THE HEALTH AND DEVELOPMENT OF AUSTRALIA’S YOUTH

UNIT 1

THE HEALTH AND DEVELOPMENT OF AUSTRALIA’S YOUTH

AREA OF STUDY

1 Understanding youth health and human development
2 Youth issues

OUTCOME

Describe the dimensions of, and the interrelationships within and between, youth health and individual human development, and analyse the health status of Australia’s youth using appropriate measurements.

Describe and explain the factors that have an impact on the health and individual human development of Australia’s youth, outline health issues relevant to Australia’s youth and, in relation to a specific health issue, analyse strategies or programs that have an impact on youth health and development.
CHAPTER 1

The individual human development of Australia’s youth

WHY IS THIS IMPORTANT?

Individual human development is a constant process that starts with conception and ends with death. The youth stage of the lifespan is one of great change and significant development. Having an understanding of the development that occurs during this stage can provide an insight into the triumphs and challenges experienced by many youths.

KEY KNOWLEDGE

1.1 definitions of physical, social, emotional and intellectual development (pages 4–11, 17, 21–2, 25–6, 41)

1.2 characteristics of, and interrelationships between, physical, social, emotional and intellectual development during the lifespan stage of youth (pages 9–29, 41)

1.7 biological determinants of individual human development of Australia’s youth including genetics, body weight and hormonal changes (pages 30–6, 41–2).

KEY SKILLS

• define individual human development (pages 11, 37, 39, 42)

• describe characteristics of, and interrelationships between, the different types of individual human development during the lifespan stage of youth (pages 11, 16, 19, 20, 23, 24, 27, 29, 36, 37–40)

• explain the biological determinants of health and development and discuss the impact on the development of youth (pages 36, 38–40, 42).

FIGURE 1.1 Development becomes more obvious as people age.
KEY TERM DEFINITIONS

abstract thought a complex thought process where ideas are the focus rather than tangible objects
adolescent growth spurt a period of rapid physical growth experienced during puberty
biological determinants factors relating to the body that affect health (e.g. genetics, hormones, body weight)
body mass index (BMI) a measure of body mass to height, used to ascertain overweight and obesity levels
complexity the quality of being intricate or complex
concrete thought a simple thought process that centres on objects and the physical environment
determinants of health factors that raise or lower the level of health in a population or individual. Determinants of health help to explain or predict trends in health and why some groups have better or worse health than others (AIHW, 2006).
developmental milestone a significant skill or event occurring in a person’s life: for example, learning to walk, getting a job or having children
ejaculation the process whereby semen is ejected from a male’s penis
embryo a developing human from around the second week of pregnancy until the end of the eighth week
emotional development the development of the full range of emotions and the optimal way of dealing with and expressing them
fertilisation the point in time when the sperm fertilises the egg, the genetic material fuses and development begins
fine motor skills the manipulation and coordination of small muscle groups such as those in the hands
genetic potential the genetic capabilities and limitations of an individual’s genetic make-up
gross motor skills the manipulation and coordination of large muscle groups such as those in the arms and legs
hormone a chemical messenger that results in changes in the body
individual human development the series of orderly, predictable changes that occur from conception until death. Development can be physical, social, emotional or intellectual
intellectual development the development of processes in the brain such as thought, knowledge and memory
menarch the first occurrence of menstruation in females
menstruation the discharge of blood and other tissue from the uterus that marks the beginning of the menstrual cycle
metabolism the sum of all chemical reactions in the body. It allows body structures to carry out their functions.
nutrient dense describes foods that contain a large amount of nutrients such as vitamins and minerals
period see ‘menstruation’.
physical development changes to the body and its systems. These can be changes in size (i.e. growth), complexity (e.g. the increase in complexity of the nervous system) and motor skills (e.g. learning to walk).
primary sex characteristics body parts that are directly involved in reproduction and form what are commonly referred to as ‘genitals’ and organs of reproduction
puberty biological changes that occur during youth and prepare the individual for sexual reproduction
rite of passage a cultural event or ceremony that signifies an achievement in a person’s development
secondary sex characteristics traits arising from changes in both males and females at puberty. They are neither directly related to reproduction nor present at birth.
semen a substance containing sperm and fluids that is released from the penis during ejaculation
social development the increasing complexity of behaviour patterns used in relationships with other people (VCAA)
sperm a component of semen. Sperm are the male sex cells required for reproduction
spermarecne relating to the first ejaculation in males
youth 12 to 18 years of age; however, it should be acknowledged that classifications for the stage of youth can differ across agencies (VCAA)
1.1 The human lifespan: an overview

**KEY CONCEPT Understanding the stages of the human lifespan**

An understanding of the human lifespan and the various stages within it allows analysis and discussion of health and individual human development that occurs for people at different times throughout their lives.

The human lifespan can be broken up into different stages (figure 1.2), although different cultures and societies have different ways of defining the stages. One thing that all groups agree on is that the human lifespan starts at conception and ends at death. In Australian society, as in most Western societies, there are a number of stages that humans go through as they get older.

**FIGURE 1.2 Stages of the human lifespan**

**Prenatal**

The prenatal stage begins when a sperm penetrates an egg (figure 1.3) in a process known as fertilisation, to form one complete cell, called a zygote. The prenatal stage continues until birth and is characterised by the development of the body’s organs and structures, and substantial growth. The unborn baby goes from being a single cell (smaller than a quarter of a millimetre across) to consisting of more than 200 billion cells at birth and weighing around 3.5 kilograms on average. This process takes about 38 weeks to complete. In terms of rate of growth, the prenatal stage is by far the fastest growth period of all the human lifespan stages. It is also one of the most uncertain in terms of making it all the way through the pregnancy and the process of birth.
Infancy

As with most lifespan stages, there is debate about when infancy finishes. Everyone accepts that it starts at birth, but when does the infant become a child? Historically, infancy was considered to continue until the onset of speech. However, because infants can vary greatly in the time at which they start speaking, many organisations and professionals in this field have adopted the view that this stage ends with the second birthday (approximately). Therefore we will also use the second birthday as signifying the end of the infancy period.

Infancy is a period of rapid growth with many changes. A newborn baby is obviously very different from a two year old. By the time an infant turns two, they have developed their motor skills and can walk; use simple words, identify people who are familiar to them, play social games — and throw tantrums when they do not get what they want.

Many of the developmental milestones that the infant achieves will have some sort of bearing on how they develop in later years. This concept will be explored in more detail in later chapters.

Childhood

Like infancy, the start and end of the childhood stage is a difficult thing to define. Most people say that it ends at the onset of puberty. As the age of the onset of puberty shows great variation among individuals, this study uses the 12th birthday to signify the end of childhood.

The development that occurs in childhood is substantial, so it is worthwhile considering this lifespan stage as being divided into early childhood and late childhood.

Early childhood

Early childhood starts at the end of infancy and continues until the sixth birthday. This stage is characterised by slow and steady growth, and the accomplishment of many new skills. The child learns social skills that will allow them to interact with other people. They will make friends, be able to eat with adults at the table and become toilet trained.

The term ‘infant’ comes from the Latin *infans*, which translates to ‘without speech’ or ‘unable to speak’.
**Late childhood**

Late childhood starts at the sixth birthday and ends at age 12. Like early childhood, late childhood is characterised by slow and steady growth. There are many physical, social, emotional and intellectual changes that occur as the child moves through this stage. These include refining reading and writing skills, developing long-term memory, understanding gender stereotypes and refining motor skills.

**Youth**

The **youth** stage of the lifespan has steadily lengthened over the past 100 years. This has resulted from puberty starting earlier, and young people taking longer to gain independence and reach maturity in other aspects of their lives. As a result, the youth stage of the lifespan is perhaps the hardest to define. We will assume that youth starts at 12 years of age and continues until 18, although this may vary depending on the research used. The youth stage is characterised by rapid growth, increased independence and sexual maturity.

This stage of the lifespan is concerned with moving from childhood to adulthood. Youth must undergo vast physical changes in order to achieve sexual maturity, and therefore the ability to reproduce. Youth will also undergo significant social, emotional and intellectual changes as they become accustomed to greater independence, more complex relationships and the development of life goals (figure 1.5).

The end of youth is characterised by a level of maturity in the physical, social, emotional and intellectual changes that have been occurring.

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**FIGURE 1.5** Friends play an influential role in development during youth.

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The terms ‘adolescent’ and ‘adult’ come from different forms of the Latin word *adolescere*, meaning ‘to grow up’. For adolescent and adult, it means ‘growing up’ and ‘grown up’ respectively.

The term ‘adolescence’ has generally come to mean the period between the onset of puberty and the cessation of growth (i.e. physical maturity). As society has changed over the years, the physical changes are seen as being only one aspect of the transition between childhood and adulthood. Young people now spend more time reaching maturity in other areas such as tertiary study, finding a career, living with their parents and gaining financial independence. As a result, the term ‘youth’ is now more commonly used to describe the stage between childhood and adulthood because it encompasses all the changes experienced during this transition, not simply the physical changes.
Early adulthood

Early adulthood begins on the 18th birthday and ends on the 40th birthday. Physically, this stage is characterised by the body reaching its physical peak around 25–30 followed by a steady decline in body systems thereafter. Some growth may continue at the beginning of early adulthood, but all stages of adulthood are essentially periods of maintenance and repair as opposed to the periods of growth experienced in the earlier lifespan stages.

People in this age group often decide on a career and may become quite career focused. Young adults may also choose their life partner, get married and/or have children. These events lead to many physical, social, emotional and intellectual changes.

Case study

Bedtimes could pinpoint the end of adolescence

Andy Coghlan

The end of puberty, or sexual maturation, is well defined. It is the point when bones stop growing. But for adolescence, the transition from childhood to adulthood, there is no clear endpoint.

‘I don’t know of any markers for it,’ says Till Roenneberg of the Centre for Chronobiology at the University of Munich in Germany. ‘Everyone talks about it but no one knows when adolescence ends. It is seen as a mixed bag of physical, psychological and sociological factors.’ [The study of 25 000 individuals of all ages] reveals a distinct peak of night-owlishness at around age 20.

Women reach this peak at 19.5 years old on average, and men at 20.9 years. After that, individuals gradually return to earlier and earlier sleeping patterns, until things go haywire in old age.

Roenneberg, thinks that the peak in lateness is the first plausible biological marker for the end of adolescence.

If it is a physiological effect, forcing teenagers to get to school for, say, 8 am, could be a mistake, Roenneberg says. They probably take nothing in for the first two lessons because they are still in biological ‘sleep time’, and end up with a horrendous sleep deficit by the weekend.

Source: Edited extract from New Scientist, 8 January 2005.
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Case study review

1 What aspect of sleeping patterns may signify the end of adolescence (youth) according to the study?
2 Discuss why starting school at 8 am could be a ‘mistake’ for adolescents.
3 (a) Create a survey that could be used to find out about the sleeping patterns of youths and young adults. Some questions to consider are:
   • What time do you go to bed?
   • What time do you wake in the morning?
   • Do you sleep during the day as well? If so, for how many hours?
   • Do you get sleepy during the day?
   • How do your sleeping patterns change on the weekend compared to Monday to Friday?
(b) Hand the surveys out to people in the youth stage (your class could be a good place to start) and to those in their 20s and 30s.
(c) Collate and present the results (graphs and tables are useful for this). Be sure to include the total number of hours of sleep for each person and the average for each age group.
(d) Did you find any patterns or trends in the results?
(e) Did they support the findings of the study in Europe?
Middle adulthood

Middle adulthood begins at 40 and continues until the 65th birthday. The events that occur during this period vary from culture to culture and from individual to individual.

Some of the more common characteristics of this lifespan stage include stability in work and relationships, the further development of identity including the maturation of values and beliefs, financial security, physical signs of ageing and, for women, menopause. During this stage, an individual’s children may gain independence and leave home, giving the parent a new sense of freedom. Sometimes this can also create a sense of loss or loneliness, often referred to as ‘empty nest syndrome’. Many individuals in the middle adulthood stage will experience the joy of becoming grandparents for the first time, although this can occur in late adulthood as well.

Late adulthood

Late adulthood, the final stage of the lifespan, occurs from the age of 65 until death. This period is characterised by a change in lifestyle arising from retirement and financial security (for most). It can include greater participation in voluntary work and in leisure activities such as golf and bowls (figure 1.7). Many older people may also have to endure the grief associated with the death of friends or a spouse.

As health begins to decline significantly, older people tend to reflect on their lives and achievements. This may provide a sense of satisfaction or regret, depending on how they assess the choices they have made in their lives.

TEST your knowledge

1. (a) When does the human lifespan start?
   (b) When does it finish?
2. (a) What are the stages of the human lifespan?
   (b) When does each stage start and finish?
   (c) i. Which lifespan stage is the longest?
      ii. Would this be the same for everyone? Explain.
   (d) Why are the starting and end points of some lifespan stages difficult to classify?
3. Discuss the difference between youth and puberty.
4. Why is it difficult to pinpoint the end of youth?
5. (a) Why has the period of youth been getting longer over the past 100 years?
   (b) How many of these reasons relate to the physical changes that occur during youth? What aspects of life do they relate to?
6. What developmental milestones are used to signify independence?

APPLY your knowledge

7. Why might other cultures define stages of the lifespan differently?
8. (a) How might the experiences of youth in Australia differ from the experiences of youth in a country like Ethiopia in Africa?
   (b) Are there any experiences you think are common to youth across the world?
9. (a) Brainstorm factors that may affect the age at which a person reaches their physical peak.
   (b) How could someone prolong their peak physical condition?
10. Work individually or with a partner to identify key words you would use to explain each lifespan stage.
    (a) What sort of words did you come up with for each stage?
    (b) Were the words used for each lifespan stage positive or negative?
    (c) Where do you think these ideas come from?
    (d) Would they be the same if someone from another culture played this game? Why?
11. Design a concept map that summarises three aspects for each lifespan stage that you think help define the stage. Images from newspapers, magazines and/or the internet can be used for this activity.
1.2 Exploring individual human development: physical

**KEY CONCEPT** Understanding the characteristics of the physical area of individual human development

Individual human development encompasses the changes that people experience from conception until death. Development is often characterised by milestones that are predictable and occur in a sequential order. Going through puberty, learning to walk or learning the skills required to interact with others are examples of milestones associated with individual human development.

In this course, we will examine four types or areas of individual human development (figure 1.8). All four types are interrelated and therefore affect each other. We will explore these relationships in more detail later. In the coming sections, we will explore each type of development and the common characteristics of each type among youth.

**Physical development**

*Physical development* refers to the changes that occur to the body and its systems. It includes external changes that you can see, such as changes in height, and internal changes you cannot see, such as the increasing size of the heart. Physical development includes growth as well as motor skill development. Various aspects associated with physical development are summarised in figure 1.9.

**Growth of body systems**

From early in the uterus, the *embryo* begins to develop the cells that will become the vital organs and systems required to sustain life in the outside world (figure 1.10). The changes in size that take place in these organs and systems are important parts of physical development. Examples of systems in the body include the circulatory system and the immune system.

Growth refers to organs and systems getting bigger in size. It is an important aspect of physical development. Much growth occurs during puberty, which is why youth is considered a rapid growth period along with the prenatal and infancy
1.2 Exploring individual human development: physical

Changes to body systems

As well as getting bigger, tissues and systems also change in structure and function. Such changes include an increase in complexity and the decline in function that occurs as a normal part of ageing.

Examples of increases in the complexity of body systems include:

• the replacement of baby teeth with permanent teeth during childhood
• the hardening of bones until early adulthood (in addition to the growth of bones)
• the change in the way sex organs function during youth
• the development of the immune system that occurs throughout life.

These changes are part of the processes that assist individuals in reaching their physical peak. This physical peak usually occurs in the early 20s to
early 30s. After this point, most of the systems — such as the muscular system, the circulatory system and the skeletal system — generally decline at a rate of about 0.5 to 2 per cent per year. This decline is a normal part of physical development. Most of the decline takes place over a long period of time. In fact, people might not realise they have changed until they look back at old photographs of themselves.

Like all aspects of development, ageing happens to everyone. Most of the changes are predictable, but there will be individual variations in when they occur. This is due to a number of factors, including:

- **differences in rate and timing of development.** Due to genetic and hormonal differences, some individuals will start the ageing process at a younger age than others, and some will age at a faster rate.
- **behaviours.** Not smoking, eating a balanced diet and exercising can slow the rate of ageing.

**Motor skills**

Motor skills refer to the control of the muscles in the body. Imagine a newborn baby. It has very underdeveloped motor skills (e.g. uncoordinated limbs). As the infant gets older, motor skills will develop and movements will gradually become more controlled and deliberate.

Motor skills can be classified as either fine or gross:

- **gross motor skills** refer to movements that involve large muscle groups such as walking, throwing, skipping and kicking
- **fine motor skills** involve control over the smaller muscle groups such as those used for writing, tying shoelaces, cutting with scissors and manipulating the mouth to speak.
Youth is a time of rapid development. The average youth will end this lifespan stage by being physically capable of reproduction; being seen as an adult in the eyes of the law; finishing compulsory education; being legally allowed to drink alcohol, drive, vote and join the army; and making many other decisions for themselves. We will explore the individual human development that occurs during youth in each of the four areas of development, beginning with physical development.

Physical development during youth

The youth stage of the lifespan is a time of rapid physical development that commences at puberty. Puberty is triggered by hormones released in the pituitary gland (in the brain) and causes many changes in the body including an increase in the rate of growth, a refinement of gross and fine motor skills, and the development of primary and secondary sex characteristics.

Growth

The adolescent growth spurt is one of the most easily recognisable signs of puberty. During the growth spurt, the individual will grow at the fastest rate since infancy (figure 1.13). According to the Go For Your Life initiative (www.goforyourlife.vic.gov.au), on average a girl will gain 16 centimetres in height and 16 kilograms in weight, while boys will gain an extra 20 centimetres in height and 20 kilograms in weight. The growth spurt happens at different times for females and males, with girls generally experiencing their growth spurt between the ages of 10 and 13, and boys between 12 and 15. The growth spurt usually lasts for two to three years.

As well as changes in height, youth experience changes in body composition. In males, increases in muscle mass and the broadening of the shoulders in relation to the waist result in a more triangular body shape. For females, the hips widen and the fat to muscle ratio increases. Most fat is deposited in the mid-section, including the thighs and hips, resulting in the hourglass figure seen in many adult females.

Fine and gross motor skills

During the adolescent growth spurt, arms and legs lengthen and body proportions change. As these changes occur, different body parts may grow at different rates. As a result, some youth may experience periods of time when arms and legs are disproportionate to the rest of the body. This can contribute to some youth experiencing difficulty controlling their limbs in a coordinated manner, in the way they were able to during childhood.

As the body continues to mature, the individual will gain more control over it. By the end of puberty, however, the arms and legs are proportionate to the rest of the body. The extra strength and endurance gained during puberty increase the ability to carry out many motor skills in adulthood.
Changes to body systems

In addition to the growth experienced during youth, a number of body systems change in structure and/or function. Bones continue to build strength, the structure of the brain increases in complexity, and sex organs change in the way they function.

Bones are first developed during the prenatal stage of the lifespan but do not reach their maximum density or strength until adulthood. Youth is an important time for building bone density and ensuring that bones are as strong as possible for adulthood.

Structures in the brain continue to increase in complexity throughout youth. New skills and experiences provide opportunities for different structures of the brain to change in complexity, and this impacts on brain function. The results of these changes relate to intellectual development and will be explored in more detail later.

One of the most noticeable changes that occur to body systems in youth are the changes to the reproductive system, which includes the sex organs and the way they function. These changes can be classified into two categories: primary and secondary sex characteristics.

Primary sex characteristics are those parts of the body that are directly involved in reproduction. During puberty, changes occur to the organs of reproduction commonly referred to as the ‘genitals’. Although present at birth, these organs only develop and become fully functional during puberty. The primary sex characteristics that develop for males and females during puberty are shown in red in figure 1.14.

Secondary sex characteristics arise from changes that occur to both males and females but are not directly related to reproduction and are not present at birth. Examples of secondary sex characteristics for males and females are shown in blue in figure 1.14.

**FIGURE 1.14** The primary sex characteristics that develop for males and females during puberty
There is wide variation in the timing of when puberty begins, although girls generally start before boys. Girls commonly reach puberty between the ages of 8 and 13, and boys between the ages of 10 and 15. The average ages at which selected events associated with puberty occur are outlined in figure 1.15. These changes and the timing and rate at which they occur are largely due to biological determinants, in particular genetics, hormonal changes and body weight.

**Figure 1.15** The timing of puberty
Source: Adapted from www.bibalex.org.

**Sexual maturity**

As youth move through the process of puberty, most will become physically capable of reproduction. In order for reproduction to be possible, sperm production in males and the menstrual cycle in females must begin.
Sperm production

The male reproductive system consists of internal and external organs that are responsible for semen production and ejaculation. The internal reproductive organs are the testicles (or testes), epididymis, vas deferens, prostate and urethra; and the external reproductive organs are penis and scrotum (figure 1.16). During puberty, these organs grow and sperm is produced. The onset of sperm production is often marked by spermarche (or first ejaculation). This often occurs as a nocturnal emission (also referred to as a ‘wet dream’) or direct stimulation (most commonly as a result of masturbation). Sperm are the male sex cells that are required for reproduction. Once sperm are produced, males are capable of reproduction. If not ejaculated, sperm will eventually die and are absorbed back into the body so a build-up does not occur.

1. Testes/testicles — create up to 1500 sperm each second. The sperm mature here for about 50 days before being released into the epididymis.

   Scrotum — a pouch-like sac that houses the testicles and assists in controlling the temperature of the testes. Testes work best when slightly cooler than body temperature. Muscles in the scrotum draw the testes closer to the body when extra warmth is required and move them further away for cooling.

2. Epididymis — 6 metres of small tubes that are coiled behind each testicle. Immature sperm are released from the testicle into the tubes and spend the next two weeks travelling the length of the epididymis as they mature.

3. Vas deferens — a tube about 30 cm long that connects the epididymis to the ejaculatory duct in the prostate gland. Sperm can be stored here ready for ejaculation.

4. Seminal vesicles — produce a glucose-rich fluid that mixes with sperm to provide a source of energy to help the sperm move. This seminal fluid makes up most of the volume of a man’s semen.

5. Prostate gland — a walnut-sized gland producing a liquid that mixes with the seminal fluid and sperm to help provide energy and keep the sperm alive.

6. Penis — the external organ used for sexual intercourse

Urethra — a tube in the penis that transports semen out of the man’s body during ejaculation.

The menstrual cycle

The menstrual cycle refers to the process required to develop an ovum (or egg) and signals the ability to reproduce in females (figure 1.17). The first menstrual cycle begins with a process called menarche which relates to the first menstruation (or period) a female experiences. Most girls will experience erratic menstrual cycles for the first couple of years after menarche before the cycle settles and becomes more regular and predictable. Once this occurs, the menstrual cycle will usually last from 24 to 30 days.
1.3 Individual human development during youth: physical

**FIGURE 1.17** The menstrual cycle generally signifies the ability of females to reproduce.

**TEST your knowledge**

1. Using examples, explain:
   (a) primary sex characteristics
   (b) secondary sex characteristics.

2. During which lifespan stage are the primary sex characteristics first created?

3. Using figure 1.14 as a guide, draw a Venn diagram summarising the changes that males and females undergo during puberty.

4. Explain what is meant by:
   (a) spermarche
   (b) menstruation
   (c) menarche
   (d) menstrual cycle.

**APPLY your knowledge**

5. Use figure 1.15 to answer the following questions.
   (a) At what age span does the growth spurt begin for males and females?
   (b) Identify two of the differences between males and females as shown in the graph.
   (c) Which milestone shows the greatest variation for females?

6. (a) Looking at figure 1.13, outline two differences in the growth spurt as experienced by males and females.
   (b) What leads to these differences?

7. Research the menstrual cycle and prepare a timeline showing when different events occur.

8. Use the Puberty links in the Resources section of your eBookPLUS to find the weblink and questions for this activity.

9. Prepare an educational guide or poster for prepubescent children outlining the changes that occur during puberty.
1.4 Exploring individual human development: social

KEY CONCEPT Understanding the characteristics of the social area of individual human development and the social development that occurs during youth

While the physical aspect of development is often the most easily recognisable, there are significant social changes that also occur as individuals move through the lifespan.

Social development

People from different cultures are raised with different values and skills relating to how they are expected to interact with others. A newborn child knows very little about how to interact with others; it must learn the appropriate social skills and behaviours. Social development refers to the social skills and behaviours that are learnt from a young age. Examples of social development are summarised in figure 1.18 and include:

- behaviours — learning what is appropriate behaviour in a range of situations and how individuals behave around others (figure 1.19). Being a good listener and being generous are two examples of behaviours that people may learn.
- social roles and expectations — Humans spend a lot of their time in different groups and will often have distinct roles within those groups. Examples include the role of employee, friend, son/daughter, coach and team-mate. Each role will generally have a set of behaviours, skills and expectations associated with it. Gender roles are another example of social roles and relate to behaviours that are culturally acceptable for males and females. Although many of these roles and expectations have broken down over the past decades, some cultures still have distinct roles for males and females. These roles are learnt from a very young age and shape many aspects of the wider society. Examples of traditional social roles related to gender include:
  - males working and females staying at home to look after the children
  - men mowing lawns and women cooking
  - girls playing with dolls while boys play with trucks
  - men and women dressing differently (e.g. women wearing skirts and men wearing trousers).
- values and beliefs — determining what is important to an individual. Throughout life, many people will stand up for what they believe in, and knowing what they believe in is the first step in this aspect of development. Values and beliefs assist in the development of an identity (see page 23) and are formed through interactions with family, friends, wider society and the media.
- communication skills — being able to effectively communicate with different groups of people. This is an important aspect of development and continues to be built upon over the years. For example, talking to an elderly grandparent requires different skills than talking to a brother, sister or school friend.
- relationships — knowing how to behave in a relationship and what is expected. This will be continually refined over time. It often requires establishing mutual respect and taking the time to listen to each other’s point of view.
Case study

Gone to the dogs: the girl who ran with the pack

Elizabeth Grice

She bounds along on all fours through long grass, panting with her tongue hanging out. When she reaches the tap she paws at the ground, drinks noisily with her jaws wide open and lets the water cascade over her head.

Up to this point, you think the young woman could be acting — but the moment she shakes her head and neck free of droplets, exactly like a dog when it emerges from a swim, you get a creepy sense that this is something beyond imitation. Then she barks.

The furious sound she makes is not like a human being pretending to be a dog. It is a proper, chilling, canine-like burst of aggression and it is coming from the mouth of a young woman dressed in T-shirt and shorts.

This is 23-year-old Oxana Malaya reverting to behaviour she learnt as a young child when she was brought up by a pack of dogs on a rundown farm near the village of Novaya Blagoveschenka in Ukraine. When she showed her boyfriend what she once was and what she could still do — the barking, the whining, the four-footed running — he took fright. It was a party trick that went too far and the relationship ended.

Miss Malaya is a feral child, one of only about 100 known in the world. The story goes that, when she was three, her indifferent, alcoholic parents left her outside one night and she crawled into a hovel where they kept dogs. No one came to look for her or even seemed to notice she was gone, so she stayed where there was warmth and food — raw meat and scraps — forgetting what it was to be human, losing what toddler’s language she had and learning to survive as a member of the pack.

A shameful five years later, a neighbour reported a child living with animals. When she was found, at the age of eight in 1991, Oxana could hardly speak and ran around on all fours barking.

Though she must have seen humans at a distance, and seems occasionally to have entered the family house like a stray, they were no longer her species.

Judging from the complete lack of documentation about her physical and psychological state when found, the authorities were not keen to record her case — neglect on this scale was too shameful to acknowledge — even though it has been of huge and continuing interest to psychologists who believe feral children can help resolve the nature–nurture debate.

What is known about ‘the Dog Girl’ has been passed down orally, through doctors and carers. She was like a small animal. She walked on all fours. She ate like a dog,’ is about as scientific as it gets.

Last month, British child psychologist Lyn Fry, an expert on feral children, went to Ukraine with a Channel Four film crew to meet Miss Malaya, who now lives in a home for the mentally disabled. Five years after a Discovery Channel program about her, they wanted to see if she had integrated into society. Ms Fry wanted to find out how far the girl was still damaged — and to see a reunion with her father.

‘I expected someone much less human,’ says Ms Fry, the first non-Ukrainian expert to meet Oxana. ‘I’d heard stories that she could fly off the handle, that she was very uncooperative, that she was socially inept, but she did everything I asked of her.’

‘Her language is odd. She speaks flatly as though it’s an order. There is no cadence or rhythm or music to her speech, no inflection or tone. But she has a sense of humour. She likes to be the centre of attention, to make people laugh. Showing off is quite a surprising skill when you consider her background. In the film, Miss Malaya looks uncoordinated and tomboyish. When she walks, you notice her strange stomping gait and swinging shoulders, the intermittent squint and misshapen teeth. Like a dog with a bone, her first instinct is to hide anything she is given.

She is only 1.52 metres tall but when she fools about with her friends, pushing and shoving, there is a palpable air of menace and brute strength. The oddest thing is how little attention she pays to her pet mongrel. ‘Sometimes, she pushed it away,’ says Ms Fry. ‘She was much more orientated to people.’

After a series of cognitive tests, Ms Fry concluded that Miss Malaya had the mental capacity of a six-year-old and a dangerously low boredom threshold. She can count but not add up. She cannot read or spell her name correctly. She has learning difficulties, but she is not autistic, as children brought up by animals are sometimes assumed to be.

Experts agree that unless a child learns to speak by the age of five, the brain misses its chance to acquire
language, a defining characteristic of being human. Miss Malaya was able to learn to talk again because she had some childish speech before she was abandoned. At an orphanage school, they taught her to walk upright, to eat with her hands and, crucially, to talk.

Through an interpreter, Miss Malaya tells Ms Fry that her mother and father ‘completely forgot about me’. They argued and shouted. Her mother would hit her and she would pee herself in terror. She says she still goes off by herself into the woods when she is upset. Although she knows it is socially unacceptable to bark, she certainly can.

Miss Malaya seems to be happy looking after cows at the Baraboy Clinic’s insalubrious farm, outside Odessa.

‘It was dirty, terribly rundown and primitive,’ says Ms Fry, ‘but in Ukrainian terms, very desirable. Her carers are good people with the best interests of their charges at heart, though there is no therapy as such. Oxana is doing things she is good at.’

It was here that the reunion with her father was staged a few weeks ago.

In the film, they stand awkwardly apart and it is ages before anyone speaks. Miss Malaya breaks the silence. ‘Hello,’ she says. ‘I have come,’ replies her father. The exchange is moving in its halting formality. ‘I thank you that you have come. I wanted you to see me milk the cows.’


Case study review

1 Explain how Miss Malaya’s social development has been affected by her early life experiences.
2 Discuss how Miss Malaya’s physical development has been/may be affected by her experiences.
3 Discuss why Miss Malaya may have forgotten how to talk but remembers how to bark.
4 Using examples from the article, explain why development that occurs in early life is important.

Social development during youth

Even though considerable physical changes occur during youth, the social changes can be just as intense. Youth generally move from being essentially dependent on parents, to being largely independent. They learn how to act among different groups, and change the way they behave according to the situation. The types of interactions that occur also change as youth are given greater freedom and treated more like adults. As a result, their communication skills are further developed.

As individuals socialise with a broader social group during this stage, they are often exposed to new beliefs and values. These may relate to religion, politics, global issues such as the economy, and social justice issues such as discrimination and racism. As a result of this exposure, youths will generally start to form their own beliefs and values, and these can influence with whom they continue to socialise. This is an important aspect of social development.

In forming their own values and beliefs and struggling to become independent, youths often learn that they are responsible for their own actions, decisions and consequences. As a result, individuals in this stage often question more things, and this can contribute to conflict with their parents or other caregivers. Up until this point, parents often make most of the decisions for their child. During youth, relationships with parents are often reorganised in such a way that both the child and parent have a say in decision making. As a result of this struggle (and the other changes that youths experience, such as identity formation, social changes and puberty), youths may disagree with parents more often, which can lead to escalating conflict. However, most young people emerge from this stage with a deeper understanding of their parents and vice versa.
The peer group is extremely influential at this stage. Many of the social experiences that youths encounter are due to their peer group. The group may influence their choice of clothing, style of music, the types of activities they participate in and the formation of their identity. As individuals strive for their own independence, they may spend a majority of their free time with their peers, possibly experimenting with different behaviours within the peer group. Some of these behaviours may be considered ‘risky’ such as smoking cigarettes and experimenting with alcohol.

Individuals often communicate in a number of different ways and the use of the internet, mobile phones and social media can significantly influence how youth communicate with friends, develop values and beliefs, and learn about the world.

The nature of relationships changes during this time as many peer groups start to include members of the opposite sex. This can further develop communication skills and provide youth with opportunities to experience new types of relationships. Many individuals will experience their first intimate relationship with another person during this stage, and some will experience their first sexual relationship.

New skills, such as conflict resolution and compromise, are learned and/or developed as a result of these relationships. Towards the end of the youth stage, the individual will usually have developed a clearer sexual identity and may be looking for a serious relationship.

Culture and family also play a significant role in the social development of youths. Some cultures have particular rites of passage linked to this stage. Youths may be allowed to stay home alone for the first time when parents go out, learn to drive, get a job, make their own transport arrangements to and from school and social engagements, go out on a date, or consider future career paths.
Emotional development

Emotional development refers to developing the full range of emotions, and learning appropriate ways of dealing with and expressing these emotions. Some specific examples of emotional development are summarised in figure 1.21 and are explained in more detail below:

- **self-concept** — how individuals see themselves. They may have different views about different aspects of themselves, such as their academic ability, social skills and physical capabilities. Self-concept also influences the formation of an individual's identity (see page 23).
- **awareness of emotions** — how individuals identify which emotions they are feeling. The first emotions that can be recognised by infants include joy, anger, sadness and fear. As children begin to develop a sense of self, they experience more complex emotions like shyness, embarrassment, shame, guilt and pride. As children develop emotionally, they begin to identify different emotions and learn appropriate ways of responding to them. This is a process that continues through youth and into adulthood.
- **management of emotions** — how individuals control their emotions in different situations. As individuals develop emotionally, they become more equipped at dealing with emotions in an appropriate manner. Desire, guilt and jealousy are common emotions that people want to control. Learning to accept the things they cannot change and focusing energy on the things they can change is a significant achievement in this area of development. For example, instead of being upset at not being selected for the soccer team, a person can direct this energy into training harder in order to have a better chance of selection next time. It takes time to develop appropriate ways of responding to the way a person feels.
• appropriate expression of feelings — how individuals show their emotions in an appropriate way. This skill develops over time, and those who are more developed emotionally are more able to control the way in which they express their feelings. This is why toddlers, rather than adults, are more likely to throw temper tantrums when they do not get their way (figure 1.22).

**Emotional development during youth**

As with social and physical development, the emotional changes that occur during youth are significant. As a result of all the changes that youth go through, the way they view themselves and how they deal with these feelings may also change.

At the beginning of the youth stage, the individual may become preoccupied with what others think of them and feel that others are judging them. This is often the result of the physical changes being experienced. As they move through the youth stage, self-concept develops and the individual becomes more comfortable with themselves. As a result, they generally become less concerned with what others think and more concerned with who they are as a person.

In the early stages of youth, individuals might be very self-conscious and begin asking themselves, ‘Am I normal?’ As a result of these feelings, youth might explore strategies, such as consulting with friends, in order to deal with these emotions effectively. This helps to shape how individuals see themselves (self-concept).

Youths also start to look less childlike and more mature, so people begin to treat them differently. Young people need time to adjust to this change.

The release of hormones during youth can bring about extremes in mood that can cause conflict with others, often parents and other family members. Consequently, youth may experience negative emotions such as isolation, rejection and loneliness.

As the body matures, the mind changes as well, and youth might seek emotional independence. For example, they might try to solve their own problems instead of consulting parents. This may lead to feelings of satisfaction if they succeed or despair if they fail. Experiencing these emotions can encourage the individual to take more responsibility for their actions and provide ways to accept emotions — both positive and negative — that occur as a result of this responsibility (e.g. guilt, remorse, happiness, fulfilment).

As the nature of relationships changes, youth may also seek intimacy and affection within those relationships. They might experience emotions such as love and lust (figure 1.23).

Towards the end of the youth stage, the individual will have been exposed to a range of emotions and will generally be able to recognise them accurately when they arise. Most youth will also have an understanding of the appropriate ways of expressing those emotions. Most older youth will be able to adequately express their feelings in words, and this helps to regulate their emotions.

As youths explore different values and settle on their beliefs, they may have deeper feelings of who they are as people. This influences their emotional development and sense of identity. If they are satisfied with the person they have become, they may emerge from the youth stage with a great sense of pride and achievement not experienced previously.

**FIGURE 1.23** Some youths will experience the emotions associated with a relationship for the first time.
Case study: Identify

Identity is the establishment of a unique personality and encompasses aspects of both social and emotional development. It refers to how an individual defines him/herself, and is based on the values and beliefs of that individual. There are various aspects of identity — including physical, sexual, political, religious and ethnic identity — and the different aspects may develop at different times. Although an identity will generally be firmly formed by the later stages of youth, aspects of it will be modified throughout life.

In early youth, identity is often based on parental expectations and occurs without exploring alternatives. As youths develop, they may begin to question this identity and actively experiment with alternatives in an attempt to find an identity that suits them. During this process, the individual may change hobbies quickly, explore various possibilities for future careers, and sample different clothing and hair styles, musical genres and friendship groups.

As abstract thought develops, many youths will explore their spirituality. Spirituality is an aspect of identity that means different things to different people. Some of the more common associations include:

• searching for meaning in life
• finding one’s place in the world, where the greater good of the universe and those in it is important
• seeing oneself as a small part of a bigger universe
• acknowledging forces both inside and outside individuals that are separate from the physical and mental functioning of living things.

Religion is an organised form of spirituality that is based on culturally and historically based guidelines (or doctrine). As part of their search for spirituality, some people will explore religions — or turn away from the religion in which they were raised.

Many factors contribute to identity formation. They include:

• culture/ethnicity
• parents
• siblings
• friends
• school
• society.

Once an identity has been committed to, people feel more comfortable about themselves. This can contribute to increased self-esteem and also help to guide their moral decisions.

Case study review
1 What is meant by the term ‘identity’?
2 What factors could cause someone to change aspects of their identity later in life?
3 Explain the difference between spirituality and religion.
4 (a) Answer this question 10 times: ‘Who am I?’
   (b) i. Rank your answers according to how well they define who you are, where ‘1’ is the answer that best defines you and ‘10’ is the answer that least defines you.
      ii. For what reasons did you choose the answer you ranked as ‘1’?
   (c) Next to each answer, write down who you think influenced this aspect of yourself the most.
   (d) i. Which influence featured the most times?
      ii. Do you think this influence is the biggest determinant of identity? Explain.
1.5 Exploring individual human development: emotional

**TEST your knowledge**
1. Using examples, explain emotional development.
2. Discuss three ways in which youth develop emotionally.
3. Explain what is meant by ‘emotional independence’.
4. Explain what is meant by ‘self-concept’.

**APPLY your knowledge**
5. Brainstorm emotions that may be experienced for the first time during youth.
6. Explain how developing emotionally can impact on relationships with others.
7. Discuss ways in which youth may express or respond to the following emotions compared to a child:
   (a) happiness
   (b) anger
   (c) jealousy
   (d) disappointment.
8. Discuss the difference between social development and emotional development.
9. Explain how social development and emotional development may impact on each other.
10. Explain why individuals in early youth might be preoccupied with what other people think of them.

**FIGURE 1.24** Identity is often found through friendship groups.
Intellectual development

Intellectual development refers both to the processes that occur within the brain and to the increasing complexity of the brain. Aspects of intellectual development are summarised in figure 1.26 and are explained in more detail below:

- knowledge — this becomes more complex as people develop intellectually. The longer a person has been developing intellectually, the more opportunities they have to gain knowledge.
- language — knowledge of language and the way it can be used develops continually over the human lifespan.
- memory — retaining information and being able recall it. Memory abilities change throughout the lifespan and can decline in the latter parts of adulthood. Using this section of the brain can help to promote a good memory into late adulthood.
- abstract thought — being able to think about concepts and ideas rather than just the physical objects you can see (concrete thought)
- creativity and imagination — thinking in new ways. Both creativity and imagination can be developed by exposure to many different experiences including books, music and other people.
- problem solving — finding a way from the current state to the desired goal when no clear path exists. Problem solving is one of the most complex of all thinking processes. Examples include trying to fit a number of commitments into a given timeframe, figuring out what has caused a computer to crash or calculating how much weight a new (as yet unbuilt) bridge can hold. Trial and error is an important part of problem solving.
• attention — focusing on one aspect of the environment while ignoring others. Attention is an important aspect of intellectual development as it assists in the learning of new material. Young children can focus their attention for shorter periods of time than older children. Attention can be developed by attaching an intrinsic (or internal) reward, such as attaching satisfaction to completing a task. The more a person enjoys the matter requiring attention, the longer they can focus their attention on it.

Many aspects of intellectual development occur in the younger years, but intellectual development continues throughout the lifespan as people learn skills associated with pursuing careers, raising children, becoming grandparents or taking up hobbies.

**Intellectual development during youth**

During youth, physiological changes occur in the brain and in the way that the young person perceives problems. These changes result in significant advances in intellectual development. Youth begin to see ‘grey’ areas in problems when they would have seen only ‘black and white’ in the past. During this stage, the brain structures mature and abstract thought develops, as opposed to the concrete thought relied upon in childhood. Information can be processed more efficiently, and groups of concepts that were viewed individually might now be linked together and viewed as an interrelated whole.

Examples of intellectual development during this stage include the following.

• Reasoning skills increase. As youth are presented with problems, they start to apply related knowledge to the problems in order to make educated guesses. In contrast, most children can see only concrete solutions.
• The ability to create hypothetical solutions and evaluate the best options develops. This comes from previous experiences and from applying old knowledge to new situations.
• Focus on the future increases (figure 1.27). This may guide intellectual development — for example, students wanting to study science might develop an interest in learning about scientific principles and choose science courses at school.
• Thinking becomes more informed. Youths can distinguish between fact and opinion and may challenge views put to them by others, including adults.
• More complex concepts are learned at school. As a result, youths may develop an understanding of how they learn best (e.g. visual versus aural learners).

Some research suggests that the frontal lobe (a part of the brain) is not fully developed until the end of puberty — possibly not until the 20s. The state of the brain during these years may make youths favour immediate rewards and disregard long-term consequences. It is thought that this aspect of brain development may account for why youth are more likely to take risks than children or adults.

**FIGURE 1.27** Towards the end of youth, individuals generally start to shift their attention to learning things associated with their interests and possible career paths.
TEST your knowledge

1 Using examples, explain what is meant by intellectual development.
2 Outline three aspects of intellectual development relevant to youth.
3 (a) Discuss the difference between concrete and abstract thought.
   (b) List one example of thought that illustrates:
      i. concrete thought
      ii. abstract thought.
4 Classify the following as examples of physical, social, emotional or intellectual development:
   (a) The changes to sex organs that occur during puberty
   (b) Learning to use a graphing calculator
   (c) Deciding to join a religious group
   (d) Pattern baldness that occurs in many males
   (e) A musician writing a song for the first time
   (f) Finding a way to fix a banging door
   (g) A person perceiving themselves as intelligent
   (h) A person deciding that they value honesty more than not hurting someone else's feelings
   (i) Developing the skills required to discuss issues with parents
   (j) Increase in the complexity of the skeletal system in a developing foetus
   (k) Using words to express emotions
   (l) Developing beliefs relating to ethical issues such as abortion
   (m) Changes in height that occur during childhood
   (n) Moving in with a partner
   (o) Selecting a career path.

APPLY your knowledge

5 Draw pictures/collage photos and create a collage representing examples of the type of development that might occur in each lifespan stage. Ensure that the four areas of development are addressed.
6 (a) Find lyrics to a song that focuses on an area of development.
   (b) Print the lyrics and share them in small groups.
   (c) Discuss what the lyrics are saying about development.
7 ‘When I was a boy of 14, my father was so ignorant I could hardly stand to have the old man around. But when I got to be 21, I was astonished at how much he had learnt in seven years.’ What do you think this quote (by American author Mark Twain) is trying to say?
8 (a) How many triangles are shown in Figure 1.28?
   (b) Compare your answers with other students.
   (c) Do you think a child would be able to answer this problem? Why?
   (d) Think of another example of a brain teaser/problem that children and youths might answer differently.

FIGURE 1.28 Triangle problem

9 Use the Child-safe toys links in the Resources section of your eBookPLUS to find the weblink and questions for this activity.
1.7 Exploring the interrelationships between the areas of individual human development

KEY CONCEPT Understanding the interrelationships between physical, social, emotional and intellectual development

Classifying developmental milestones

Developmental milestones refer to the changes and achievements that occur throughout the lifespan. Examples include learning to walk and talk, completing basic mathematics problems, getting married, having children, choosing a career, finishing high school and experiencing love. Some of these milestones are easily classified into one of the four areas of development. For example, learning to walk is an aspect of physical development. But what about learning to talk (figure 1.29)? Muscles must be manipulated to make coherent sounds (physical development) and words must be learnt (intellectual development). Obviously, speech allows the individual to communicate (social development). Examples such as these can be classified into any one or all of these three areas.

There are many other examples of milestones that do not fit neatly into one of the four areas. Therefore when classifying a developmental milestone, you should justify why you have chosen a particular area for that milestone.

Interrelationships between physical, social, emotional and intellectual development

While the four areas of development have their own definitions and characteristics, none of them occurs in isolation. All four areas influence each other, and so are said to be interrelated. That is, a change in one will produce a change in the others. There is no limit to which any single aspect of development can influence another and the nature of the interrelationships will depend on the individual in question. Figure 1.30 and the paragraphs that follow outline some possible impacts on the different areas of development based on different scenarios.

A person’s social skills (social development) can influence the social group with which they associate. This in turn can affect social habits such as food consumption (e.g. eating at food courts). Food consumption has a direct impact on physical development, as the foods eaten contribute to the development of the body’s systems such as bones, muscles and organs (physical development). An individual’s ability to socialise and communicate may assist with expressing their emotions adequately (emotional development). Being a good listener (social development) might mean that the individual learns from others, such as parents and grandparents (intellectual development).
Being able to adequately deal with emotions (emotional development) such as disappointment might influence whether they are prepared to take risks, such as trying out for a sports team at school. Taking such risks can ultimately enhance motor skill development, for example, if they make the team (physical development). Being able to effectively express emotions can contribute to more meaningful friendships which can assist in developing communication skills and behaviours (social development). Valuing intrinsic rewards such as satisfaction and achievement (emotional development) can contribute to a person applying themselves at school and therefore developing knowledge (intellectual development).

Youths with higher intellectual development may have a greater knowledge of the benefits of nutrition and exercise, and may therefore have more advanced motor skills and greater development of bones, muscles and organs (physical development). Those with high levels of intellectual development may associate with people of similar intellect. The peer group in turn influences the development of behaviours and communication skills (social development). Youths who succeed academically may receive praise from their parents, which can contribute to feelings of pride (emotional development).

**TEST your knowledge**

1. Explain what is meant by ‘interrelationships’.
2. What is meant by the term ‘developmental milestone’?
3. Identify three developmental milestones often associated with youth. Would these be common for all youth across the world? Explain.
4. Discuss why it can be difficult to classify some developmental milestones into one of the four areas of development.

**APPLY your knowledge**

5. Select two of the following developmental milestones and complete a diagram similar to that in figure 1.30 for each one:
   - Learning to do gymnastics (physical development)
   - Leaving school in year 11 to start an apprenticeship (social development)
   - Passing a driver’s licence test and getting a car (social development)
   - Learning to play a musical instrument (intellectual development)
   - Being in love for the first time (emotional development).

Remember that the selected milestone should be in the centre of the diagram with the possible effects on the other three areas of development coming out from it.

6. Write a play or create a comic strip outlining how physical, social, emotional and intellectual development can interrelate.
Determinants of health and development: an introduction

There are many factors that influence the health and individual human development of youth. Some of these are genetic and out of the individual’s control, some are choices that people make, and some form part of the society and environment in which the individual lives. These factors act together to determine health and individual human development and hence are termed the ‘determinants of health and development’, sometimes shortened to the ‘determinants of health’.

The biological determinants are concerned with the body’s cells, tissues, organs and systems, and how they function. They include genetics, hormonal changes and body weight (see figure 1.32). Due to the many physical changes that occur during youth — and the impact these changes have on social, emotional and intellectual development — biological factors are particularly significant. As a result, some of these will be investigated as the development and health of youth are explored.

The behavioural, physical environment and social determinants also play a significant role in the health and individual human development of youth and will be explored specifically in chapter 4.

Genetics

The term ‘genetics’ refers to the biological information that is passed down from parents to children at the time of conception. Most cells in the human body contain this genetic blueprint, which contributes to many aspects of health and individual human development for youth.

Most cells contain a nucleus (figure 1.33). The nucleus controls the functions of the cell including the reproduction of cells and the timing of development. Within the nucleus there are structures called chromosomes. The chromosomes contain links of DNA called genes. Although genetics have a significant impact on individual human development during youth, it should be remembered that other factors also play large roles.

Physical appearance is also largely determined by genetics. A person has genetic potential in many aspects of their physical appearance (e.g. height, weight, skin colour, freckles, hair and eye colour, muscle mass and facial...
features). Remember that other determinants also play a part, and they can be just as influential as genetics. For example, a person who has the genetic potential to be tall might not consume sufficient nutrition and so could end up shorter than the maximum height possible according to their genetic potential.

Genetics determine sex, which has a large impact on the different physical characteristics of males and females such as genitals and reproductive systems. Genetics also influence the types and amounts of hormones that are released during puberty and therefore influence the physical changes that occur during youth. While genetics influence the timing of the release of these hormones, it is the hormones themselves that cause the changes associated with puberty.

**Hormonal changes**

Hormones are an example of a biological determinant and are responsible for the process of puberty. Hormones are chemicals that are released by special parts of the body called glands. The series of glands in the body make up the endocrine system. There are numerous glands in the body and some of the main ones are shown in figure 1.35. Hormones play an important role in bringing about changes in physical development during youth. When hormones are released from the glands, they are transported through the bloodstream and circulate around the body. Certain cells around the body are sensitive to different hormones and will react when the particular hormones are present in the blood (see figure 1.34).

Different hormones act on different parts of the body and are essential for many aspects of life such as metabolism, growth, cell death, the menstrual cycle in women and puberty in youths. Hormones are the trigger for puberty and will play a role in the physical state of both females and males for life.

Hormone changes during youth are caused by many factors including genetics and body weight. It is the release of hormones that triggers puberty and results in the changes in physical development that occur during this stage. The different proportions of hormones released in males and females contribute to the different changes that occur between the sexes.

Hormones also influence when and how quickly an individual develops, and there is great variation in the rate of development. This is partly why some individuals start puberty at eight and others may not start until 16. The duration of puberty also varies greatly and can last from two to eight years. Generally speaking, the earlier an individual starts puberty, the faster they move through it (although this has no bearing on final height). Rate and timing of development can affect other aspects, such as motor skill development. Early puberty contributes to increased strength and endurance, which can contribute to greater participation in activities that promote motor skill development. Social development can also be affected by early puberty. Those who start puberty early might be expected to act in a more mature manner because they look older than their actual age. They may also socialise with youth who are older and this can also affect their social development.

During puberty, growth hormone is released at around double the amount that was present during childhood. This leads to a faster rate of growth than was experienced during childhood. The amount of growth hormone released may influence final height. Growth hormone is also responsible for other aspects of growth that take place during the youth stage, including an increase in muscle mass and an increase in the size of the organs. These changes improve the functioning of the body and contribute to the peak physical development that is usually reached in early adulthood.
1.8 The impact of biological determinants on youth development

**FIGURE 1.35 The glands and hormones responsible for the changes experienced during puberty**

1. The hormone that starts puberty is gonadotropin-releasing hormone (GnRH). GnRH is released from the hypothalamus and triggers the pituitary gland to release two more hormones, luteinising hormone (LH) and follicle-stimulating hormone (FSH).

2. LH and FSH are released from the pituitary gland.

3. LH and FSH act on the ovaries and stimulate the production and release of oestrogen.

4. Although found in both sexes, oestrogen is present in higher amounts in females. It is responsible for the development of the female reproductive organs including the uterus and vagina. Oestrogen also increases fat deposits, promotes breast development and plays a role in regulating the menstrual cycle.

The thyroid gland produces the hormone thyroxine, which regulates the rate of metabolism in the body. This hormone is essential to regulate the energy produced by the body, for the development of the nervous system and muscles, and for the growth of long bones. These functions are particularly relevant during youth as the individual undergoes significant development in these areas.

Body weight

Maintaining a healthy body weight is beneficial for development during youth. Body weight that does not fall within the healthy range can have a number of effects on youth development. Genetics play a role in body weight, as does food intake. When people do not have a balanced food intake, many nutrients required for optimal development and health are absent from the diet or not present in the right amounts. This is the result of not eating enough nutrient dense food.

Body weight can affect individual human development in many ways. Young people who are either underweight or overweight/obese may not be eating enough of the foods that provide adequate nutrition. This can mean that optimal physical development is not achieved during puberty. The individual may not be as tall as they should be, or may not develop optimal bone density. They might not participate in sporting events, which could have a negative effect on their motor skill development.
As with all effects on an individual, the impact of body weight on social, emotional and intellectual development will vary, but some examples could include:

- missing out on social experiences can affect communication skills
- coping strategies may be developed to deal with feelings of loneliness and affect emotional development
- being victimised at school can affect concentration levels and impact on intellectual development.

Generally, body weight is measured using the **body mass index (BMI)**. The BMI is calculated using the following formula:

\[
\text{BMI} = \frac{\text{Weight (kg)}}{\text{Height (m)}^2}
\]

So for someone who is 170 centimetres and weighs 68 kilograms:

\[
\text{BMI} = \frac{68 \text{ (kg)}}{1.7 \text{ (m)}^2} = \frac{68}{2.89} = 23.5
\]

For adults, the BMI score is compared to set figures to determine if a person is underweight, a healthy weight, overweight or obese (although waist circumference is increasingly being used as an indicator of health risks associated with excess body weight). This cannot be used for youth because they are growing and their body proportions and fat levels change as they grow. Therefore the BMI-for-age charts must be used (figures 1.36 and 1.37). They compare youth to other individuals of the same age and sex, and give a more accurate indicator of overweight or obesity than the adult charts.

![BMI Chart for Boys Aged 2–20 Years](source: Adapted from US Centers for Disease Control and Prevention, www.cdc.gov)
1.8 The impact of biological determinants on youth development

The rates of overweight and obesity for young Australians in 2011–12 are shown in figure 1.38. These rates have steadily increased over the past 25 years.

Although overweight and obesity are well-publicised issues for youth, underweight poses a significant challenge for many, particularly females. The media play a
significant role in attitudes towards underweight, in that being thin is often related to beauty in popular culture. Females are at significantly higher risk of being underweight. In cases of underweight, the onset of puberty is often delayed. Current research indicates that individuals must reach a certain weight before puberty will begin as nutrient and fat stores must be sufficient to support the development that will occur. The average age at which puberty begins has decreased in recent decades and some researchers believe this is due to increasing rates of overweight and obesity.

The rate of physical development may also be slowed in underweight youth as the nutrients required for building new tissues are not present in the diet in the right amounts. This can be particularly detrimental to building optimal bone density.

Case study

Puberty at 7: why girls are maturing early

Christina Larmer

A landmark US study shows the number of girls reaching puberty by the age of seven has doubled during the past 10 years. Research figures published in the medical journal *Pediatrics* found that of the 1239 girls studied, between 10 and 23 per cent had breast development by seven — a condition known as ‘precocious puberty’.

While these figures aren’t yet reflected in Australia, those on the frontline say it is cause for concern. ‘Certainly the age of puberty is dropping throughout the Western world,’ says Dr Louise Farrell, an obstetrician and gynaecologist, and vice president of The Royal Australian and New Zealand College of Obstetricians and Gynaecologists (RANZCOG). ‘Now it’s not uncommon for girls to have breast development and puberty at primary school, whereas it was less common previously.

The most obvious reason is the rise in body weight. In Elizabethan times, when girls were smaller, many didn’t reach puberty until their late teens. Since then, improvements in nutrition and health have seen the average age drop gradually to about 12. ‘Generally, women won’t menstruate under a certain weight,’ Dr Farrell says. ‘There is no doubt that increasing obesity or body mass index (BMI) is contributing.’

Various international studies also point the finger at environmental toxins, family breakdown and exposure to artificial light, all of which are increasing in Australia.

Precocious puberty has serious health implications, leaving girls at greater risk for asthma, depression and breast and reproductive cancers in adulthood. They’re also more likely to engage in risky behaviour such as underage sex and substance abuse.

‘A seven-year-old girl isn’t equipped emotionally to have the body of a young woman,’ says Denise Greenaway, psychologist and body image educator with MirrorMirror.com.au. ‘We’re dealing with very young, vulnerable, impressionable children who aren’t at the same emotional, psychological level as their bodies.’

The sudden development of breasts can trigger body image issues and lead to confusion at school and in the community, says Dr Farrell: ‘Once a girl develops physical changes she might not appreciate that she can be the object of unwanted sexual attention and older males may not appreciate how young she is.

Greenaway says parents need to be sensitive to how their daughter is feeling without dismissing it or inflaming it further. ‘For parents to pour out all of their anxiety, pain and grief at seeing the loss of their little one doesn’t help,’ she says.

Make sure your child understands what’s happening to her body. ‘If she wants to talk about sex, drugs and alcohol make it a listening opportunity to see what she knows, rather than burden her with information she may not be ready for emotionally,’ Greenaway says.

And remember, your priority is to protect her. Speak to her teachers, sports groups, friends and family about the need for greater privacy and understanding: ‘She may look older but she’s still a little girl at heart and little girls can hopefully still be climbing trees, riding horses and looking daggy.’

(continued)
Here’s what international studies have shown.

- Body weight: Girls who are obese at the age of three may be more likely to experience early puberty by the age of 10. Body weight signals the brain to start reproducing.
- Stepdads: Girls living with stepfathers are almost twice as likely to enter early puberty as those who live with their biological dad, due to the presence of unrelated male pheromones.
- Family instability: On average, girls from broken homes start puberty four months earlier than those whose parents are together. Instability, stress and the absence of the biological father may all be triggers.
- Medical disorders: Brain changes, genetic problems and hormone-releasing tumours can all bring on early puberty.
- Environmental toxins: Certain chemicals, some natural, others man-made, can affect normal hormonal development.

*Source: Sunday Herald Sun, 15 May 2011.*

**Case study review**

1. What is meant by ‘precocious puberty’?
2. What is the most ‘obvious reason’ for precocious puberty according to the article?
3. Identify the health risks associated with precocious puberty.
4. Explain why the level of emotional development of young girls is an issue if they go through puberty early.
5. Explain how precocious puberty can impact on intellectual development.
6. Outline other factors that are believed to contribute to precocious puberty.

**TEST your knowledge**

1. Outline what is meant by ‘biological determinants of health and development’.
2. Using genetics as the basis of your discussion, outline why people often look like a combination of both their parents.
3. Explain how each of the following can impact on the development of youth (remember that development is not just physical).
   - Genetics
   - Hormonal changes
   - Body weight
4. Prepare a summary table for the hormones and be sure to include:
   - (a) the name of the hormone
   - (b) the gland that secretes it
   - (c) the role it plays in physical development during puberty.
5. Draw a flow chart that shows how the hormones act on the body for both males and females.
6. (a) What is BMI?
   (b) How is it calculated?
   (c) Explain why the BMI of youths is compared to percentile charts rather than the set values used for adults.

**APPLY your knowledge**

7. (a) Calculate the BMI and determine the weight range (according to figures 1.36 and 1.37) for each of the following:
   - i. a 10-year-old boy who is 140 centimetres tall and weighs 47 kilograms
   - ii. an 18-year-old female who is 175 centimetres tall and weighs 52 kilograms.
   (b) i. A 15-year-old boy with the same height and weight as the 10-year-old boy would fall into which weight category?
      ii. Why is there a difference between the two?
8. Use the Genetics links in the Resources section of your eBookPLUS to find the weblink and questions for this activity.
9. Use the BMI links in the Resources section of your eBookPLUS to find the weblink and questions for this activity.
KEY SKILLS The individual human development of Australia’s youth

KEY SKILL Define individual human development

It is essential to be able to define individual human development. A definition should include reference to the four areas of development (physical, social, emotional and intellectual).

In the example below, the term ‘individual human development’ is defined.

Individual human development refers to the changes that humans experience from conception until death. Individual human development (sometimes simply referred to as ‘development’) includes the predictable, orderly changes that occur and can be physical (such as growth and motor skill development), social (such as communication skills), emotional (such as learning to control and effectively express emotions) and intellectual (such as changes in thought patterns).

KEY SKILL Describe characteristics of, and interrelationships between, the different types of individual human development during the lifespan stage of youth

Youth is a time of rapid development, and the common aspects of development should be known. In addition to the physical changes that occur, the social, emotional and intellectual changes are also significant. Some questions will focus on one area of development and others will be more open. Be sure to read the question carefully to determine the main focus or requirement.

In the following scenario or case study, Tan is in grade six and she has just started puberty. The following response outlines the physical changes that Tan will experience as she moves through puberty.

Tan can expect to go through many physical changes during this stage of development. Tan’s ovaries will produce more oestrogen, which will be responsible for many of the changes that occur in the coming years.

Tan will begin to develop breasts, although this process takes some years to complete. She will start to grow pubic hair, underarm hair and leg hair. Her voice will deepen and she will undergo a growth spurt that will see her add around 16 centimetres to her height and 16 kilograms in weight. At the end of puberty, her bones will have finished developing and her height will not increase much more. As a result of the growth spurt, Tan’s body proportions will change and fat will be deposited around her hips. Her hips will also widen, preparing her body for reproduction. Tan’s menstrual cycle will begin. This marks the beginning of her ability to reproduce. Her primary sexual characteristics will also develop as her body prepares itself for reproduction (e.g. the enlarging of her vagina and uterus).

A key requirement of this skill is to develop the ability to predict possible outcomes for an individual, in all areas of development, in a particular scenario or set of circumstances. Having a detailed knowledge of the four areas of development is the first step in achieving this.

In this scenario (or case study), Ben is 16 and has just left school to begin a plumbing apprenticeship. A discussion of how Ben’s development might be affected by his leaving school and beginning full-time employment is presented below.

Ben’s development might be affected in the four key areas: physical, social, emotional and intellectual.

Physical: He may miss out on playing sports at school, and this could affect his motor development. He may learn new manual skills in the workplace that may enhance his motor development.
KEY SKILL Explain the biological determinants of health and development and discuss the impact on the development of youth

In order to complete this key skill, knowledge of the biological determinants of health and development is important. As well as being able to explain the biological determinants of health and development, the ability to predict the likely effect of these determinants on the individual human development of youth is also required. You may also be required to use the biological determinants to explain possible reasons for differences in the development between individuals. Remember that the focus of this key skill is on youth and any discussion should be about this particular age group.

Completing a summary table (such as table 1.1) can provide practice in predicting likely effects of biological determinants on youth development.

**TABLE 1.1** A summary table for analysing the impact on development of the biological determinants

<table>
<thead>
<tr>
<th>Determinant: Body weight</th>
<th>Area of development</th>
<th>Possible impact on youth</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Physical</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Social</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Emotional</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Intellectual</td>
<td></td>
</tr>
</tbody>
</table>

Consider the following example:
Trent and Mai-Lin are both 13 years old and are in year 7 at the same school. Although it would be expected that Mai-Lin would have started puberty earlier than Trent, this is not the case. Trent started puberty 18 months ago which is relatively early for a male, whereas Mai-Lin has not yet started puberty. Mai-Lin is slightly underweight with a BMI of 14, whereas Trent has a BMI of 27, which for a male of his age puts him in the obese category.

To identify biological determinants of health and development, and discuss how they might influence the differences in development experienced by Trent and Mai-Lin, a response might be as follows.

**Genetics.** Even though females, on average, start puberty earlier than males, Trent’s genes may be responsible for his earlier start to puberty.

**Body weight:** Body weight is linked to the onset of puberty and the fact that Mai-Lin is underweight could have contributed to her delayed onset of puberty. Trent on the other hand, is classified as obese which may have contributed to his relatively early onset of puberty.
PRACTISE the key skills

1 Define individual human development.
2 Glenn is 14. He has just moved away from the family home to attend boarding school.
   (a) Glenn is in which lifespan stage?
   (b) Discuss ways that attending boarding school could impact on Glenn’s physical, social, emotional and intellectual development.
3 Jacob and Zoe have both just started puberty. Discuss the role that hormones play in the development that each will experience over the coming years.
4 The graph in figure 1.39 shows the rate of growth for James compared to the average male youth.
   (a) Discuss how James’ rate of growth differs from that of the average male.
   (b) Using biological determinants as the basis of your answer, discuss possible reasons for this difference.
   (c) Discuss how James’ physical development may have affected his social and emotional development.

5 List three aspects of physical, social, emotional and intellectual development that occur during youth.

Key skills exam practice

6 Fabio and Mandie are both 14 and attend the same school. They are active individuals who started puberty in the past 18 months.
   (a) Identify two similarities in the physical development that occurs at their stage of the lifespan.

_____________________________________________________________________________________________________________________
_____________________________________________________________________________________________________________________
_____________________________________________________________________________________________________________________
(2 marks)
(b) Identify two differences in the physical development that occurs at their stage of the lifespan.

____________________________________________________________________________________
____________________________________________________________________________________
____________________________________________________________________________________
____________________________________________________________________________________
____________________________________________________________________________________

2 marks

(c) Identify two hormones that contribute to the physical development being experienced by Fabio and/or Mandie and explain the role they play in physical development.

____________________________________________________________________________________
____________________________________________________________________________________
____________________________________________________________________________________
____________________________________________________________________________________
____________________________________________________________________________________
____________________________________________________________________________________

6 marks

(Adapted from the VCAA exam paper, 2005, Q. 4)
Chapter summary

• The human lifespan begins at conception and ends at death. Each stage has characteristics common to most people.
• The start and finish of some lifespan stages has been debated over the years, and different groups and organisations may define the lifespan stages differently. For the sake of this course, the lifespan stages, and the start and end of each stage, are:
  – prenatal: fertilisation until birth
  – infancy: birth to 2nd birthday
  – early childhood: 2 years of age to 6th birthday
  – late childhood: 6 years of age to 12th birthday
  – youth: 12 years of age to 18th birthday
  – early adulthood: 18 years of age to 40th birthday
  – middle adulthood: 40 years of age to 65th birthday
  – late adulthood: 65 years of age until death.
• Development refers to the orderly, predictable and sequential changes that occur in individuals from conception to death. Development occurs in the physical, social, emotional and intellectual areas.
• Physical development involves internal aspects (development and growth of body systems and organs) and external aspects (motor skill development and growth). It includes the decline in body systems.
• Youth is considered a period of rapid growth.
• The physical changes that occur during puberty can be classified as either primary or secondary sex characteristics.
• Social development refers to the social skills, behaviours, capabilities and roles that people learn through interacting with others.
• Youth is a time of rapid social development. Values and beliefs are formed in this stage and youths interact with a wider range of people, including increased interactions with those of the opposite sex.
• The peer group is an important influence on social development as it contributes to the development of behaviours and communication skills.
• Emotional development refers to the way that people identify, deal with, and express the emotions they experience.
• Self-concept is an important aspect of emotional development and relates to the way that an individual sees himself/herself.
• Individuals experience a wider range of emotions during youth and learn to recognise and deal with them more appropriately.
• Intellectual development refers to the processes occurring in the brain and includes knowledge, language, memory and problem solving.
• The brain continues to develop during youth and contributes to more developed thinking and reasoning skills.
• Youths often become more focused on knowledge related to possible career paths.
• Some milestones may represent more than one area of development. Learning to use a knife and fork is an example of both physical development (manipulating the muscles to hold and move the knife and fork adequately) and social development (the socially expected way to eat most meals).
• The four areas of development are interrelated and all affect each other.
• The development experienced throughout life is determined by a broad range of factors called determinants.
• Biological determinants relate to the state and functioning of the body and include genetics, hormones and body weight. Biological determinants play a significant role in the physical development experienced by individuals in the youth stage of the lifespan.
• Genetics contribute to many aspects of development including height, the timing of the onset of puberty, sex and physical appearance.
• Hormonal changes are largely responsible for the physical changes that occur during puberty and can affect the onset and rate of physical development during youth. Growth hormone is responsible for many of the changes that occur in height at this time.
• The rate of overweight and obesity has increased over time and impacts on the onset of puberty for youth.
• Body mass is often measured using the body mass index (BMI). For adults, BMI scores are judged according to set values. For youths, however, BMI classifications are based on percentile charts because youths are undergoing rapid growth and experiencing changes in body proportions.

TEST your knowledge
1 Define individual human development.
2 Draw a concept map outlining the four areas of development. For each area, include five characteristics that occur throughout the lifespan.
3 Explain why puberty is no longer used to signify the start of the youth stage of the human lifespan.

APPLY your knowledge
4 Make a list of physical, social, emotional and intellectual characteristics that occur for people of your age.
5 Write a newspaper article titled ‘The long and winding road — youth of today’.
6 ‘Youth really lasts from age 12 until age 25’. Working in groups, debate this statement.