24.12, in 2012, 28 per cent of people in the labour force were born overseas (AIHW, 2012). About one in 10 (11 per cent) were born in main English-speaking countries, while 17 per cent were born in non-main English-speaking countries.

Figure 24.12 also shows that the participation rate for people born in main English-speaking countries was the same as that for people born in Australia (both 68 per cent) in 2012. However, people born in non-main English-speaking countries had a lower participation rate (58 per cent). They also had the highest unemployment rate (5.9 per cent), followed by people born in Australia (5.2 per cent).

Unemployment among CALD people has been associated with increased self-harm rates, increased suicide rates, increased risk of mortality and decreased levels of educational attainment. Unemployed CALD people have higher rates than non-CALD Australians of serious chronic illness, disability, symptoms of psychological distress (depression and anxiety), obesity, smoking and greater restrictions on social interactions.



Weblink

Investigate

For the most recent results, go to the ABS website and look at 'Characteristics of recent migrants' no. 6250.0.

Education

At the individual level, an inability to communicate with health care providers creates a barrier to accessing health care. Understanding the English language and/or having an interpreter is an option but this does not always ensure that CALD people receive appropriate care. Factors such as cultural misunderstandings, lack of communication with service providers and not understanding how the health system works are all barriers to receiving appropriate health care.

In the classroom, teachers make an effort to understand and value the cultures of all students, which ensures they are better able to develop meaningful and flexible teaching strategies that can help CALD students achieve academic success. Literacy instruction that clearly builds upon the cultural knowledge, ways of making meaning and prior knowledge that all children bring with them to the classroom will encourage children to feel that their culture is important and valued in schools.



Figure 24.13 Flexible teaching strategies can ensure positive outcomes for CALD students.

To effectively connect with all students, teachers need to understand how CALD students' patterns of communication and languages affect their classroom learning. Although English is the language of instruction in schools, it is not always the language of the children outside the classroom. Acceptance of the home language of students and identification of a process to help students move to a more standard form of English is an important part of literacy development and, in turn, improved educational and health outcomes.

Ageing population

Many older members of the Australian population were not born in Australia and do not speak English as their preferred language. Language barriers may lead to problems in communicating individual health requirements or developing the knowledge and understanding about existing aged care services available.

The overseas-born population has an older age structure than the Australian-born population. At 30 June 2013, 18 per cent of people born overseas were aged 65 and over, while 12 per cent

of people born in Australia were over 65 (AIHW, 2013). The proportion of migrants from Europe has been declining, whereas migrants from Asia are increasing.

Inequities experienced by CALD people are increasing due to the ageing population. In the future, planning for areas such as aged care services will require priority over other previously prioritised health care areas.

Examining the media's role in influencing social attitudes and public policy

Images portrayed in the media can both create and reinforce social attitudes. These images can be powerful tools for spreading **prejudice** and **racism**. Since the media plays a large role in the social construction of what may be considered 'reality', it can impact on public opinion and understanding of CALD people.

Young CALD Australians learn at school how to manage issues associated with a **multicultural** Australia. Teachers can encourage racial tolerance and help young CALD people to negotiate any prejudices that may be conveyed in the media.

Some challenges for the media include:

- telling stories in a way that embraces cultural complexity and allows audiences to learn more about one another
- offering a greater diversity of sources in public discussions
- emphasising a commitment to objective, accurate and impartial information delivery.

Socially excluded CALD people lack the means to participate in mainstream economic, social, cultural and political life and, therefore, are denied opportunities to participate in everyday life.

Social connectedness refers to the existence of mutual trust and respect in a community and the wider society, and is determined by the degree to which individuals are integrated with, and participate in a safe social environment. The media can promote positive community attitudes of social support, which in turn can lead to positive influences on health and contribute to protecting CALD people against poorer levels of health.

Supportive networks also help CALD people to feel that they have a place in the community. Belonging to a social group makes them feel cared for, loved and valued. It also provides social status and a sense of control over their health and life situations.

CALD people with good social support networks live longer than those without such supports, are at reduced risk of cardiovascular disease, are less likely to experience mental health issues, experience lower levels of cancer and are less likely to be exposed to infectious illness. Additionally, when social cohesion is increased for CALD people, rates of cardiovascular disease have been shown to decrease.

Challenging generalisations about populations experiencing inequities

Reframing statements

A generalisation involves using one or a couple of facts to form a wider, more general statement. Below are generalisations made about culturally and linguistically diverse people. Rewrite the following generalisations to form positive, accurate statements.

- CALD people are only interested in living by their own culture in Australia.
- CALD people cannot be bothered to learn and speak English.
- CALD people are all law-breakers.
- CALD people are uneducated and live off welfare payments.

Evaluating government interventions

NSW Multicultural Health Communication Service



Weblink

Investigate

Go to the NSW Multicultural Health Communication Service website and look at its recent projects.

The NSW Multicultural Health Communication Service (MHCS) has expertise in developing communication strategies, campaigns, resources and products specifically targeted to culturally and linguistically diverse (CALD) communities in New South Wales. The service organises health promotion, education and information services, audio and video production, the development of print resources and distribution networks.

MHCS also provides support to CALD communities in regards to anti-tobacco, children's health, healthy eating and lifestyle, healthy heart, men's and women's health, organ and tissue donation and problem gambling.

Access to allied psychological services



Weblink

Investigate

Go to the NSW Department of Health ATAPS website to find out more.

The Department of Health funds Medicare Locals under the Access to Allied Psychological Services (ATAPS) program. This allows GPs to refer patients who have been diagnosed as having a mental health disorder of mild to moderate severity to mental health professionals, who provide short-term focused psychological strategies services.

ATAPS primarily treats people with common mental health disorders such as anxiety and depression. All ATAPS services are targeted to give priority to population groups that have particular difficulty in accessing mental health treatment in the primary care sector, including people from CALD communities, who are a target group under the program.

Under ATAPS there is support for service delivery costs associated with clinical services to referred mental health clients. These may include the use of interpreter services. A series of GP Mental Health Care Medicare items complement ATAPS and provide a structured framework for GPs to undertake early intervention, assessment and management of patients with mental health disorders, as well as providing referral pathways to allied mental health service providers.

Programme of Assistance for Survivors of Torture and Trauma



Weblink

Investigate

Go to the NSW Department of Health website and search for PASTT to find out more.

The Programme of Assistance for Survivors of Torture and Trauma (PASTT) receives funding from the Department of Health. PASTT service providers deliver mental health and other support to permanently resettled humanitarian entrants and those on temporary visa products who are experiencing psychological and/or psychosocial difficulties resulting from their pre-migration experiences of torture and trauma. PASTT services include:

- direct counselling and related support services, including advocacy and referrals to mainstream health and related services for individuals, families and groups who have experienced torture and trauma
- education and training to mainstream health and related service providers
- provision of resources to support and enhance the capacity of specialist counselling and related support services to deliver effective services and to respond to emerging client needs
- community development and capacity building activities to emerging community groups
- outreach services to rural, regional and remote areas.

Agencies delivering PASTT services are all members of a network of specialist rehabilitation agencies that work with survivors of torture and trauma, known as the Forum of Australian Services for Survivors of Torture and Trauma (FASSTT). There is a FASSTT member agency in each state and territory in Australia.

Clients can be referred through a wide range of sources including Humanitarian Settlement Services (HSS) administered by the Department of Social Services (DSS), other settlement services, GPs and other health services, education providers, legal services, community services, family, friends, community members and through self-referral.

Three investigations

- 1 Investigate TWO organisations that have specific programs aimed at employing Aboriginal and Torres Strait Islander and/or CALD people.
- 2 Examine TWO media articles about Aboriginal and Torres Strait Islander and/or CALD people and determine the level of media influence that may exist towards the group/s. Investigate the use of language and visual imagery and any other relevant techniques that may exist within the article. Comment on what message the articles are looking to portray and whether the author has been effective in achieving this.
- 3 You have been appointed as the new principal of a school and have noticed that the students in the school include a range of culturally and linguistically diverse students from varying backgrounds. The students appear to rarely mix in the playground. How would you approach the task of creating a school that is not only accepting of all cultures but willing to create and integrate a new school culture?

LEARNING TIP

In this section, you need to clearly understand how health inequalities have impacted on TWO population groups. Questions may require a comparison, so selecting two groups with similarities and differences would be helpful.

CHAPTER SUMMARY

Aboriginal and Torres Strait Islander people

- Aboriginal and Torres Strait Islander people suffer more ill health than other Australians. They die at much younger ages and are more likely to experience disability and an overall reduced quality of life due to ill health.
- Indigenous Australians are also more likely than non-Indigenous Australians to rely on income from government pensions and allowances.
- Indigenous Australians experience lower employment rates compared to non-Indigenous Australians due to lower levels of education, poorer training and skills, poorer health, discrimination, and poorer job retention.
- Housing has been identified as a major influence on the health of Aboriginal and Torres Strait Islander people.
- Poor nutrition contributes to many health problems experienced by Indigenous Australians.
- Indigenous people experience lower levels of access to timely and effective health services than the non-Indigenous population.
- The media is a powerful tool that can be used to educate Indigenous individuals and communities about risks to health and ways to reduce these risks. The media can also be a political tool, used to target and pressure policy-makers for social change.

Culturally and linguistically diverse people

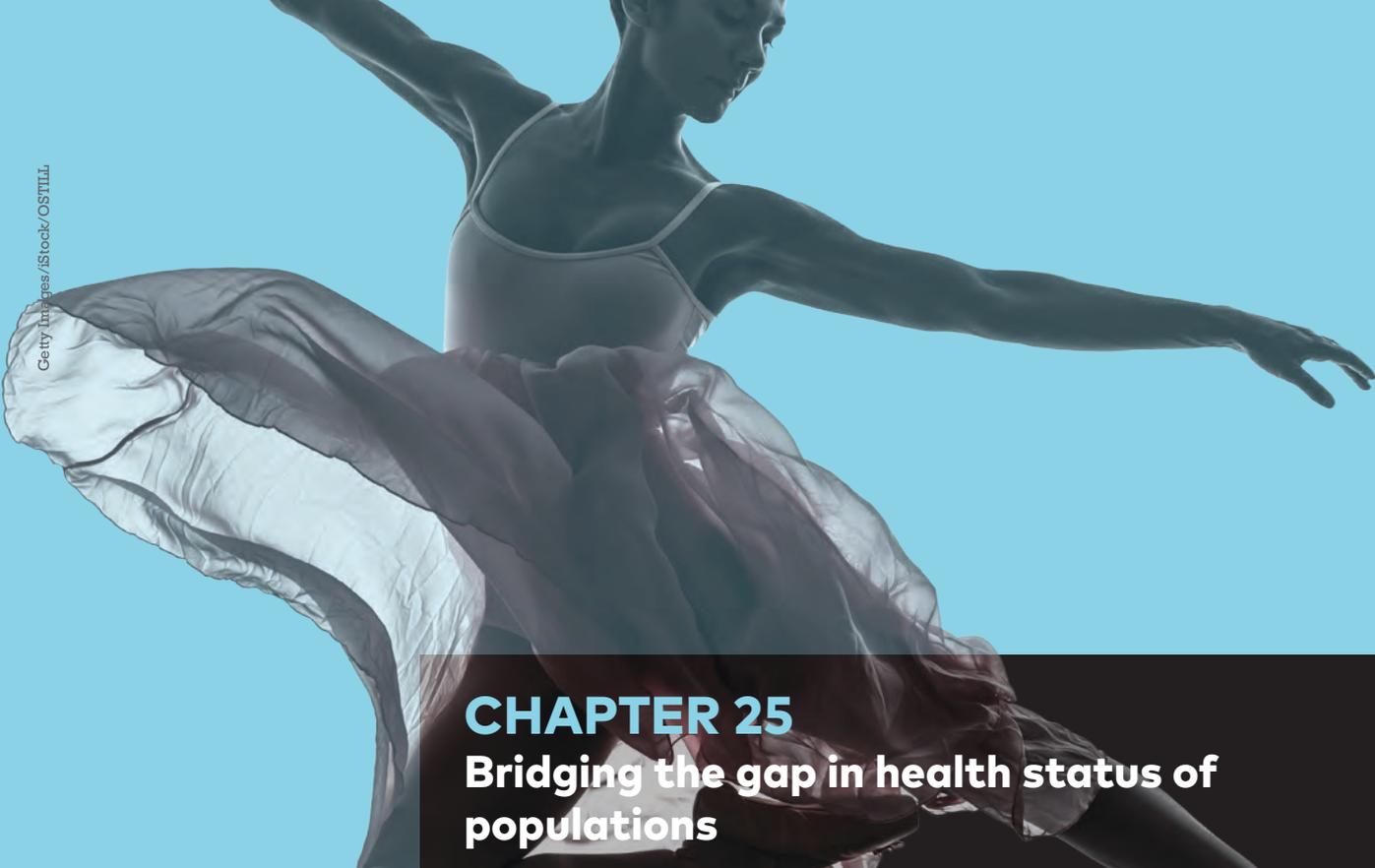
- In the Australian context, individuals from a CALD background are those who identify as having a specific cultural or linguistic connection to their place of birth,

ancestry, ethnic origin, religion, preferred language or language spoken at home.

- On average, overseas-born residents have lower death rates than Australian-born residents.
- Geographical disadvantage can affect an individual's ability to improve their life situations by denying them access to social supports.
- Differences exist in health status according to place of residence – depending on whether it is urban, rural or remote.
- Many CALD families live as extended families where three generations may live together.
- A good level of income allows CALD people to feel as though they possess an identity and are able to participate fully within their families, communities and broader society.
- Job uncertainty has been shown to increase anxiety, depression, self-reported ill health, heart disease and risk factors associated with heart disease.
- Unemployment has been associated with CALD people's increased self-harm rates, increased suicide rates, increased risk of mortality and decreased levels of educational attainment.
- Language barriers may lead to problems in communicating individual health requirements or developing the knowledge and understanding about existing health care services available.

CHAPTER REVIEW ACTIVITIES

- 1 **Describe** the impact unemployment may have on disadvantaged populations.
- 2 **Compare** the similarities and differences between access to services for ATSI and CALD people.
- 3 **Discuss** to what degree the gap in inequity is reducing between ATSI and non-ATSI people.
- 4 **Examine** the media's role in influencing social attitudes and public policy towards ATSI and CALD people.
- 5 **Assess** the impact low levels of education may have on disadvantaged population groups.
- 6 **Evaluate** ONE government intervention for a population group of your choice.
- 7 Critically **analyse** generalisations made about ATSI and CALD populations.



CHAPTER 25

Bridging the gap in health status of populations

IN THIS CHAPTER

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FUNDING TO IMPROVE HEALTH

Funding for health

The Australian health system comprises several layers of funding delivered by governments, private health insurers, health providers and individuals. Funding for the health system is predominantly divided between the Commonwealth and state/territory governments.

The Commonwealth Government provides funding for key areas such as:

- Medicare
- Pharmaceutical Benefits Scheme (PBS)
- community-controlled primary health care organisations for Aboriginal and Torres Strait Islander peoples
- medical research grants
- private health rebates
- subsidies for aged care services
- veterans' health care
- purchase of vaccines for national immunisation programs.

State and territory governments fund:

- public hospitals
- public dental clinics
- emergency services

- ambulance services
- health and safety programs
- immunisation programs
- mental health services
- breast cancer screening.

Shared responsibility between the Commonwealth and states/territories also exists with funding for:

- public hospital services
- health professional registration and accreditation
- **palliative** care
- mental health
- preventative services, such as free cancer screening programs.

Sometimes these shared arrangements result in neither level taking responsibility for funding, or duplication of funding with both levels being involved. The result can be an excess of resources allocated to health issues.

In its report *Health Expenditure Australia 2015–16*, the Australian Institute of Health and Welfare (AIHW) calculated that \$170.4 billion was spent on all health care in Australia in 2015–16. This is approximately \$7096 in recurrent expenditure per person (not including capital). Most health spending in Australia (almost 70 per cent) is funded by governments and the largest component is for the provision of public hospital services. For more information, see the PDF booklet *Health Expenditure Australia 2015–16*.



Weblink

In New South Wales, a major factor for determining funding needs is the size of the population in each Area Health Service. Simply put, the larger the population, the greater the need. Visit the website of NSW Health to view the local health districts in the state, which vary greatly in size and population.

Funding priorities are determined through the population characteristics of sex and age. Incorporating these factors can become complex because funding calculations are determined using each five-year age group (from birth to 85+) for each sex.

Evidence that represents specific health needs, such as the number of people living alone or the level of homelessness in a community, must also be taken into consideration when determining funding for health.

Funding for specific populations

Health organisations look for ways to identify populations that are overlooked and under-funded. They also aim to provide the additional costs of caring for populations with high needs (such as Indigenous and culturally and linguistically diverse people), providing health services to specific populations that are under-represented (such as the homeless) and caring for populations in geographically remote areas.

New technologies, income growth and demographic trends ensure that health care requirements for specific populations in Australia will continue to increase. For example, statistics show that as people grow older they require more health care services on a more regular basis, which in turn raises the overall funding requirements for health care.

People who live in geographically remote areas have access to fewer health professionals per person than those in urban areas, and the more chronic or urgent the problem, the more difficult it may be to access the specialist treatments required. For patients in geographically remote areas, access to primary and emergency care services can be many hours away and it may be easier for them to simply manage the health issue as best they can. Access to the more specialised services that are only available in major population centres involves even longer travel times and greater financial costs, which in turn creates further disruption to family life and work.



Figure 25.1 For Indigenous people living in remote communities, access to health services can be limited and difficult.

Federal funding has been allocated to improve health care for remote Indigenous communities of New South Wales. The communities in need are identified under a health agreement signed by the Commonwealth and New South Wales governments, in conjunction with various Indigenous organisations with stakeholder interests.

This collaborative approach between all stakeholders aims to plan, implement and evaluate the future delivery of Aboriginal health care services in New South Wales and to identify which services will best suit each community's needs.

Funding priorities

- 1 Using the table below, individually prioritise which organisations you believe should receive prioritised funding – ranked 1 (first) to 8 (last).
- 2 Pair up with a classmate and determine a shared ranking.
- 3 Join with another pair and determine a group priority ranking.
- 4 Discuss as a class to determine the top four priorities.

Group	Individual ranking	Pair ranking	Group ranking	Class ranking
Homeless Foundation				
Council for Aboriginal and Torres Strait Islander Peoples				
Centre for People with Disabilities				
Council for the Incarcerated				
Organisation for Gay and Lesbian People				



Scaffold





Group	Individual ranking	Pair ranking	Group ranking	Class ranking
Organisation for Cultural and Linguistically Diverse People				
Rural and Remote Farmers Association				
Council for Aged Services				

- 5 As a class, discuss each step of the activity and how the decision-making process may have become more challenging as it introduced more people with differing views.
- 6 How does the government determine where and how much funding is allocated?
- 7 Does funding solve inequities?
- 8 Will improving the health of all Australians reduce the existing gap?

Class debate

Should funding go where there is the greatest chance of success, or to the area of greatest need? Is it possible to do both?

Limited resources

Human and non-human resources are limited and governments look to direct health services and resources to areas of greatest need and maximum impact. Because not all needs can be met, governments aim to run efficient, effective and equitable health systems by using evidence (such as **epidemiology**) to set priorities for groups experiencing inequity.

For example, many public hospitals have limited resources to treat what are considered non-urgent cases (even though treatment may result in great health benefit). The outcome is fewer people receiving medical treatment for these cases each year. This is further complicated when a patient lives in a remote area and may have to wait for an extended period to get treatment. In some instances they may not bother to seek medical treatment.

Health funding often seems to be focused on how much money there is available to spend, but of equal importance is how financial resources are shared across the state and among services.

Changes in demographics of certain areas may result in a redirection of funding priorities. For example, some suburbs that were once sparsely populated have become thriving new centres with rapidly increasing populations requiring new health services and resources. Other areas that once were attractive for young families have become home to an ageing population who now make new demands on their health services.

Limited resources have resulted in local governments in rural areas investing their own funds in medical infrastructure and support services. Local councils attempt to attract doctors, dentists and nurses into their area by financially supporting their housing, travel and salaries. However, this may take money away from other important local community services, adding to the problems for local governments that are often poorly resourced.

ACTIONS THAT IMPROVE HEALTH

Enabling

People cannot achieve their health potential until they are able to take control of the influences over their health. To achieve equity, health promotion aims at reducing differences in current health status. It also attempts to ensure equal opportunities and resources are available so that everyone has a chance to achieve their health potential.

An example of this is educating geographically remote farmers about first-aid procedures for treating bites, stings and bleeding. By attending workshops on first aid, farmers develop the knowledge and skills they require if a health issue occurs when they are out on their own in the paddocks.



Figure 25.2 First-aid training for farmers in geographically remote locations may help them in life or death situations.

Enabling also includes encouraging local people to seek their own solutions to problems according to their own priorities. An example is members of a community in a local area who wish to address a local need, such as an increase in under-age drinking and resulting issues due to intoxication. A number of communities in country areas have created their own solution by enforcing a curfew on anyone younger than 18 years. Young people must be in their homes by 10.00 p.m. and failure to do this results in local police picking them up and returning them to their parents. These communities hope that by controlling the environment the young people live and behave in, the level of destruction to property at night and the number of alcohol-related health injuries may be reduced.

Mediating

Mediation involves balancing the conflict between groups with differing interests in the pursuit of improving health inequity. People may be involved in mediation as individuals, families or communities.

Conflicts in the health industry occur regularly between levels of government and non-government sectors, providers and patients, staff and family members, professionals, labour and management, and physicians and administrators. Conflict that is unmanaged may be costly in time, money, quality of care and workplace morale. Unresolved conflict may also lead to staff shortages, union involvement, strikes, lower-quality patient care, potential litigation and financial losses.

The goal of all mediation programs in health care is to enable all health areas to:

- prevent conflict before it occurs
- pinpoint and resolve the underlying reasons for the initial conflict
- reduce the risk of further conflict
- provide a forum for resolution outside the law court
- create inexpensive methods to resolve conflict.

It is important to note that for successful mediation, all groups involved must be given the opportunity to state their

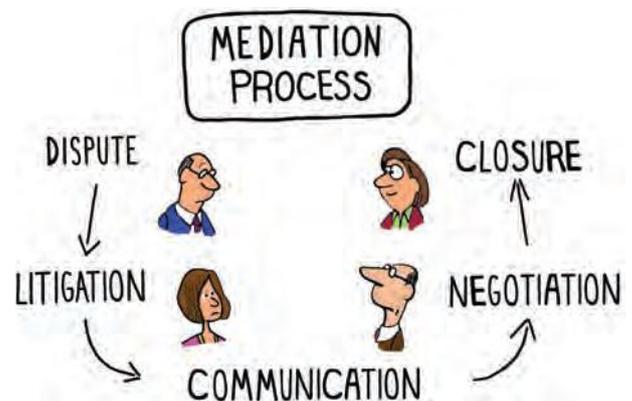


Figure 25.3 The mediation process

case, be prepared to listen to other perspectives and eventually be prepared to compromise with the goal of achieving an equitable consensus.

Advocacy

Advocacy is increasingly being recognised as a valuable way of promoting equity in health and wellbeing. Advocacy includes lobbying, political action and identifying a 'champion for the cause'. It can be carried out by the people affected by the issue or problem, by other people representing them, or by both groups together. It involves speaking up for specific groups, particularly if they do not have connections to the more powerful and wealthy people or organisations making the decisions that affect them.

However, the process is often more successful if it is led by those affected by the issue. Advocacy requires careful planning if it is to be effective. An effective advocate is someone with the ability to use available evidence and knowledge about an issue in order to push for improved equity and health over the long term.

When acting as an advocate, it is important to ensure that the needs and concerns of the people being represented are presented fairly. This requires having an understanding of the issue from a range of perspectives – balancing evidence found in published literature and seeing how the issue is perceived by those directly involved.

On a larger scale, volunteer and not-for-profit organisations are created because of a perceived need to advocate for a specific group experiencing inequity. A not-for-profit organisation is one that does not operate for the profit or gain of its individual members, whether these gains would have been direct or indirect. Any profit made by the organisation goes back into the operation to carry out its purposes.

Examples of not-for-profit organisations working towards greater equity include:

- Aboriginal Education Council
- Australian Rural Leadership Foundation
- Foundation for Aged People
- Australian Foundation for Disability
- Adult Multicultural Education Services (AMES).

These and many other organisations work towards the common goal of achieving equity for all Australians. You can follow the link to the websites of these organisations.



Weblink

Inequity

Choose one of the not-for-profit organisations listed above. Research how the actions of enabling, mediating and advocating could be applied to assist the organisation in achieving sustainable improvements.

A SOCIAL JUSTICE FRAMEWORK FOR ADDRESSING HEALTH INEQUITIES

Empowering individuals in disadvantaged circumstances

Empowering individuals means helping them develop the knowledge, understanding, motivation and skill needed to manage the stress resulting from external risk factors. It also involves them gaining personal or social skills to change their way of life or to be more resilient when exposed to adversity.

To date, people from disadvantaged backgrounds have had too many pressures in their lives to respond well to health education. They have responded best to health interventions that have a behavioural focus; that is, where information is given along with support to the individual.

Outreach programs that endeavour to empower disadvantaged individuals include support programs for pregnant teens, counselling services for the unemployed (to prevent mental health issues) and clinics that help people on low incomes to reduce alcohol and tobacco dependence. Another group that has been targeted with outreach programs is people who live with a disability.

ARTICLE REVIEW

Read the following edited article published by the University of Queensland and respond to the questions below.



Figure 25.4 Sean Fisher, 21, is the face of the ABLExSeries.

Free course to improve healthcare for people with intellectual disability

More than 100 international experts have contributed to a world-first online course designed to improve healthcare for people with intellectual disability.

The ABLExSeries, developed by a team of online learning specialists from The University of Queensland's UQx and The Queensland Centre for Intellectual and Developmental Disability (QCIDD), will launch on World Down Syndrome Day, Monday 21 March.

The series of three free Massive Open Online Courses (MOOC) courses are designed to help those in the healthcare industry understand best practice for people with intellectual disability.

Experts from 17 countries contributed to the course, which explores the complexities of health issues for people with intellectual disability, and the impact for their families, disability organisations and health professionals.

United Nations Special Rapporteur on the right to health Professor Dainius Puras said the course is essential to understanding and improving the status of intellectual disability healthcare worldwide.

'The right to health is a fundamental part of our human rights and of our understanding of a life in dignity,' he said.

'The barriers of attitudes and systems experienced by people with disabilities in seeking healthcare are remarkably greater than for people without disabilities.

'I heartily endorse the ABLEx courses, the aims of which are both simple and weighty – that is: to improve the physical and mental health of people with intellectual disability by empowering them, their families, their supporters and their health professionals.'

Queensland Centre for Intellectual and Developmental Disability Director, Professor Nick Lennox, said education to address best healthcare practice for people with intellectual disability had been largely missing from the healthcare community.

'The health inequities experienced by people with disabilities around the world are profound,' he said.

'People with intellectual disability die up to 20 years earlier than the general population.

'This series of courses will go some way to improving this picture of persistent and pervasive neglect of people with intellectual disability.

'The ABLExSeries draws on the wisdom of people with intellectual disability, their families and supporters, clinicians and other global experts to empower and educate a wider community in best practice in the field, which until now has not been readily available.

'The depth and breadth of the course provides new knowledge on interpersonal communication, physical health needs, health





promotion, mental health and legal and ethical complexities, to name a few.'

Source: The University of Queensland (<https://www.edx.org/xseries/intellectual-disability-healthcare>)

Questions

- 1 Explain what this program hopes to achieve in regards to empowering individuals.
- 2 What is your prediction for the success of this program?
- 3 Could the concept of this program be more widely used for other groups experiencing inequity?

Empowering disadvantaged communities

Community development is primarily about increasing the ability of disadvantaged communities to work together to identify and take action on priorities defined as important by the communities themselves.

Initiatives that aim to empower disadvantaged communities have focused on strengthening their social networks and/or taking on a strategy that develops the physical, economic and social structures of an area. Such initiatives, where members are all working together, can successfully modify the local environment and services to promote equity in health for all.

If people in disadvantaged communities are working well collectively, they can influence their local environment in small but constructive ways. Examples include attracting resources to the area to improve housing and safety, working together to tackle crime or reducing the level of substance abuse.

Points to be considered when aiming to empower disadvantaged communities include:

- Involving the whole community in the setting of local priorities empowers members of that community to create change for themselves in the future.
- When services respond to priorities identified by the community, the trust and respect of the community is gained and this provides the foundation for further work.
- Programs need to be planned and implemented in a sustainable manner.
- Community development is an effective way to engage socially excluded groups in their health issues.
- Stakeholders will value programs that respect their cultural strengths, practices and preferences.
- Acquiring long-term funding will provide effective and sustainable services for key priorities.

ANALYSIS

Read the following excerpt from the 2015 Empowered Communities Report, written by Indigenous leaders.

'Empowerment, in our meaning, has two aspects. It means Indigenous people empowering ourselves by taking all appropriate and necessary powers and responsibilities for our own lives and futures. It also means Commonwealth, state and territory governments sharing, and in some cases relinquishing, certain powers and responsibilities, and supporting Indigenous people with resources and capability building.'

Source: Empowered Communities: Empowered Peoples Design Report

Discussion

In small groups, discuss the following:

- 1 Are these statements an accurate description of how the Indigenous population can be empowered?
- 2 What is meant by '... governments sharing, and in some cases relinquishing, certain powers and responsibilities'?
- 3 What resources are the writers referring to?
- 4 Would you make any other recommendations to assist in empowering Aboriginal and Torres Strait Islander peoples?
- 5 How could other groups experiencing inequity also benefit from the empowerment of their communities?

Improving access to facilities and services

People need **accessible** health facilities and services that can be reached by various forms of transport. They need to be affordable and appropriate to people who experience inequity.

Health facilities and services can become inaccessible when they fail to recognise and respect cultural influences, physical obstacles and economic barriers. Ways of addressing cultural influences include:

- creating facilities and services based on a holistic model of health and wellbeing
- training and employing health professionals and health workers from local communities
- building relationships between health professionals and patients that demonstrate honesty, trust and mutual respect
- identifying ways to overcome language barriers
- involving the community in decision-making about what facilities and services are required and where they should be located
- providing facilities and services in non-traditional settings.

Poor levels of health promotion by service providers and various levels of government can also lead to communities being uninformed about available facilities and services. This can result in them not being accessed by the very groups they were intended for.

Improving access to adequate housing, sanitation, uncontaminated food supplies, safer workplaces and health and welfare services have all contributed to improved health outcomes. Such measures not only benefit the health of the population in general, but particularly that of the people living in poorer conditions, which in turn can result in a reduction in the health inequity gap.

The federal government is committed to improving access to health services for people living in geographically remote locations. The following programs and initiatives have been introduced to address the continuing health needs of geographically remote people in Australia.

Rural Retention Program

This program provides incentives for medical practitioners to move to country townships and communities, or to encourage them to stay in remote regions. Geographically remote communities benefit through improved access to general practitioner services and improved continuity of care, thereby improving their health and wellbeing.

Rural and Regional Teaching Infrastructure Grants (RRTIGs) programme

A total of \$52.5 million has been committed for investment in general practice infrastructure and training. An anticipated minimum of 175 grants, each capped at \$300 000, are available for existing general practices to expand their facilities to provide additional consultation rooms and space for teaching medical students and supervising general practitioner registrars.

Mental Health Services in Rural and Remote Areas (MHSRRA)

MHSRRA provides funding to non-government health organisations such as primary health networks, Aboriginal medical services and the Royal Flying Doctor Service, to deliver mental health services via social workers, psychologists, occupational therapists, mental health nurses, Aboriginal health workers and Aboriginal mental health workers. MHSRRA funds the provision of mental health services in rural and remote communities that would otherwise have little or no access to mental health services, including areas where access to Medicare-subsidised mental health services is low.



Getty Images/Auscapse

Figure 25.5 Programs such as MHSRRA allow vital services such as the Royal Flying Doctor Service to continue.

Encouraging economic and cultural change

Encouraging economic change requires working with groups experiencing inequity to address the fundamentals for health, such as offering a range of employment opportunities, providing adequate incomes and opportunities for growth, and providing a safe and secure living environment. Governments at all levels must take responsibility for economic change.

An example of economic change in action is the Australian government’s pledge to end child poverty. This is being proposed through increases in benefits for children and parents, financial increases in funding for education to Indigenous and rural communities, and funding towards assisting disadvantaged people to take part in employment programs.

Economic policies that have protected or improved the standard of living of the poor have shown beneficial health results, sometimes large enough to be reflected in health statistics for the whole population.

From a cultural perspective, it is important for a community experiencing inequity to develop a sense of identity and a willingness to work together to achieve set goals. Community members must first be able to clearly identify their disadvantage, and then create a culture of working together to determine a plan towards minimising or completely eliminating the inequity.

An example of where cultural change could be effective would be a community group in a small town that wishes to create its own local medical centre. This would certainly assist in reducing the inequity of access to essential services, and allow the medical facility to focus on addressing the specific needs of the community. Initially, gaining expert advice and assistance from trained health professionals would be an important method of establishing a strong foundation for setting up the centre. This would be done with a view to then training community members in nursing or emergency first aid. Support may also come from an **intersectoral** collaboration between local government, independent businesses and large organisations.

It is important to note that for any health change to be effective and sustainable, all members of the community must have the opportunity to contribute. The main aim of cultural change is to ensure that the whole community has ownership of the issue and is prepared to support it for the long term. Developing a culture of empowerment and confidence within the

Investigate

Identify a specific need for a group experiencing inequity and examine how intersectoral collaboration could be used to address that need.

community, where all individuals are seeking to invest in the same goals, is likely to have a long-lasting effect and a more significant outcome for the program or initiative.

CHARACTERISTICS OF EFFECTIVE HEALTH PROMOTION STRATEGIES

Working with the target group in program design and implementation

When designing and implementing health promotion programs it is essential that governments and non-government organisations work with the individuals and communities who are actually experiencing the inequities.

Health promotion programs require interventions that are targeted to address the needs of groups experiencing inequity. Traditionally, government programs have focused on the social determinants of health, particularly the economic issues, social influences, environmental factors and access to services. An example of an intervention is subsidised nicotine replacement programs for Indigenous Australians.

People who experience inequities need to focus on issues that are most relevant to their lives. For example, newly arrived **refugees** to Australia require assistance with housing, learning English, employment opportunities, income support, establishing support networks, and accessing health facilities and services. At this time, the health issue of smoking is likely to be a low priority for them even though they might consider this a higher priority at other times.

LEARNING TIP

In this section, you need to clearly understand how the gap in health status can be bridged. Knowing when to refer to funding, actions, social justice and/or characteristics of health promotion strategies is important, as well as how they link to population groups.



Fairfax Photos/Eddie Jim

Figure 25.6 Newly arrived migrants receive English language tuition.

When designing a health promotion program, communication must be customised to address people's literacy levels so that they can understand the key issues. Throughout implementation of a program, it is crucial that individuals and groups are provided with opportunities to offer ongoing feedback, thus allowing program design to be modified as it evolves. Ownership and involvement at all stages of design and implementation will empower individuals and communities and ensure sustainability of the program.

Health programs should respond to the needs of target groups and provide meaning for them in their local context. Action research and feasibility testing is also particularly important in equity work because this determines the worth of designing a health promotion program. Establishing a clear and agreed health promotion framework – agreed to by all stakeholders – is important because it ensures that effective partnerships are created between groups experiencing inequity and the various levels of government, industry and community organisations.

Ensuring cultural relevance and appropriateness

Health promotion strategies are more effective when they are designed to include and focus on the cultural relevance of the group experiencing inequity. It is important to ensure that a strategy is worded in such a way that no group is offended and, therefore, unwilling to participate.

Indigenous and culturally and linguistically diverse (CALD) people are often intimidated by mainstream health services that bear no cultural relevance to their traditional health programs. If they are placed in a position where they have to wait for a service they may feel intimidated by medical staff. This situation is often accepted as normal and can result in them not seeking further service after the initial consultation.

In order for Indigenous and CALD people to gain access to social services and participate in the economy on an equal footing with the rest of the population, the barriers to access need to be broken down and the cultural relevance of the social services (such as education, health and housing) must be reinforced.

The federal government has placed a strong emphasis on improving the cultural relevance of education by facilitating Indigenous and CALD involvement in educational and health decision-making. The rationale is that if Indigenous and CALD people are involved in the early decision-making process, there is a greater likelihood that the planned programs will be effective and, as a result, participation will increase.

Traditional approaches have not worked for large sections of the Indigenous and CALD populations and alternative approaches must be supported. Promoting communication among national health authorities and cultural populations will certainly make positive contributions towards the improvement and sustainability of the health of people experiencing **health inequities**.

Skills, education and prevention

Health professionals understand that the most effective health promotion strategies are those that focus on educating people on how to prevent illness and disease before it occurs.

One way that people can escape the poverty cycle is to learn new skills. We often hear that there are many jobs for skilled people but there is a shortage of skilled people to fill them. On the other hand, there are no jobs for the thousands of unskilled people. How do these unskilled people become skilled?

An effective health promotion strategy aims to increase the skills and education of disadvantaged people by developing useful personal and practical skills. This can be achieved through community programs, volunteer work or government workplace opportunities. Providing unskilled people with skills needed in society increases their chances of economic security and fulfilment. It can also assist in preventing inequity for future generations.

A key health promotion strategy is to employ people from groups experiencing inequity at all levels and occupational areas within the health system. This will contribute to the engagement of individuals and groups, reorient the planning and implementation of health facilities and services, inform new policies and guidelines and eventually provide effective, appropriate health care. Accomplishing this goal will require long-term investment in recruiting and training people to a level that responds to their service needs.

Quality education is one of the most powerful tools for preventing poverty and inequity, as well as laying the foundation for sustained national health and economic growth. Focusing on education has many health benefits, such as:

- enabling people to read, communicate and make informed health choices
- ensuring that women have healthier babies and experience lower infant morbidity
- building a skilled, flexible workforce that leads to improved income and quality of life.

Effective health promotion strategies focus on learning the skills required to prevent inequity. Until this is achieved, the cycle of poverty continues. Disadvantaged people hope to escape these conditions for themselves and their family, and the most effective way to achieve this is through education and a supportive environment.

Investigate

Investigate current programs available within the community for TWO groups experiencing inequity. They should be programs that focus on assisting people to develop new skills and/or gain an education.

- 1 What strategies have been adopted to support these people? Have these strategies been successful?
- 2 Are these programs sustainable? Explain.

Supporting the whole population and high-risk groups

Programs that aim to improve health cater for people with different needs in different ways. They include a mix of strategies and targeted programs for those who are in high-risk groups. Well planned and implemented strategies are important for improving the health status of the overall population, while targeted programs aim to reduce the gap in health status by focusing on improving the health and wellbeing of people who are experiencing inequity. Within these targeted programs, there is also a place for additional targeted strategies and resources to enhance program effectiveness for specific groups. An example is the availability of language-specific help lines for people wanting to quit smoking.

Resources that support health interventions are restricted and relative to the potential demand for them, hence the need to prioritise resource allocation. Because all health services have a fixed amount of resources, it is necessary to prioritise services that are capable of achieving the maximum health gain. For example, prioritising intensive care for those with life-threatening conditions over palliative care for the terminally ill involves an assumption that increasing the length of life is more important than improving the quality of life.

It is important to note that there is a limited number of health professionals available to perform interventions, a limited amount of time in which the interventions can be performed, a limited number of areas in which the intervention can take place, and a limited amount of funding available to support these interventions.

In Australia, there are limited resources (money, time, space and available staff) for providing health services to people in high-risk groups, which means those people have less access to appropriate health promotion facilities and services.

Intersectoral collaboration

Intersectoral collaboration involves a range of organisations working in partnership to achieve a common goal. It can involve different groups planning, implementing and evaluating a program with the specific goal of reducing the level of inequity that exists within a community.

For example, a local rural community may be looking to address the needs of people who have limited access to health services due to their geographic location. Intersectoral collaboration would mean that different sectors of the community work together with the common goal of building a health centre, training and employing a nurse and providing appropriate resources. This would provide a more useful option for the community.

All members of the community can feel a sense of empowerment if they have contributed to the decision-making process as well as participating in the creation of the centre; for example, supplying the concrete or timber for the building, physically assisting with the painting or contributing financially.

Some of the questions/issues that may be addressed when implementing intersectoral collaboration include:

- How are common goals, roles and responsibilities identified and negotiated?
- How will equity principles be incorporated into the planning stage?
- In what ways will the focus group be involved in all aspects of the work from beginning to completion of the project?
- What local, state or national policies, statements, guidelines or plans support the equity initiatives?
- Who are the people that can lobby, have influential contacts or access to external resources?
- Are the strategies, resources and time frame appropriate to the goal?
- How will the program be communicated and assessed on progress?
- How will the project show ongoing and sustainable benefits for participants, and maintain community and partner commitment?

Research

Research a specific health promotion strategy that is currently being used for a group experiencing inequity. Predict its potential for success.

TWO PEOPLE

Read the following case studies of two people from communities experiencing inequity. In pairs, discuss the strategies that could be used to assist these people to overcome their current issues.

Ming

Ming is 25 years old, a single mother of two children (aged 10 and 8 years), with no family in Australia to offer support. She speaks very little English and most of her income from the government goes towards food, household bills and rent. Ming and her children live in a one-bedroom housing unit.

Ming experiences major financial issues when she is required to pay medical and educational costs. Extracurricular school activities are expensive but swimming lessons, for example, would clearly benefit her children's level of safety around water.

Ming finds it difficult to make friends, mainly due to the language barrier. She would like to help her children achieve a better life than her own.

Richard

Richard is 18 years old. He officially left school when he turned 17, but rarely attended from the age of 15. Richard comes from an Indigenous background and lives with his extended family in a house in rural Australia.

Richard has three younger siblings and his parents are both receiving welfare payments. There are few opportunities for employment in his town, especially for someone with a limited education. Richard spends most of his time with friends, hanging out in the streets or park and playing sport.

He is a talented rugby league player but finds it difficult to pay for equipment and travel to training and games. He has been caught stealing money from a neighbour's house and joyriding in a car while under the legal driving age. He has recently been warned by the police that now, because he is 18, his next misdemeanour may lead to jail time.

CHAPTER SUMMARY

- In New South Wales, the major factor for determining funding needs is the size of the population in each Area Health Service. The larger the population, the greater the need.
- Health organisations find ways to identify populations that are overlooked and under funded. They also aim to provide fairly for the additional costs of caring for populations with high needs, providing health services to specific populations that are under-represented and caring for populations in geographically remote areas.
- Resources are limited and governments look to reorient health services and resources to areas of greatest need and maximum impact.
- Changes in demographics of certain areas may result in a redirection of funding priorities.
- People cannot achieve their health potential until they are able to take control of the factors that influence their health.
- Mediation involves balancing the conflict between groups with differing interests in the pursuit of improving health inequity.
- Advocacy includes lobbying, political action and identifying a 'champion for the cause'. Advocacy can be carried out by the people affected by an issue or problem, by other people representing them, or by both groups together.
- Empowering individuals is about building the knowledge, understanding, motivation and skill expertise to enable a person to manage the stress experienced from external risk factors.
- Initiatives that aim to empower disadvantaged communities have focused on strengthening their social networks and/or taking on a strategy that develops the physical, economic and social structures of an area.
- Health facilities and services can become inaccessible when services do not recognise and respect cultural influences, physical obstacles and economic barriers.
- Poor levels of health promotion by service providers and various levels of government can also lead to a lack of knowledge about the facilities and services within the community, and thus limited usage by the intended groups experiencing inequity.
- Encouraging economic change requires working with groups experiencing inequity to address the fundamentals for health. Governments at all levels must take responsibility for economic change.
- Ownership and involvement at all stages of design and implementation can assist towards individual and community empowerment, as well as improved likelihood of program sustainability.
- Health promotion strategies are more effective when they have been designed to include and focus on the cultural relevance of the group experiencing inequity and the level of appropriateness associated with the strategy to ensure the group is not offended or unwilling to participate due to a lack of cultural awareness.

CHAPTER REVIEW ACTIVITIES

- 1 Outline** the process used by government to determine funding for health.
- 2 Describe** how limited resources may affect levels of health funding.
- 3 Discuss** how the actions that improve health interact with each other.
- Select ONE group experiencing inequity and **apply** the social justice framework to the development of a plan to assist this group.
- 5 Explain** how working with the target group community is important in program design and implementation.
- 6 Examine** how health professionals can focus on skills, education and prevention to enhance health promotion strategies.
- 7 Analyse** how health programs can be effective in supporting the whole population, while at the same time, directing extra resources to high-risk groups.
- 8 Critically evaluate** the effectiveness of health promotion strategies that use intersectoral collaboration.



Extra
Exam-style
Assessment
tasks for
Option 5

GLOSSARY

adenosine triphosphate Compound used for energy in muscle contractions

aerobic Any reaction occurring in the presence of oxygen

aerobic training threshold Point at which the body starts to achieve a training effect; approximately 60 per cent of maximum heart rate

alactacid system An anaerobic energy system using phosphate creatine as a fuel to resynthesise ATP

anabolic steroids Drugs that increase muscle strength by encouraging new muscle growth; enable an athlete to train harder and longer at any given period

anaerobic Any reaction occurring without oxygen being present

anaerobic metabolism Breakdown of a substance in the absence of oxygen

anaerobic threshold Point at which the body starts to produce lactic acid quickly; approximately 80 per cent of maximum heart rate

anxiety A state that manifests itself in response to a given stimulus or situation which may be perceived as being threatening

arousal A physical and mental state of being alert, or being aware of surrounding situations before or after an event

associative stage When the athlete has progressed from thinking about what they are doing to thinking about how they do the skill

ballistic stretching Forcing a muscle by stretching past the stretch reflex

biomechanical analysis Form of analysis that provides valuable information for analysing an athlete's technique and performance results, and for the prevention of injuries

bulk billing System where doctors charge Medicare directly for services provided to patients

carbohydrate loading A strategy involving changes to training and

nutrition that can maximise muscle glycogen (carbohydrate) stores prior to endurance competition

carcinogen A substance that has the potential to cause cancer

cardiac output The amount of blood pumped out of the heart per minute

centering Focusing attention in one spot

character The way a person feels, thinks and acts that promotes moral strength, firmness, self-control and integrity

chronic A particular long-term illness or condition

cognitive stage Relating to the brain and the ability to learn

commodity Any article of trade that is bought or sold

creatine phosphate Fuel used to resynthesise ATP molecules in the ATP/PCr system

cryotherapy A form of cooling as a means of treating injuries, especially acute and chronic injuries

diagnostic A way of identifying the nature or cause of an illness, disorder or problem

disadvantage A negative influence on the health or socioeconomic status of an individual or a group

diuretics Masking agents that can be used to control weight or mask the use of other drugs

doping Also known as using ergogenic aids; the practice of using artificial substances or methods to enhance athletic performance

drills Specific activities that replicate the skills used in a sport

elastic resistance bands Inexpensive and convenient resistance bands that can be used in limited spaces

epidemiology Branch of medicine dealing with the incidence, distribution, and control of diseases in specific populations

erythropoietin (EPO) Stimulates the bone marrow stem cells to make red blood cells, which increase the delivery of oxygen to the kidneys

ethnic Relating to a group of people of the same descent and heritage who share a common and distinctive culture passed on through generations; ethnic groups can exhibit such distinguishing features as language or accent, physical features, family names and customs

free fatty acids Fat used by the body to produce numerous ATP molecules

glucose A simple sugar which is a form of carbohydrate

glycaemic index (GI) A scale used by dietitians to gain a better understanding of the types of carbohydrates ingested by an athlete and how quickly they are digested

glycogen Glucose that is broken down and stored in the liver and muscle

glycogen sparing The body's preference to break down fats before the carbohydrates are depleted

glycolysis Process of converting glucose to pyruvic acid

haemoglobin Protein responsible for the red colour of blood and for the transport of oxygen to the tissues

health inequities Unequal access to funding, resources and services that provide opportunities to maintain good health

health sector The part of a society and its economy, including government and non-government agencies that provides health services and products

health status Overall level of health when disability, health determinants, life expectancy and other influences are considered

holistic A view of health that includes many dimensions, social determinants and diverse understandings

human growth hormone (HGH) A hormone that is naturally produced by the body in the pituitary gland; stimulates the body's synthesis of the proteins that form bone and muscle tissue; decreases body fat and increases testosterone levels

hydraulic A type of exercise that maintains a fixed amount of resistance throughout the entire exercise depending on the speed of the movement

hydrotherapy The use of hot or cold water to treat injuries

hypertrophy Increase in size of muscle fibres

infrastructure The basis or framework on which something is built

intersectoral Characterised by cooperation between people from different agencies, industries and levels of government

kinaesthetic sense The body's system for using the senses to give feedback to an athlete about position and performance

lactic acid The by-product given off after glycogen is broken down in the lactic acid energy system

life expectancy Predicted life span for a particular population group

lipolysis The process by which triglycerides are broken down into free fatty acids and glycerol

literacy The ability to read and write at a conventionally accepted level

lung capacity The volume of air the lungs can hold

mass media Any form of communication, such as the press, television, radio and film, that reaches large numbers of people

meditation A mental practice used as a form of relaxation

mental rehearsal A method involving images that an athlete may use to visualise skilled performance

migrant Someone who chooses to leave their home to live in another country

minerals Essential components of the body that help in muscle contraction and nerve transmission; also known as electrolytes

mitochondria Also known as the power house of the body; it is where the production of ATP occurs

modified rules Rules in a game or sport that have been adapted for children to reduce the excessive physical demands of adult equipment and field sizes

mortality rates Number of deaths (usually presented per 100 000 population)

multicultural Relating to the cultural and linguistic diversity of a society

neoplasm A tumour or tissue containing a growth

objective performance measure Measurement of performance using measurable data, such as time or distance, as reference

optimal arousal A point between performance and arousal where performance is the best

osteoarthritis A common form of arthritis that typically affects the spine, hips, knees and hands

osteoporosis The thinning of bone tissue and loss of bone density

over-training A state of burnout caused by inappropriate stress loads in training programs

oxygen debt The additional oxygen that must be taken into the body after vigorous exercise to restore all systems to their normal states

palliative Alleviating pain and symptoms without eliminating the cause

patriotism Demonstration of love and loyal support for one's country, deemed essential for national welfare

peaking A state of being in the absolute best condition, physically, emotionally and mentally, at a specific time for an event or race

perinatal Relating to the period around childbirth, specifically from around week 28 of pregnancy to around one month after the birth

periodisation An annual training plan separated into three periods or phases: pre-season (preparatory), in-season (competition) and off-season (transition)

personal judging criteria A personal opinion or idea used by a judge to appraise performance

personality An individual's way of thinking, feeling and behaving

prejudice A usually unfavourable, pre-formed opinion based on insufficient knowledge, irrational feelings or inaccurate stereotypes

premium The sum of money paid, usually at regular intervals, for an insurance policy

pre-screening A process that provides information about an athlete's history, capabilities and any pre-existing conditions

prescribed judging criteria A set checklist or criteria distributed by a sports governing body that a judge uses to appraise performance

progressive overload A training method where an individual works past their normal limits in small, increasing increments

quality of life An intangible measure of the extent to which individuals feel well and fulfilled by their lives; includes both physical and psychological aspects

racism Prejudice or animosity against people who belong to other races

refugee A person who is outside their country of nationality and is unable or unwilling to return because of a

well-founded fear of persecution for reasons of race, religion, nationality, membership of a particular social group or political opinion

rehabilitation A process that restores a person to health through training and therapy; enables an athlete to return to play or activity as soon as is safely possible

relaxin A hormone produced by the ovaries during pregnancy

resilience The ability to recover quickly from setbacks

resting heart rate The heart rate of the body at rest

resynthesis To rejoin together, such as ADP and free phosphate resynthesising to make ATP

reversibility The loss of training effects due to activity stopping

rheumatoid arthritis A chronic autoimmune disease in which the body's immune system attacks the joints

short interval training Training designed to improve an athlete's workload by combining heavy bouts of fast running with recovery periods of slower jogging

skill An athlete's ability to choose and perform the right technique at the right time, successfully, regularly and with a minimum of effort

skill acquisition Learning a particular skill and committing it to memory for future use

small-sided games Practice games that focus on different aspects of team play and that apply skills learned to team situations

social determinants Events, characteristics or circumstances that can increase the chances of ill health (risk factors) or good health (protective factors)

sociocultural Relating to, or involving, cultural and social factors

somatotype The body shape of a person

specificity training Training that involves reflection of an activity in terms of muscles and energy system used

state anxiety An unpleasant emotional arousal in the face of threatening demands or dangers

stereotype A person who is characterised as having a certain image, character or expression

strength training Overload manipulation of the number of repetitions, tempo, sets, force applied and exercise types

stretch reflex A protective mechanism in the muscle that aims to prevent injury while stretching the muscle

stroke volume The amount of blood pumped out of the heart per beat

subjective measure A measurement based on personal opinion

supplementation An extra intake of a dietary substance which may be lacking in a diet; e.g. vitamins, minerals or protein

tapering A gradual reduction in an athlete's workout demands in order to allow the body to recover from the stress

therapeutic Working to maintain somebody's health

trait anxiety Anxiety that is general to all populations

triglycerides A form of fat stored as adipose tissue which provides protection for the body

visualisation An athlete seeing pictures in their mind of a performance that will be undertaken

vitamins Essential components of the body that help with converting food into usable forms of energy

weight training A form of isotonic resistance training involving a manipulation of the number of repetitions, sets, tempo, exercise types and weight used to cause desired increases in strength, endurance, size, and shape

ACRONYMS

ABS Australian Bureau of Statistics

AIHW Australian Institute of Health and Welfare

ASC Australian Sports Commission

ATSI Aboriginal and Torres Strait Islander peoples

CACP Community Aged Care Package

CALD Culturally and linguistically diverse

CHSP Commonwealth Home Support Program

COAG Council of Australian Governments

HACC Home and Community Care

HIA Health Impact Assessment

HWA Health Workforce Australia

IAGDP Indigenous Australian Government Development Program

IRSD Index of Relative Socioeconomic Disadvantage; a scale used to describe different levels of social status

MSL Medical Surcharge Levy

NATSISS National Aboriginal and Torres Strait Islander Social Survey

NHMRC National Health and Medical Research Council

NHPA National Health Priority Area

OECD Organization for Economic Cooperation and Development; the collective name for a group of the world's wealthiest nations who collect and share social data for the purpose of improving the lives of their populations

PASST Programme of Assistance for Survivors of Torture and Trauma

PBS Pharmaceutical Benefits Scheme

PISA Programme for International Student Assessment

RRTIG Rural and Regional Teaching Infrastructure Grant

RTA Registered Training Organisation

WHO World Health Organization

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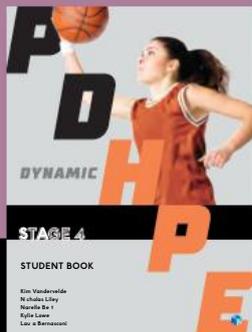
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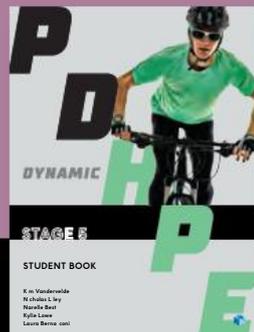
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OVERVIEW

- Written to the existing Stage 6 PDHPE syllabus
- Features a fresh, up-to-date, rigorous approach
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