

NSW CHILDHOOD OVERWEIGHT AND OBESITY DETAILED DATA REPORT



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EXECUTIVE SUMMARY



Prevalence of childhood overweight and obesity

- More than 1 in 5 NSW children are above a healthy weight and rates are stable
- Childhood overweight and obesity rates increase with socioeconomic disadvantage
- Most parents of children above a healthy weight perceive their child to be about the right weight



Nutrition

- Children are not eating enough vegetables
- Many children still aren't choosing water as their main drink
- Around 2 in 5 children have sugar-sweetened drinks regularly
- Around 2 in 5 children eat takeaway food at least once per week



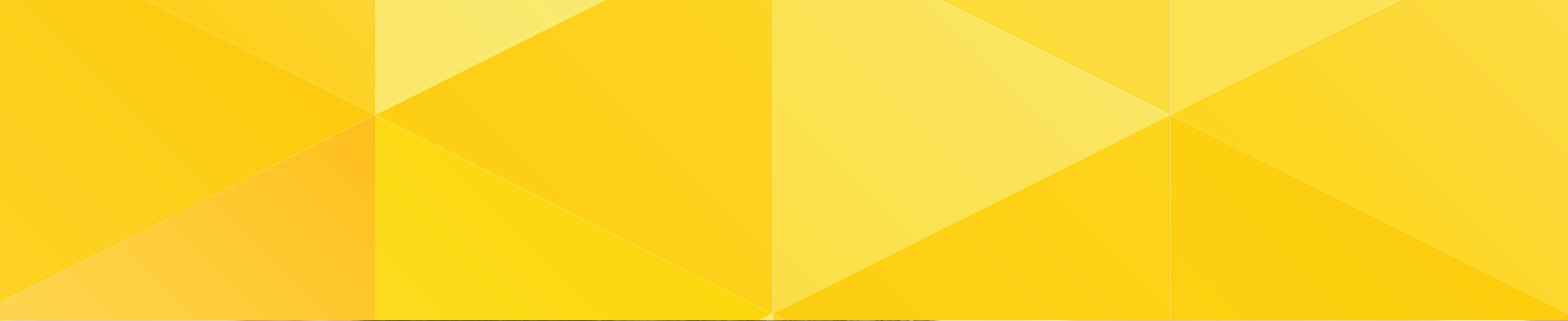
Physical Activity

- Most children are not active enough and many spend too long on screen time
- Too few children use active travel to get to and from school
- There is a low level of awareness of physical activity recommendations



Impacts of overweight and obesity

- Overweight and obesity increases the likelihood of developing chronic disease
- Overweight and obesity is associated with a decreased life expectancy
- Obesity has a significant impact on the Australian economy



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PROFILE OF CHILDREN IN NSW¹



NSW Children aged 5-16 years 1,134,235 (1.13 million)



Boys
582,653



Girls
551,582

Age profile of children



**2 to 4
years (early
childhood)**
301,374



**5 to 11 years
(primary
school)**
683,961



**12 to 16
years (high
school)**
450,274

Where children live in NSW



Major cities
74%



**Inner
regional**
20%



**Outer
regional
and remote**
6%

INTRODUCTION

Why is childhood overweight and obesity an issue?

Childhood overweight and obesity is a serious and complex public health issue. In NSW in 2018, more than 1 in 5 children (24%) aged 5–16 years were overweight or obese, of whom around three quarters were overweight and the rest were obese. This means about 270,000 NSW children are above a healthy weight.

Children who are above a healthy weight are at increased risk of some health problems, such as asthma, during childhood. Stigmatisation of obesity in childhood can also contribute to emotional difficulties, such as depression and anxiety.² Children who are overweight or obese are also more likely to carry excess weight into adulthood and are at increased risk of chronic disease later in life as well as premature mortality. Overweight and obesity is associated with a range of diseases including cancer (such as breast, bowel, oesophageal, liver and kidney), cardiovascular disease, musculoskeletal conditions, type 2 diabetes, dementia and chronic kidney disease.³

A range of individual, social and economic risk factors have led to an environment that promotes excessive energy (kilojoule) intake while decreasing opportunities for incidental and physical activity, resulting in significant weight gain across the NSW population. Unhealthy eating, physical activity and unhealthy weight have complex causes and differential impacts among populations.

How is NSW addressing the issue?

In NSW, the prevalence of childhood overweight and obesity has doubled since 1985^{4,5} but the implementation of a suite of evidence-based interventions has contributed to stable rates since 2007. There is no single, simple solution to reducing childhood overweight and obesity at a population level. A sustained, multifaceted population-level approach is required to positively affect weight-related health behaviours, improve health outcomes and reduce the considerable burden of this issue on children, families and the community.

Weight gain often starts early and it is difficult to reverse. By four years of age, around 25% of Australian children are already above a healthy weight.⁶ As the first few years of life are a critical time for establishing patterns of healthy nutrition and physical activity, it is important to support children and families to establish healthy behaviours during these years.⁷ With over 90,000 babies born in NSW each year, a program of integrated interventions is needed to target children over time.

NSW Health leads a multi-agency approach to tackle childhood obesity.⁸ Our approach is comprehensive:

- programs are delivered at scale in childcare, schools and community settings to support children and their families
- an increasing role for clinicians is being established, including training and engaging with health professionals to provide advice for families with children above a healthy weight
- social marketing strategies support community behaviour change
- food and physical activity environments are being changed to support people to make healthier choices
- program monitoring assesses the impact of services to adapt and respond to community needs.

In 2015, the NSW Premier made it a priority to reduce overweight and obesity rates of children by five percentage points by 2025. Childhood overweight and obesity completed its term as a Premier's Priority in 2019. During this time, significant progress has been made in implementing a suite of evidence-based policies, programs and strategies to reduce childhood obesity. NSW Health will continue its comprehensive approach focusing on children in the early years and consolidate successful policy and program approaches with interagency partners.

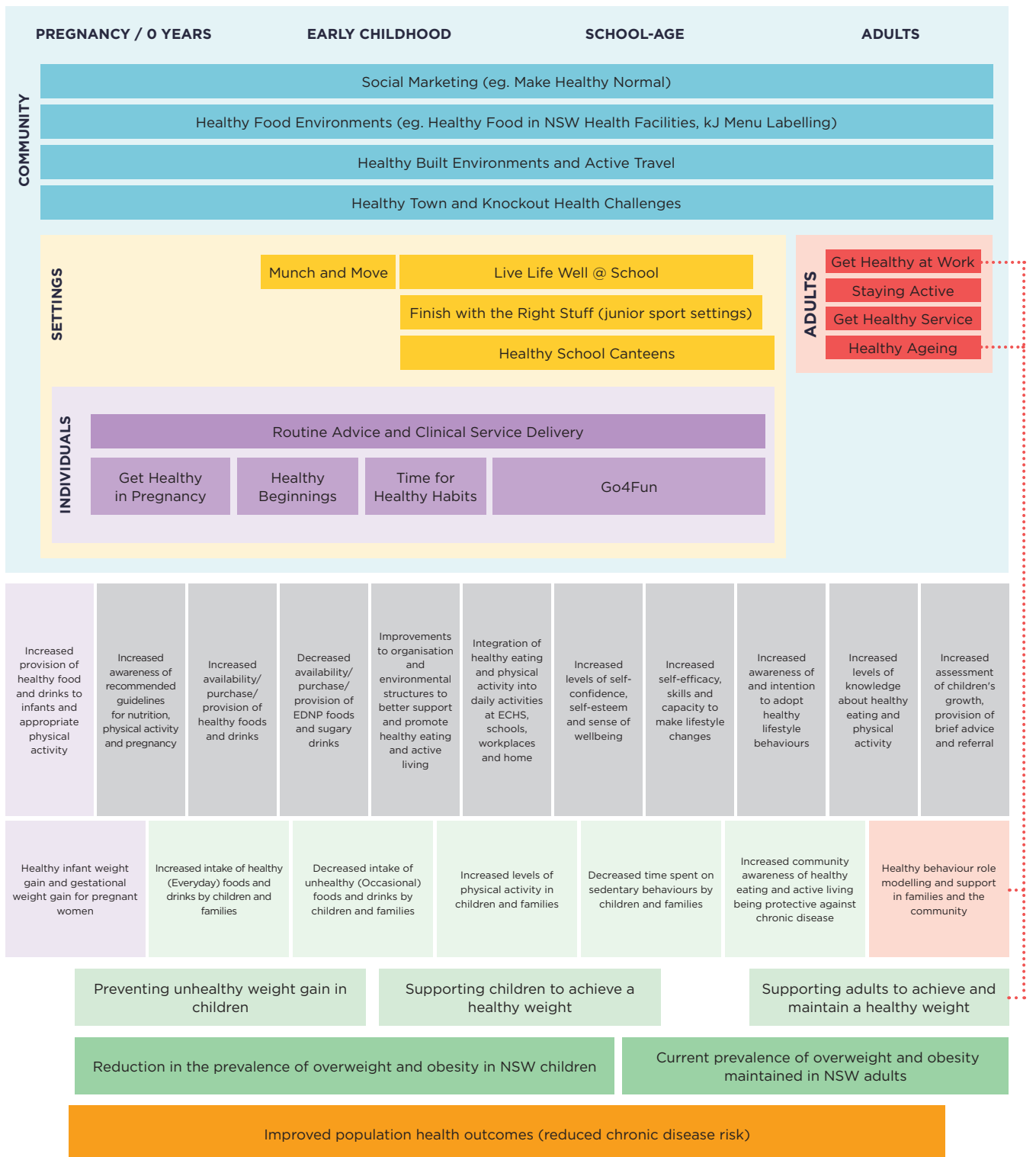
What is the purpose of this report?

To realise the long-term target of reducing childhood overweight and obesity, improvements across a range of intermediate outcomes must be achieved first. Monitoring and reporting on these outcomes provides a measure of success for NSW programs and initiatives and an indication of the future likelihood of achieving the long-term objective of reducing childhood overweight and obesity (Figure 1).

This report presents data for a range of weight-related behaviours and health outcomes for NSW children. It includes information on the prevalence of overweight and obesity, nutrition and physical activity behaviours and the impacts of overweight and obesity on individuals and the community. For more information on the data sources used and interpretation of data in the report see **Appendices 1 and 2**. A summary of indicators and trends is available at **Appendix 3**. A list of acronyms can be found on page 98.



Figure 1. NSW Health child obesity outcomes model: an outline of current programs and initiatives and how they are expected to impact on food and physical activity behaviours to reduce childhood overweight and obesity





How is childhood overweight and obesity defined?

Child weight status

Weight status is measured and assessed for children aged 2 years and over using the Body Mass Index (BMI).

$$\text{BMI} = \frac{\text{weight (kg)}}{\text{height (m)}^2}$$

For children, the BMI is adjusted for sex and age to account for growth and maturation patterns. This is mapped to a weight category (using international standards): Below a healthy weight (Underweight), Healthy weight, Above a healthy weight (Overweight) and Well above a healthy weight (Obese). In this report, a combined 'overweight and obese' category is frequently reported to capture those children who are 'above' and 'well above' a healthy weight.

NSW Health programs and interventions generally use non-stigmatising language, such as 'above a healthy weight' and 'well above a healthy weight', that has been shown to be acceptable to children and their parents. Throughout this report, a combination of terms are used.

It is good clinical practice to routinely measure the growth of all children. In health care settings in NSW, it is recommended that a child's growth is measured using the BMI for age and sex growth charts derived from the US Centers for Disease Control (CDC). Visit <https://pro.healthykids.nsw.gov.au/assess> for more information on calculating and monitoring a child's growth.

There are some limitations with the BMI classification as it does not distinguish between the proportion of fat or fat-free-muscle, which makes it less accurate for some body types.

Waist-to-height ratio

Alternative measures may be used to provide estimates of weight status and correlating risk of chronic disease. Measuring the waist circumference and calculating the waist-to-height ratio (WHR) provides a measure of central adiposity (excess weight around the midsection), which is a significant predictor of cardiovascular disease risk in children and is also included in this report (Table 1).

Table 1. Standard WHR categories

Weight status category	WHR
Low cardio-metabolic risk	<0.5
At cardio-metabolic risk	≥0.5

Defining 'children'

In this report, various age groups are used to define the child population, depending on the data source and the topic and these are clearly referenced throughout the report. The broad age group for school-age interventions in NSW is 5-16 years of age. Data have been reported to align as closely as possible with this age group.

For more information about the measurement and reporting of weight status and relevant data sources used in this report see **Appendices 1 and 2**.

PREVALENCE OF CHILDHOOD OVERWEIGHT AND OBESITY

NSW children



More than 1 in 5 NSW children are OVERWEIGHT or OBESE

24.0% of children (5-16 years)

Source: NSW PHS 2018



Overweight and obesity has remained stable over the PAST 10 YEARS

Source: NSW PHS



A similar proportion of BOYS and GIRLS are overweight and obese

26.5% of boys

21.3% of girls

Source: NSW PHS 2018



Overweight and obesity rates are similar across AGE GROUPS

25.1% of children 5-11 years

22.5% of children 12-16 years

Source: NSW PHS 2018



Overweight and obesity rates are similar across NSW

Outer regional and remote (27.5%)

Inner regional (23.6%)

Major cities (21.6%)

Source: NSW PHS 2015-2018



Overweight and obesity rates increase with DISADVANTAGE

Most disadvantaged (28.9%)

Least disadvantaged (17.1%)

Source: NSW PHS 2015-2018

What are we trying to achieve?

Children who are above a healthy weight are more likely to carry excess weight into adulthood, placing them at increased risk of developing chronic diseases later in life. NSW Health is committed to implementing policy and programs to increase the proportion of children at a healthy weight.

This chapter presents information on the prevalence of childhood overweight and obesity in NSW, including prevalence trends, national and international comparisons and an analysis of variation between population groups. Data are reported from three main sources: NSW Population Health Survey (PHS), NSW Schools Physical Activity and Nutrition Survey (SPANNS) and the National Health Survey (NHS). See **Appendices 1 and 2** for more information on data sources.

What is the prevalence of childhood overweight and obesity?

More than 1 in 5 children in NSW are above a healthy weight

In NSW in 2018, more than 1 in 5 children (24%) aged 5–16 years were overweight or obese, of whom 75% were overweight and 25% were obese. This means about 270,000 NSW children are above a healthy weight.

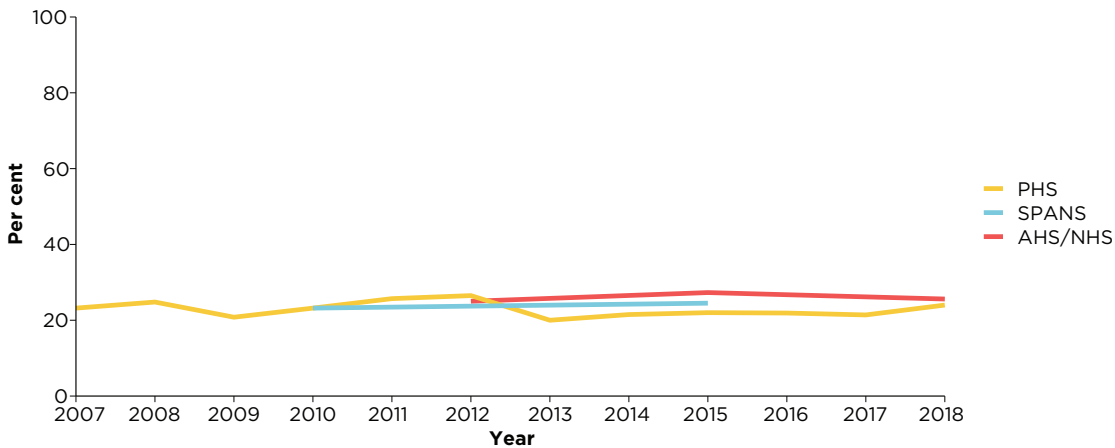
NSW rates are stable

Between 1985 and 2004, the rate of childhood overweight and obesity more than doubled from 11% to 25%.^{4,5} Since 2007, the rate of childhood overweight and obesity has been stable in NSW – a pattern that has been found in three independent surveys over the last decade (Figure 2). While rates of childhood overweight and obesity are stable, they remain high and overweight and obesity continues to be a serious public health issue.

Active Kids program data

It is estimated that 25% of children who registered for the NSW Active Kids program and provided height and weight information in 2018 were overweight or obese.⁹

Figure 2. Overweight and obesity prevalence, children 5–16 years and 5–17 years, NSW, trend^{††}



Source: NSW Population Health Survey, SPANS, Australian Health Survey (AHS)/National Health Survey (NHS)

^{††}PHS and SPANS = students 5–16 years; AHS/NHS = children 5–17 years

Variation in prevalence estimates between data sources

Prevalence estimates vary by data source due to differing survey data collection methods. Primarily, the NSW PHS calculated weight status using parent-reported measures of their child’s height and weight, whereas SPANS and the National Health Survey use objective measurements of height and weight.

Comparing the latest NSW estimates:

- NSW Population Health Survey: 24.0% in 2018 (children 5–16 years)¹⁰
- SPANS: 24.5% in 2015 (students Kindergarten to Year 10 / children 5–16 years)⁵
- National Health Survey: 25.6% in 2017–18 (children 5–17 years)⁶

These three data sources all indicate that prevalence has stabilised in recent years.

Margins of error in survey data sources

All data sources are subject to margins of error that show how much results could vary from the true population value. In this report the margins of error, representing 95% confidence intervals, are shown as error bars (‘wings’) on bar charts and shaded areas on line charts. None of the surveys used in this report have a large enough sample to detect small changes in rates of overweight and obesity over time. Nor can they provide precise information on sub-groups of children such as children of different ages, or who live in different areas of NSW. See **Appendices 1 and 2** for more information on data sources, including caveats and limitations.

Complementary data sources

There are a number of NSW datasets that include children’s height and weight data. Data sources that include a large number of children will be able to give very precise measures of overweight and obesity for different groups of children, but may not be representative of children generally.

Emerging data sources include:

- Active Kids program: Parent-reported height and weight data are collected for children who register for the Active Kids program, for which all school-aged children in NSW are eligible. This is a very large dataset, so there may be opportunity to provide data on priority populations.
- NSW Health Facilities: NSW Health is embedding growth assessment, advice and referral into routine paediatric care. Height and weight data collected for NSW children who are treated at NSW Health facilities may, in the future, provide trend data on specific sub-populations.
- NSW Public Oral Health Services: Children’s height and weight are collected at NSW Public Oral Health Services. This includes data in school settings as part of the Primary School Mobile Dental Program, which is delivered through a combination of fully equipped dental vans and portable dental equipment set up on school grounds. Over time, these data may reveal trends in overweight and obesity prevalence among children treated in these settings.

When combined with information from surveys on the use of health services and participation in programs, it may be possible to use data from multiple sources to provide a more detailed and precise picture of overweight and obesity in NSW children in the future.

Overweight and obesity rates are similar across Australia

National Health Survey 2017-18 estimates show little difference in the prevalence of overweight and obesity among children aged 5-17 years in NSW (25.6%) and Australia (24.9%)⁶ (Figure 3).

National rates are stable

At a National level, the prevalence of childhood overweight and obesity has stabilised over the past 10 years, after an earlier increase between 1995 and 2007-08 (from 20.9% in 1995 to 24.7% in 2007-08).^{6,11}

Figure 3 . Overweight and obesity prevalence, children 5-17 years, by location, Australia 2017-18



Source: National Health Survey

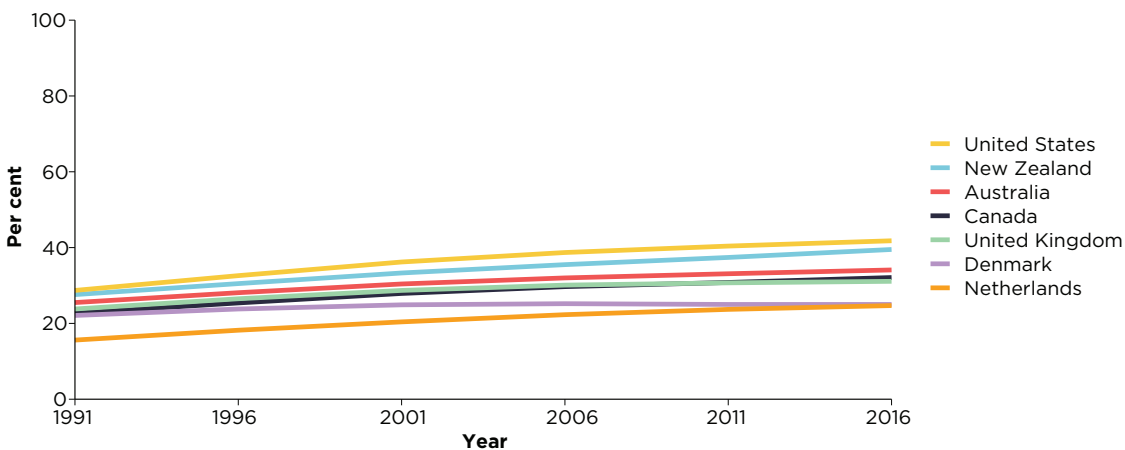
Australia has one of the highest rates of overweight and obesity in the world

There is significant global variation in the prevalence of childhood overweight and obesity with the highest rates observed in developed countries including the United States, New Zealand, Canada and Australia (Figures 4 and 5).¹² There are more children above a healthy weight in developing countries (due to the larger populations) and the prevalence is increasing at a much higher rate in these areas.¹³

Global rates have increased over the long term

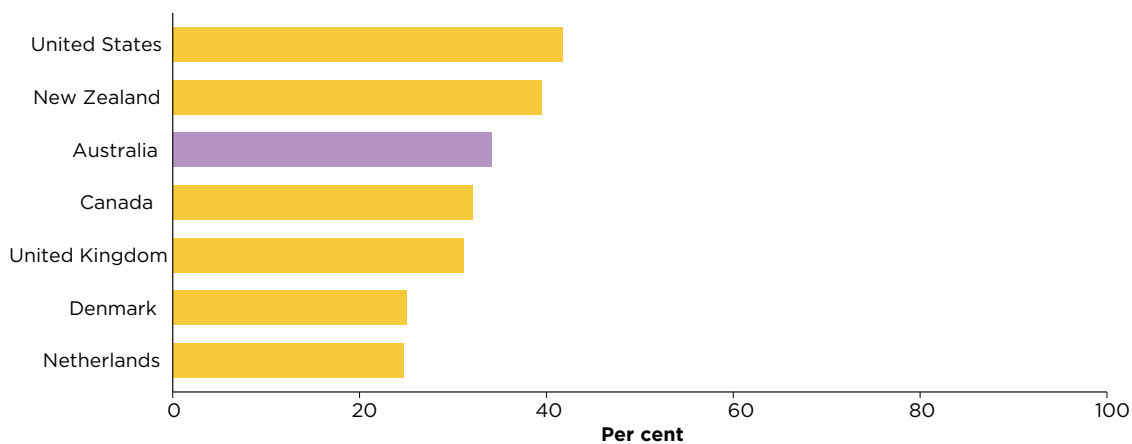
Worldwide, the prevalence of overweight and obesity among children aged 5-19 years increased from 4% in 1975 to just over 18% in 2016.¹⁴

Figure 4. Overweight and obesity prevalence, children 5-19 years, by country, trend



Source: World Health Organization

Figure 5. Overweight and obesity prevalence, children 5-19 years by country, 2016



Source: World Health Organization

Parents' perceptions of children's behaviours and weight

Parents play a key role in influencing their children's behaviour. It is essential that parents are able to accurately assess their own child's weight and recognise whether overweight and obesity is an issue in their own family, in order to influence their family's behaviours.

Most parents agree obesity is a problem in the community

Parents in NSW recognise that changes in the availability of convenience foods and environmental factors that contribute to physical inactivity are the major causes of overweight and obesity.¹⁵ Most parents (81.0%) agree that overweight and obesity is a problem among children.¹⁶

Most parents perceive their child to be about the right weight

While parents agree that obesity is a serious issue, they are generally unable to accurately identify their own child's weight status. Around 3 in 4 (73.2%) parents of children (Kindergarten to Year 4) in the overweight BMI category and around 1 in 3 (29.9%) parents of children in the obese BMI category perceived their child to be 'about the right weight'. Comparatively, 85.0% of parents of children in the healthy weight BMI category perceived their child to be 'about the right weight'.⁵

There is some indication that parents' perceptions are influenced by the changing social norm of what is considered to be a 'healthy weight'. Around a quarter of parents (26.8%) stated that most people now accept that being overweight and obese is normal and not something to worry about.¹⁶ Health professionals and communication campaigns play an important role in supporting parents to more accurately assess their child's weight status and make positive lifestyle changes.

Which groups are at greatest risk of unhealthy weight gain?

Overweight and obesity rates are similar between sexes

The estimates of childhood overweight and obesity are similar for boys and girls in both the NSW PHS (26.5% for boys and 21.3% for girls in 2018) and SPANS (24.5% for both boys and girls in 2015).

SPANS estimates that 1 in 7 students aged 5–16 years (13.9%) were 'at cardio-metabolic risk' ($WHR \geq 0.5$). See Introduction (*How is childhood overweight and obesity defined?*). Rates were higher among boys (15.6%) than girls (12.2%).

There is no difference in the prevalence of overweight and obesity between age groups

In 2018, 1 in 4 children aged 5–11 years (25.1%) and more than 1 in 5 children aged 12–16 (22.5%) were above a healthy weight.

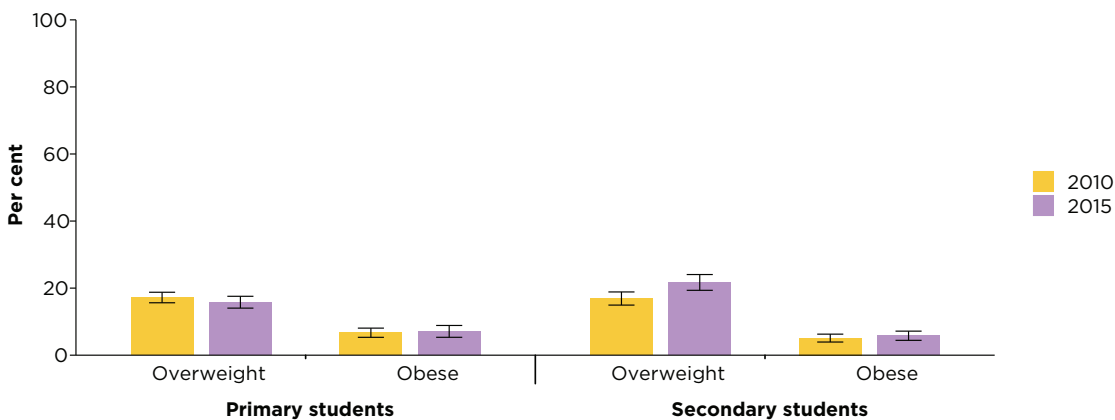
Weight gain often starts early and it is difficult to reverse. By four years of age around 25% of Australian children are already above a healthy weight.⁶ Establishment of healthy behaviours during the early years of life is crucial to prevent unhealthy weight gain.

The proportion of older children classified as overweight has increased

There is some variation in the patterns of weight gain by age groups over time. This is only observed when the overweight and obese weight categories are reported separately, rather than as a combined overweight and obese estimate.

Between 2010 and 2015, the proportion of secondary students classified as ‘overweight’ increased (from 16.9% to 21.7%), while the proportion of primary students classified as ‘overweight’ remained stable (17.2% and 15.8%). There was no change in the proportion of primary or secondary students in the obese category during this time (Figure 6).

Figure 6. Overweight and obesity prevalence, students 5–16 years by BMI weight category, NSW 2010 and 2015[†]



Source: SPANS

[†] Where figures using SPANS survey data show estimates with overlapping confidence intervals but the estimates are noted in the text as being somehow different, the statement was based on formal significance testing. See Appendix 1 for more detail.

Between 2010 and 2015 the proportion of secondary school students identified 'at cardio-metabolic risk' (WHR ≥ 0.5) increased (from 9.5% to 13.1%), while the rate among primary students remained stable (12.1% in 2010 and 14.3% in 2015).

Recent increases in the proportion of secondary students in the overweight category and 'at cardio-metabolic risk' are particularly concerning as these young people enter adulthood, a period where weight gain is commonly observed. When weight gain starts early, it is often difficult to reverse. Across four large studies of cardiovascular risk factors, 2 in 3 children (65%) classified as 'overweight or obese' and 4 in 5 children in the 'obese' category alone (82%) became obese as adults.¹⁷

The weight status of NSW adults

Parents who are above a healthy weight are more likely to have children above a healthy weight. By focussing efforts on integrating healthy eating and active living programs for all ages at the community level, there is likely to be a longer-term impact on the prevalence of overweight and obesity in both adult and child populations.

In 2018, more than 1 in 2 NSW adults (54.2%) were overweight or obese (61.3% of men and 47.2% of women). Between 2009 and 2018 the prevalence of overweight and obesity increased slightly (from 51.1% in 2009), driven by an increase in the prevalence of obesity (from 18.7% to 21.4%). The prevalence of overweight remained relatively stable (32.4% in 2009, 32.9% in 2018).¹⁸



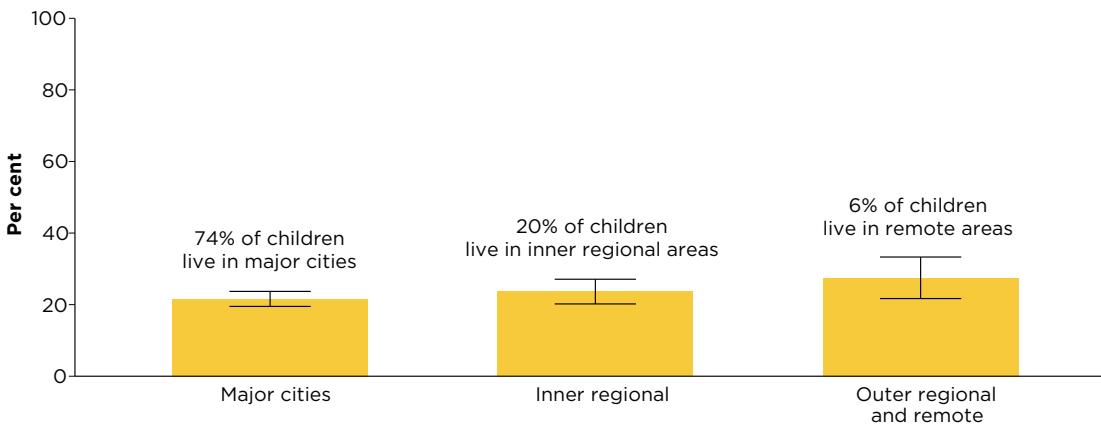
Most children above a healthy weight live in major cities

In 2015-2018, rates of childhood overweight and obesity were similar across major cities (21.6%), inner regional (23.6%) and outer regional and remote areas (27.5%) (Figure 7).

In 2015, SPANS also showed no significant difference in the prevalence of overweight and obesity between students from urban and rural areas (24.9% and 23.2% respectively).

Although prevalence rates are similar across all regions of NSW, the size of the population living in regional and remote areas is relatively small (compared to major cities). This means there is a much larger number of children above a healthy weight in major cities, due to the larger population.

Figure 7. Overweight and obesity prevalence, children 5-16 years, by remoteness, NSW 2015-2018

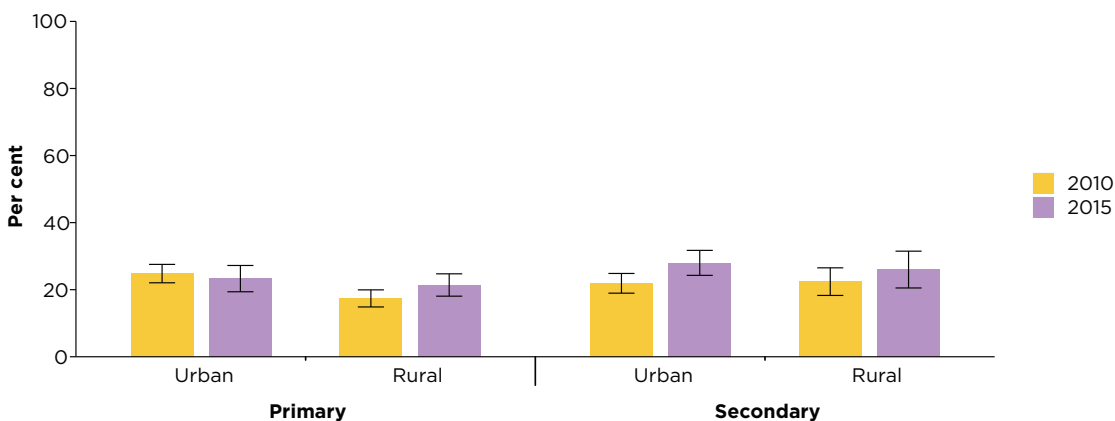


Source: NSW Population Health Survey

Rates have increased in younger rural students and older urban students

Between 2010 and 2015, the prevalence of overweight and obesity increased in primary students in rural areas (from 17.4% to 21.4%) and secondary students in urban areas (from 21.9% to 28.0%) (Figure 8). When primary and secondary students were combined, there was no change in prevalence observed in students in either urban or rural areas during this time.

Figure 8. Overweight and obesity prevalence, students 5-16 years by school group and remoteness, NSW 2010 and 2015[†]



Source: SPANS 2015

[†] Where figures using SPANS survey data show estimates with overlapping confidence intervals but the estimates are noted in the text as being somehow different, the statement was based on formal significance testing. See Appendix 1 for more detail.

Definitions of remoteness used by different data sources

While NSW Population Health Survey data are grouped into three location categories (Major cities, Inner regional, and Outer regional and remote), SPANS uses two location categories (Urban and Rural). The different location categories used by these data sources limits our ability to directly compare the results and may account for the variation in estimates between sources.

Rates of overweight and obesity increase with socioeconomic disadvantage

In 2015-2018, NSW PHS estimates showed a significant difference in the prevalence of overweight and obesity between the least disadvantaged (17.1%) and most disadvantaged quintiles (28.9%) (Figure 9). The relationship between SES and obesity is complex. SES affects a range of factors including access to food and patterns of physical activity, which may increase an individual's risk of unhealthy weight gain.

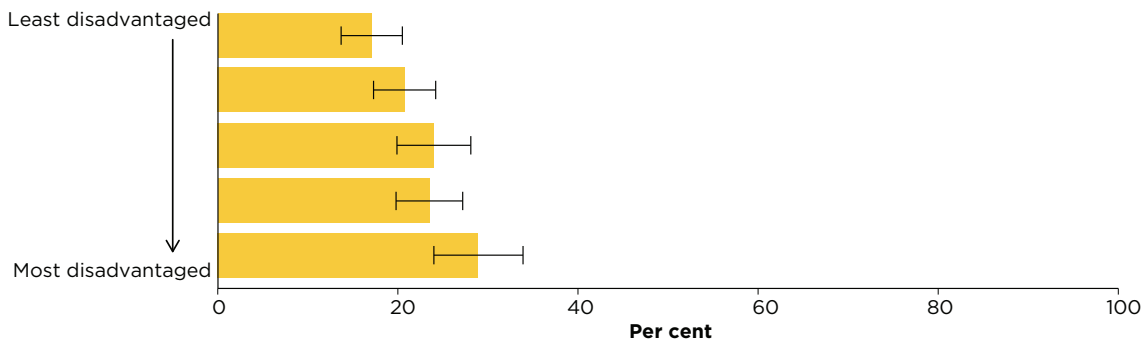
In 2015, SPANS found that students from low (33.7%) and middle (23.4%) SES backgrounds were more likely to be above a healthy weight than children from high SES backgrounds (19.3%) (Figure 10). WHR measures also show higher levels of cardio-metabolic risk among students from low (19.9%) and middle (13.4%) SES backgrounds than students from high SES backgrounds (10.2%).

Rates have increased for students of low SES

Between 2010 and 2015, SPANS showed an increase in the proportion of students from low SES backgrounds who were above a healthy weight (from 27.3% to 33.7%). There was no significant change for students from middle or high SES backgrounds (Figure 10).

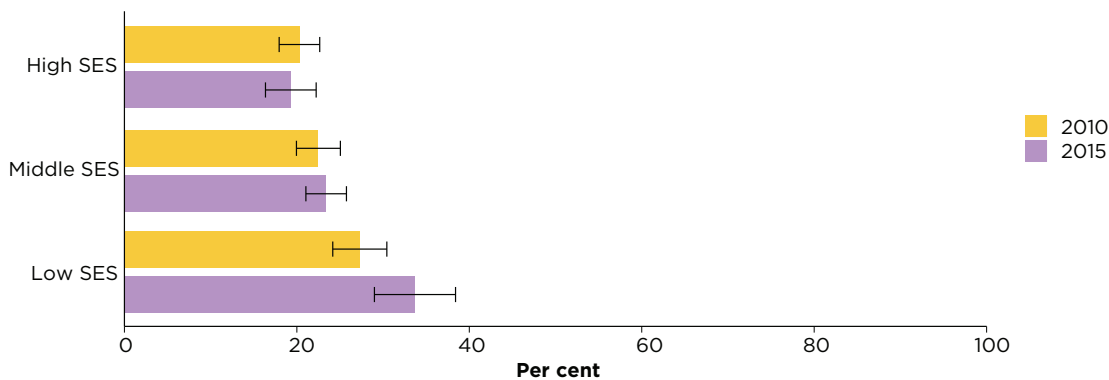
A similar pattern was observed for WHR measures. The proportion of students from low SES backgrounds 'at cardio-metabolic risk' (WHR \geq 0.5) increased from 14.1% to 19.9%. Again, there was no increase for students from middle or high SES backgrounds.

Figure 9. Overweight and obesity prevalence, children 5-16 years, by SES, NSW 2015-2018



Source: NSW Population Health Survey

Figure 10. Overweight and obesity prevalence, students 5-16 years, by SES, NSW 2010 and 2015[†]



Source: SPANS

[†] Where figures using SPANS survey data show estimates with overlapping confidence intervals but the estimates are noted in the text as being somehow different, the statement was based on formal significance testing. See Appendix 1 for more detail.

Some cultural groups are at increased risk of unhealthy weight gain

In 2015, the prevalence of childhood overweight and obesity was higher among students from Middle Eastern backgrounds (42.3%), compared to students from English-speaking backgrounds (23.3%) (Figure 11).

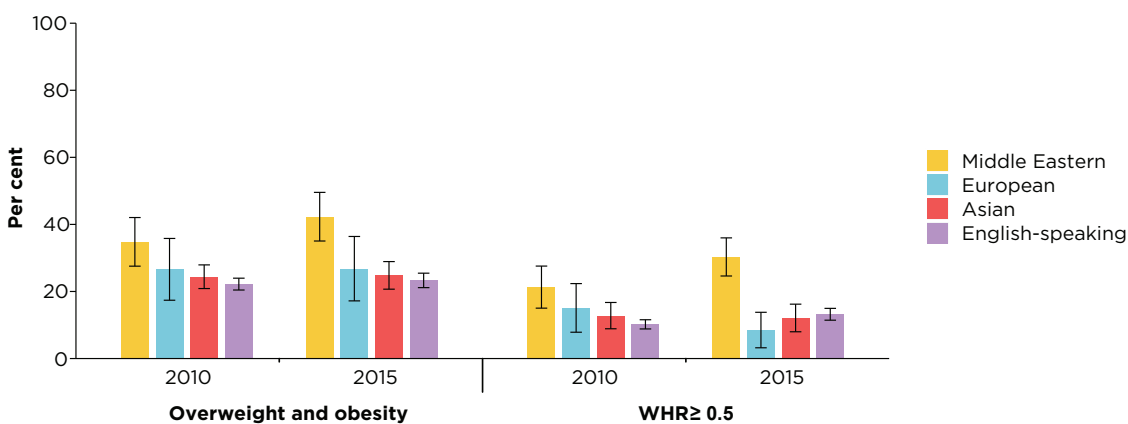
A similar pattern was observed for WHR measures. In 2015, students from Middle Eastern backgrounds (30.3%) were more than twice as likely to be 'at cardio-metabolic risk' (WHR ≥ 0.5) than students from English-speaking backgrounds (13.2%) (Figure 11).

Risk has increased for some cultural groups

Between 2010 and 2015, there was an increase in the proportion of students 'at cardio-metabolic risk' from Middle Eastern (from 21.3% to 30.3%) and English speaking backgrounds (10.2% to 13.2%). (Figure 11).

During this same period, there was an increase in the prevalence of overweight and obesity among secondary students from Middle Eastern (23.8% to 41.1%) and Asian cultural backgrounds (18.2% to 29.3%). No increase was observed among secondary students from European or English-speaking cultural backgrounds, or among primary students from any cultural background.

Figure 11. Overweight and obesity and WHR ≥ 0.5 prevalence, students 5–16 years by cultural background, NSW 2010 and 2015[†]



Source: SPANS

[†] Where figures using SPANS survey data show estimates with overlapping confidence intervals but the estimates are noted in the text as being somehow different, the statement was based on formal significance testing. See Appendix 1 for more detail.

Nationally, Aboriginal and Torres Strait Islander children are more likely to be overweight or obese than non-Indigenous children

Australian Aboriginal and Torres Strait Islander Health Survey 2012-13 estimates show that nationally, around one in three (29.7%) Aboriginal and Torres Strait Islander children aged 2-14 years were

either overweight (19.6%) or obese (10.2%).¹⁹ The proportion of Aboriginal and Torres Strait Islander children who were overweight or obese was higher than the rate for non-Indigenous children (25.0%). This was mainly due to higher obesity rates among Aboriginal and Torres Strait Islander children (10.2%) compared to non-Indigenous children (6.5%).

NUTRITION

Healthy foods and drinks NSW children



1 in 15 children eat the recommended serves of VEGETABLES daily

6.7% of children (2-15 years)
Source: NSW PHS 2017-2018



Change over time:

Vegetable intake has remained **stable** over the past 10 years



2 in 3 children eat the recommended serves of FRUIT daily

64.0% of children (2-15 years)
Source: NSW PHS 2017-2018



Change over time:

Fruit intake has **decreased** over the past 10 years



Around 1 in 2 children drink 4 or more cups of WATER daily

54.0% of children (2-15 years)
Source: NSW PHS 2017-2018



Change over time:

Water intake has remained **stable** over the past 10 years



Around 3 in 4 babies are fully BREASTFED at discharge from hospital

72.6% of NSW babies
Source: HealthStats NSW 2018



Change over time:

Full breastfeeding at hospital discharge has **decreased** over the past 10 years



3 in 4 children eat BREAKFAST daily

76% of children (5-16 years)
Source: SPANS 2015



Change over time:

The proportion of secondary school students eating breakfast daily **decreased** over the past 5 years

Unhealthy foods and drinks NSW children



Around 2 in 5 children drink SUGAR-SWEETENED DRINKS regularly

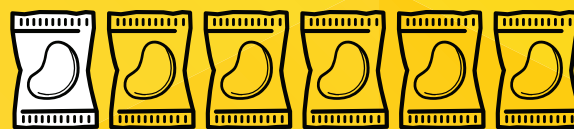
41.9% of children (2-15 years)

Source: NSW PHS 2017-2018



Change over time:

Sugar-sweetened drink intake has **decreased** over the past 10 years



1 in 6 children usually eat a SALTY SNACK daily

17.0% of children (2-15 years)

Source: NSW PHS 2017-2018



Change over time:

Salty snack intake has **increased** over the past 7 years



2 in 5 children eat TAKEAWAY (fast food) at least once a week

40.1% of children (2-15 years)

Source: NSW PHS 2017-2018



Change over time:

Takeaway intake has **increased** over the past 7 years

How are we influencing change at a population level?

State-wide interventions aim to increase **KNOWLEDGE, AVAILABILITY** and **PROVISION** of healthy foods and decrease **AVAILABILITY** and **PROVISION** of unhealthy foods

Munch & Move in early childhood services (children 0-5 years)

	Level of adoption of Munch & Move program as at June 2019		
	All services	Major cities / Inner regional	Outer regional / Remote / Very remote
As at 30 June 2019: 3,464 out of 3,954 early childhood services across NSW have participated in Munch & Move training.			
Services meeting the targets for adoption of the strengthened Munch & Move practices (achieving 65% of practices)	68% of services	67% of services	78% of services
	Level of achievement of healthy practices as at June 2019		
	All services	Major cities / Inner regional	Outer regional / Remote / Very remote
Practice 1: Service encourages and supports breastfeeding (0-12 months)	47% of services	46% of services	66% of services
Practice 2: Service communicates with families when children's lunchboxes are not consistent with the Australian Dietary Guidelines	86% of services	87% of services	82% of services
Practice 3: Service menu has been assessed against the Caring for Children guidelines	21% of services	21% of services	24% of services
Practice 4: Service provides intentional learning experiences about healthy eating at least 2 times per week	87% of services	87% of services	87% of services
Practice 5: Staff create a positive healthy eating environment for children	93% of services	93% of services	92% of services
Practice 10: Service has a written nutrition policy	60% of services	60% of services	61% of services
Practice 15: Service cook has completed training in providing nutritious meals and snacks for children	64% of services	64% of services	67% of services

Live Life Well @ School in primary schools (children 5–12 years)

	Level of adoption of Live Life Well @ School program as at June 2019		
	All schools	Major cities / Inner regional	Outer regional / Remote / Very remote
As at 30 June 2019: LLW@S is implemented in 2,142 out of 2,595 primary schools in NSW.			
Schools meeting the targets for adoption of the strengthened LLW@S practices (achieving 65% of practices)	66% of schools	67% of schools	66% of schools
	Level of achievement of healthy practices as at June 2019		
	All schools	Major cities / Inner regional	Outer regional / Remote / Very remote
Practice 1: School provides curriculum learning experiences or lessons regarding healthy eating and physical activity	78% of schools	77% of schools	82% of schools
Practice 3: School provides the opportunity for classes to eat vegetables and/or fruit and drink water	82% of schools	81% of schools	84% of schools
Practice 5: School canteen provides food and drinks consistent with the NSW Healthy School Canteen Strategy	23% of schools	24% of schools	22% of schools
Practice 6: School provides a supportive environment for healthy eating	77% of schools	77% of schools	79% of schools
Practice 7: School has provided information on healthy eating and physical activity to families within the past 12 months	58% of schools	59% of schools	55% of schools



What are we trying to achieve?

Healthy eating is a key factor in achieving and maintaining a healthy weight. NSW has a suite of initiatives aiming to model and support healthy diets and lifestyles for children and their families. Achieving the following outcomes in the NSW population will contribute towards increasing the proportion of children at a healthy weight:

- Increase intake of healthy (Everyday) foods from the Five Food Groups including fruit and vegetables
- Decrease intake of unhealthy (Occasional) energy-dense nutrient poor foods and drinks
- Increase intake of water in preference to sugar-sweetened drinks.

The *Australian Dietary Guidelines* and the *Australian Guide to Healthy Eating*²⁰ provide evidence-based advice about the types and amounts of foods that are needed for health and wellbeing. Many children's diets fall short of the recommendations as children typically eat too many unhealthy foods and too few healthy foods. The Australian Health Survey 2011-12 found that children get around 40% of their total daily energy (kilojoules) from unhealthy foods and drinks.²¹ This means they are not consuming adequate healthy (Everyday) food from the Five Food Groups.

These foods have protective factors and are associated with a reduced risk of weight gain:²⁰

- Vegetables and legumes/beans
- Fruit
- Grain (cereal) foods (mostly wholegrain and/or high cereal fibre varieties)
- Lean meat, poultry, fish, eggs, tofu, nuts and seeds and legumes/beans
- Milk, yoghurt, cheese and/or their alternatives (mostly reduced fat)

A range of individual, social and economic factors have led to an environment that promotes excessive energy (kilojoule) intake while decreasing opportunities for incidental and structured physical activity. Overweight and obesity is the result of people consuming more energy (kilojoules) from food on a daily basis than they are able to use up through movement and exercise. An additional 200-300kJ per day over several years is all a child needs to become overweight.²² This is equivalent to ½ a can of sugar-sweetened drink or one sweet biscuit.

Unhealthy eating, physical inactivity and unhealthy weight have complex causes and differential impacts among populations. This chapter presents information on children's dietary behaviours. Where data were available, differences between population groups are also reported. See **Appendices 1 and 2** for more information on data sources.

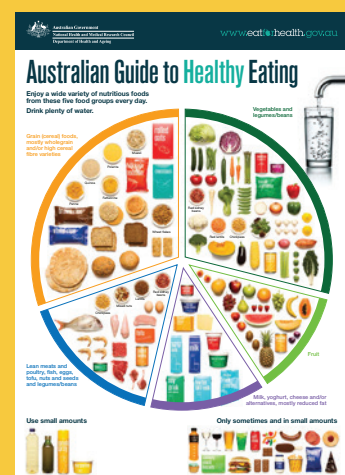
The Australian Dietary Guidelines²⁰

The *Guidelines* provide the following advice:

1. To achieve and maintain a healthy weight, be physically active and choose amounts of nutritious food and drinks to meet your energy needs.
2. Enjoy a wide variety of nutritious foods from the Five Food Groups every day and drink plenty of water.
3. Limit intake of foods containing saturated fat, added salt, added sugars and alcohol.
4. Encourage, support and promote breastfeeding.
5. Care for your food; prepare and store it safely.

The *Australian Guide to Healthy Eating* (pictured right) illustrates the *Australian Dietary Guidelines* and shows the Five Food Groups (inside the circle) and the proportions (based on the average recommended serves for adults (men and women)) needed for a balanced diet. The key to eating well is to enjoy a variety of foods from each of the Five Food Groups and only consume the unhealthy choices (those on the bottom-right) sometimes and in small amounts.

For more information visit the Eat For Health website: <https://www.eatforhealth.gov.au/>



Are children eating adequate healthy foods and drinks daily?

The *Australian Dietary Guidelines* recommend enjoying a wide variety of nutritious foods from the Five Food Groups each day. Population health surveys typically collect information on fruit and vegetable intake to represent healthy food intake.

Most children are not eating enough vegetables

In 2017-2018, 1 in 15 children aged 2-15 years ate the recommended number of serves of vegetables (2.5-5.5, dependent on age) daily (6.7%). Nearly 3 in 4 children (73.2%) eat two or less serves of vegetables per day (Figure 12).

Vegetable intake is relatively stable

NSW PHS estimates show that the proportion of children eating the recommended serves of vegetables has not changed over the past 10 years (Figure 13) (7.8% in 2009-2010, 6.7% in 2017-2018).

SPANS data show that the proportion of students eating the recommended serves of vegetables increased slightly from 5% in 2010 to 7% in 2015. There are still too few children eating an adequate number of serves of vegetables per day.

Figure 12. Serves of vegetables eaten daily, children 2-15 years, NSW 2017-2018

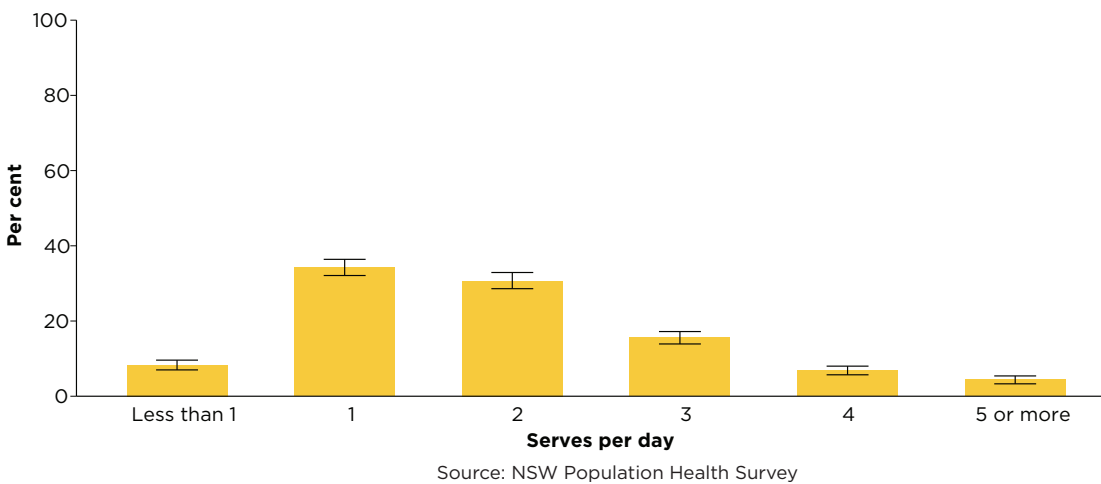
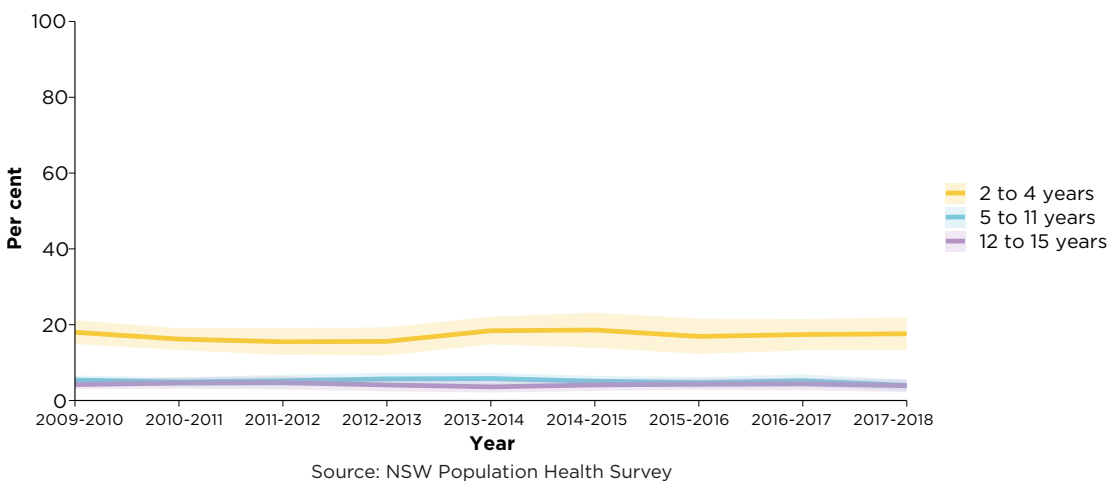


Figure 13. Recommended serves of vegetables (2.5-5.5) eaten daily, children 2-15 years by age group, NSW trend



Younger children are more likely to meet recommendations for vegetable intake

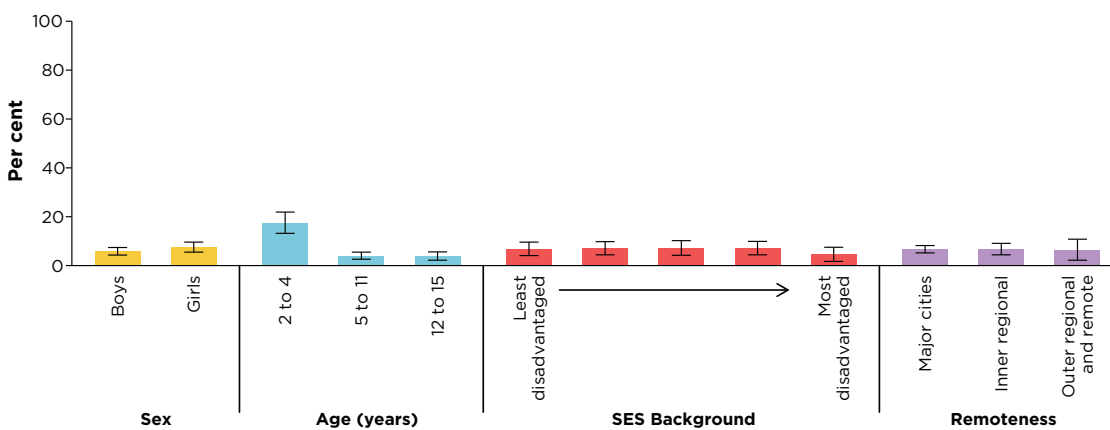
NSW PHS 2017-2018 estimates of children who ate the recommended serves of vegetables daily:

- Sex: Boys (5.9%); Girls (7.5%).
- Age: 2-4 years (17.6%) > 5-11 years (4.0%) and 12-15 years (3.9%).
- SES background: Least disadvantaged (6.8%); Most disadvantaged (4.6%).
- Remoteness: Major cities (6.7%); Inner regional (6.7%); Outer regional and remote (6.5%) (Figure 14).

SPANS 2015 estimates of children who ate the recommended serves of vegetables daily:

- SES background: Low (9%) > High (6%)
- Remoteness: Rural (9%) > Urban (6%).

Figure 14. Recommended serves of vegetables (2.5-5.5) eaten daily, children 2-15 years, NSW 2017-2018



Source: NSW Population Health Survey

Many children do not eat enough fruit

In 2017-2018, about 2 in 3 children aged 2-15 years (64.0%) ate the recommended number of serves (1-2 serves, dependent on age) of fruit daily. Around 1 in 14 children (7.2%) ate less than 1 serve of fruit per day (Figure 15).

Fruit intake has decreased

NSW PHS estimates show that the proportion of children eating the recommended serves of fruit per day has decreased over the past 10 years (Figure 16) (69.0% in 2009-2010, 64.0% in 2017-2018). SPANS data show an increase in the proportion of students eating the recommended amount of fruit daily, from 73% in 2010 to 79% in 2015.

Figure 15. Serves of fruit eaten daily, children 2-15 years, NSW 2017-2018

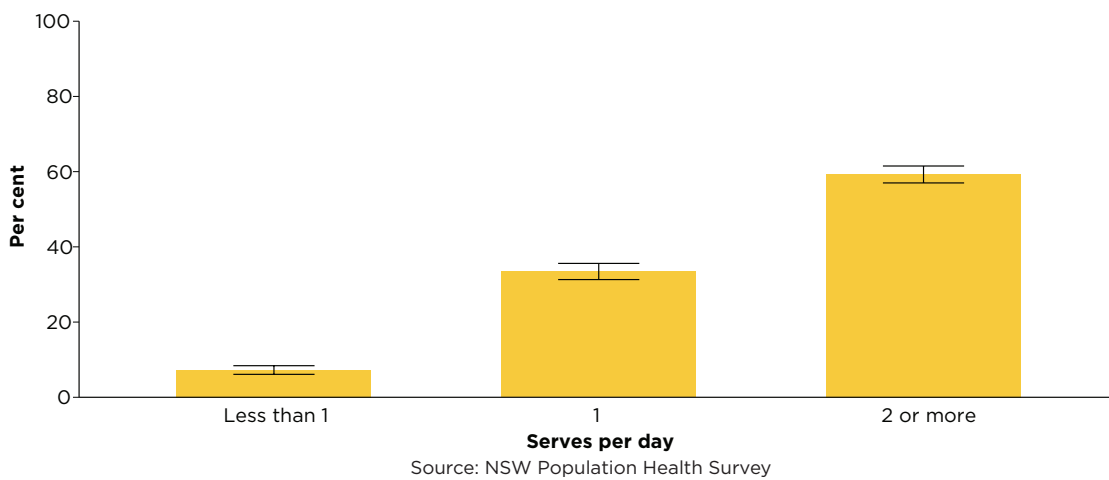
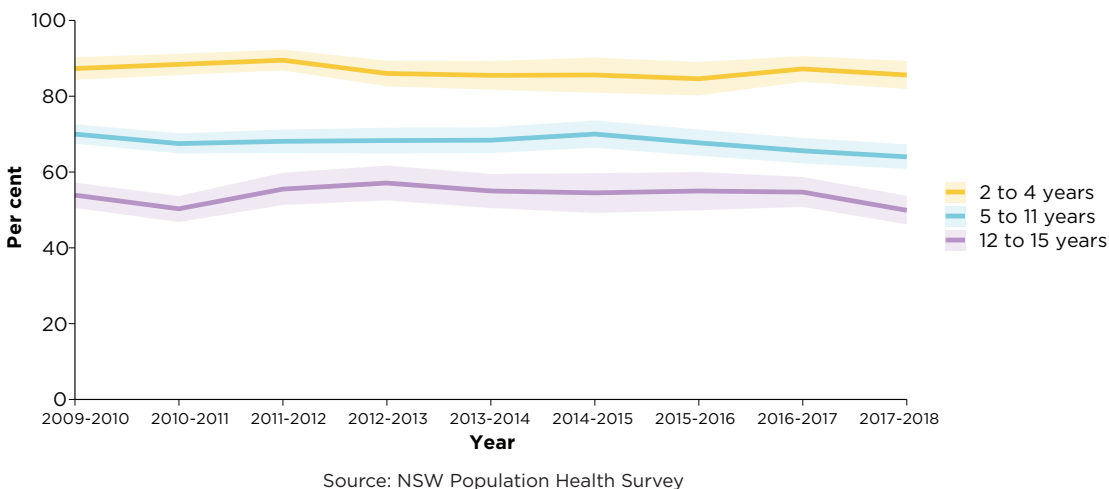


Figure 16. Recommended serves of fruit (1-2) eaten daily, children 2-15 years, NSW trend



Older children and those from low SES backgrounds are less likely to meet recommendations for fruit intake

NSW PHS 2017-2018 estimates of children who ate the recommended serves of fruit daily:

- Sex: Boys (61.9%); Girls (66.1%)
- Age: 2-4 years (85.6%) > 5-11 years (64.0%) > 12-15 years (49.9%)
- SES background: Least disadvantaged (67.6%) > Most disadvantaged (56.3%)
- Remoteness: Major cities (63.0%); Inner regional (67.4%); Outer regional and remote (66.0%) (Figure 17).

SPANS 2015 estimates of children who ate recommended serves of fruit daily:

- Remoteness: Rural (83%) > Urban (77%).
- Cultural background: English-speaking backgrounds (80%) > Asian cultural backgrounds (68%).

Recommended fruit and vegetable intake for children

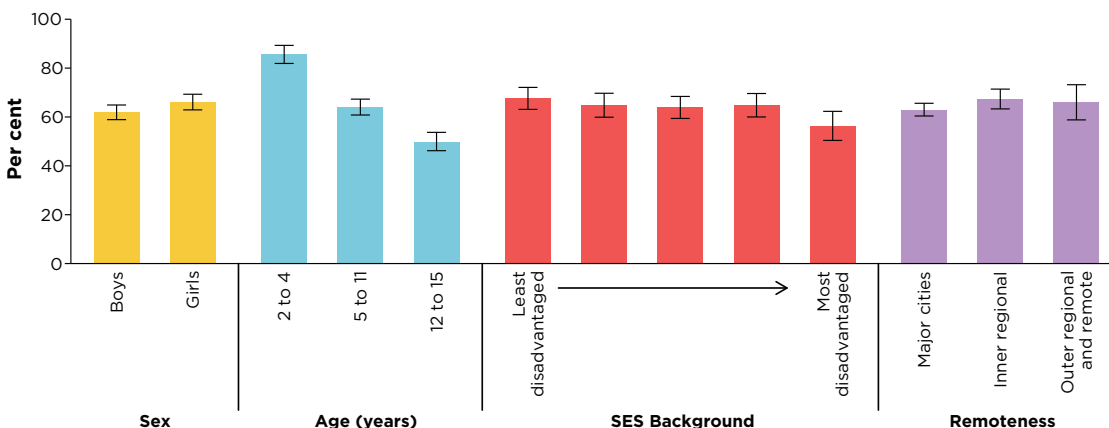
The *Australian Dietary Guidelines* recommend:

Age Group	Fruit	Vegetables
2-3	1 serve	2.5 serves
4-8	1.5 serves	4.5 serves
9-15	2 serves	5-5.5 serves

A serve of vegetables is about 75g or ½ cup of cooked vegetables, 1 cup of salad or 1 tomato. A serve of fruit is about 150g or 1 medium apple, banana, orange or pear, 2 small apricots or plums or a cup of canned fruit (no added sugar).²⁰

Research suggests parents generally have a limited understanding of the dietary guidelines and how they apply to children. Parents perceive the recommended intakes to be high and are therefore a significant challenge for them to achieve.¹⁵ Government programs and campaigns aim to provide parents with information and support on how to apply these recommendations within their families.

Figure 17. Recommended serves of fruit (1-2) eaten daily, children 2-15 years, NSW 2017-2018



Source: NSW Population Health Survey



Recommended water intake for children

The *Australian Dietary Guidelines* recommend drinking plenty of water and choosing plain water in preference to other drinks. The Nutrient Reference Values for Australia and New Zealand recommend a daily fluid intake between 1.0 litres and 1.9 litres (4+ cups) for children (depending on age and sex), with the majority of this consisting of plain water.²⁰

Many children do not drink enough water

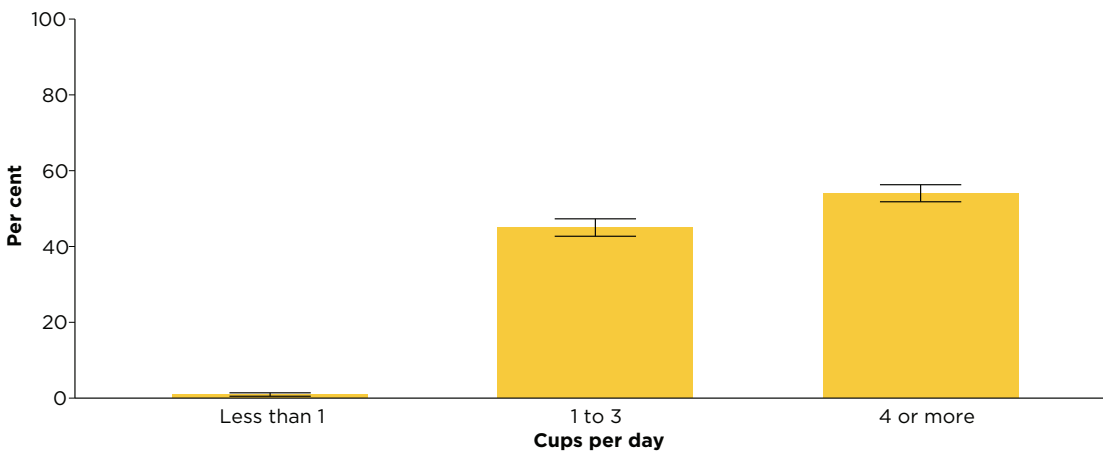
In 2017-2018, about 1 in 2 children (54.0%) drank 4 or more cups each day, suggesting that too many children are choosing other less-healthy options (Figure 18). Over the past 10 years the proportion of children drinking 4 or more cups of water each day has remained stable (55.1% in 2009-2010, 54.0% in 2017-2018).

Younger children and those from major cities drink less water

NSW PHS 2017-2018 estimates of children who drank 4 or more cups of water each day:

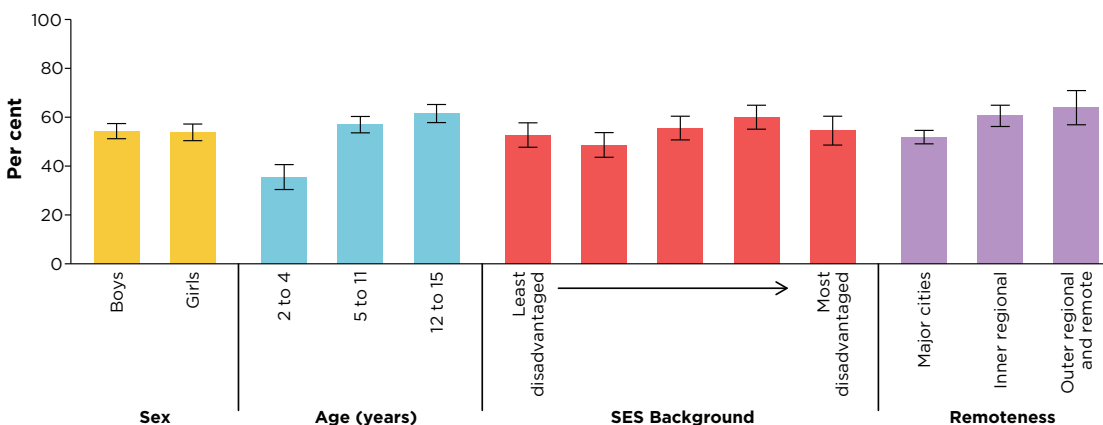
- Sex: Boys (54.3%); Girls (53.8%).
- Age: 2-4 years (35.5%) < 5-11 years (56.9%) and 12-15 years (61.5%).
- SES background: Least disadvantaged (52.7%); Most disadvantaged (54.5%).
- Remoteness: Major cities (51.9%) < Inner regional (60.6%) and Outer regional and remote (63.9%) (Figure 19).

Figure 18. Daily water intake, children 2-15 years, NSW 2017-2018



Source: NSW Population Health Survey

Figure 19. Recommended water intake (4 or more cups) consumed daily, children 2-15 years, NSW 2017-2018



Source: NSW Population Health Survey

Most babies are breastfed until discharge from hospital

In 2018, 3 in 4 babies (72.6%) were fully breastfed at the time of discharge from hospital after birth, and a smaller proportion (16.1%) were partially breastfed.²³

Rates of breastfeeding have decreased

The proportion of babies who were fully breastfed at the time of discharge from hospital decreased from 80.5% in 2009 to 72.6% in 2018.

Breastfeeding rates are higher for babies of high SES and born to non-Aboriginal mothers

In 2018, a larger proportion of babies were fully breastfed in the highest SES group (86.5%), compared to the lowest SES group (71.0%). Babies of non-Aboriginal mothers were also more likely to be fully breastfed (73.1%) compared to babies of Aboriginal mothers (61.2%).



Recommendations for breastfeeding

The *Australian Dietary Guidelines* encourage, support and promote breastfeeding. Guideline 4 recommends that infants are exclusively breastfed until around 6 months of age when solid foods are introduced. Breastfeeding should continue until the baby is 12 months old, or for as long as both the mother and infant want to keep going.

There is a convincing association between breastfeeding and a reduced risk of unhealthy weight gain in childhood, adolescence and early adulthood (compared with infant formula feeding).²⁰

Are children consuming unhealthy foods and drinks more than just occasionally?

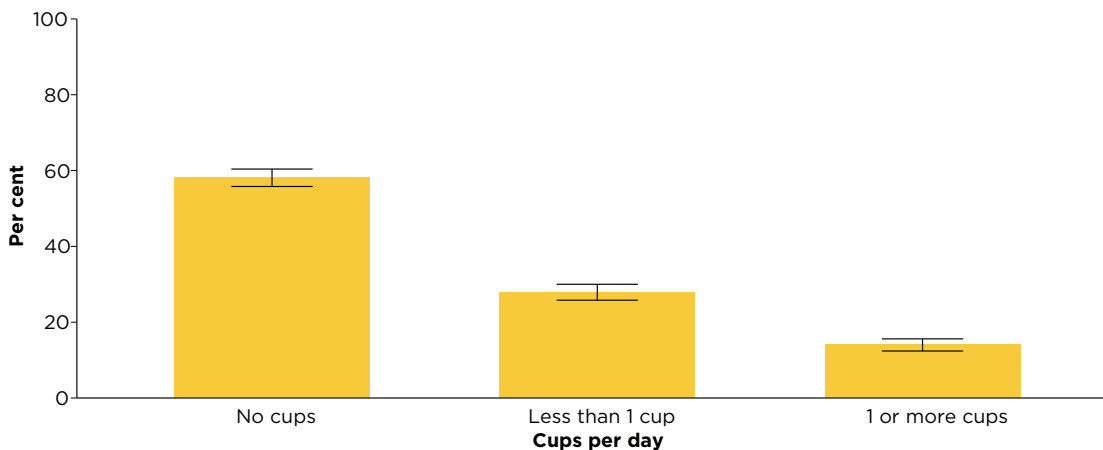
Some foods and drinks are not necessary for a healthy diet; they are usually high in saturated fat, added sugars and/or added salt, and often low in essential nutrients. As well as leaving less room for more nutritious foods, the extra kilojoules, saturated fat, sugar and salt they contain, as well as the lack of fibre, is associated with increased risk of obesity and chronic disease.²⁰ These unhealthy foods can be enjoyed occasionally and in small amounts but aren't necessary for a healthy diet. An additional 200-300kJ per day over several years is all a child needs to become overweight.²² This is equivalent to ½ a can of sugar-sweetened drink or one sweet biscuit.

Population health surveys collect information on children's intake for a range of unhealthy food and drink groups.

Around 2 in 5 children have sugar-sweetened drinks regularly

In 2017-2018, around 2 in 5 NSW children (41.9%) regularly drank sugar-sweetened drinks such as soft drinks, cordials and sports drinks (Figure 20).[†]

Figure 20. Daily sugar-sweetened drink intake, children 2-15 years, NSW 2017-2018[†]



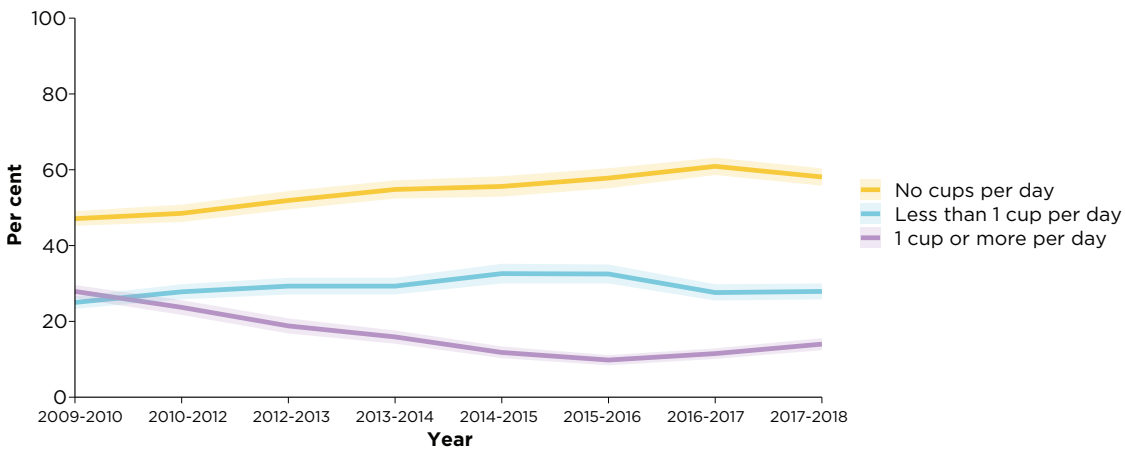
Source: NSW Population Health Survey.

[†]In this report, regular consumption of sugar-sweetened drinks is defined as any daily intake.

Regular consumption of sugar-sweetened drinks has decreased

NSW PHS estimates indicate that the proportion of children who regularly drank sugar-sweetened drinks decreased from 52.9% in 2009-2010 to 41.9% in 2017-2018 (Figure 21).[†] While children's consumption of sugary drinks has decreased over time, levels are still too high.

Figure 21. Daily sugar-sweetened drink intake, children 2-15 years, NSW trend[†]



Source: NSW Population Health Survey.

[†]In this report, regular consumption of sugar-sweetened drinks is defined as any daily intake.

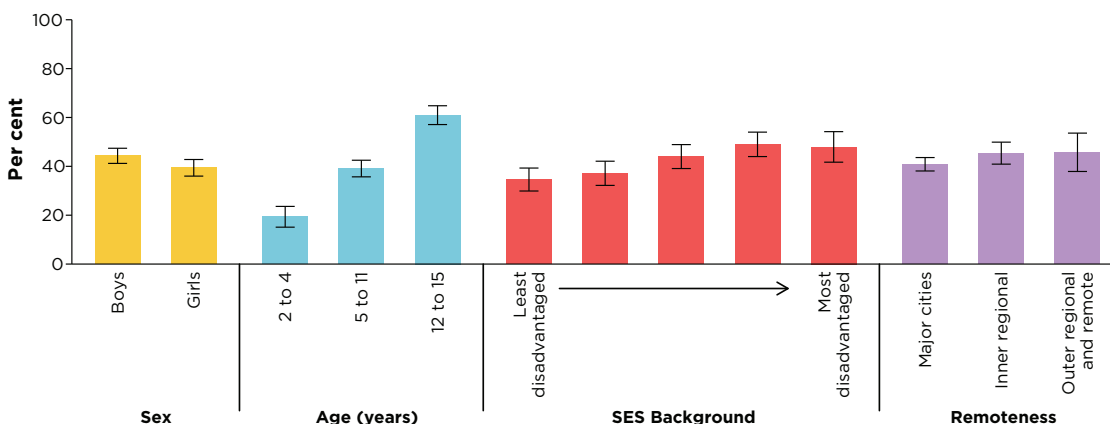
Consumption of sugar-sweetened drinks increases with age and level of disadvantage

NSW PHS 2017-2018 estimates of children who regularly consumed sugar-sweetened drinks:

- Sex: Boys (44.3%); Girls (39.4%).
- Age: 2-4 years (19.3%) < 5-11 years (39.1%) < 12-15 years (61.0%).
- SES background: Least disadvantaged (34.6%) < Most disadvantaged (47.9%).
- Remoteness: Major cities (40.8%); Inner regional (45.4%); Outer regional and remote (45.8%) (Figure 22).[†]

SPANS data show some variation in sugar-sweetened drink consumption by SES and cultural background. Students from low (11%) and middle (7%) SES backgrounds were more likely than students from high SES backgrounds (4%) to drink 1 or more cups of soft drink daily. Students from Middle Eastern cultural backgrounds (12%) were more likely to drink 1 or more cups of soft drink daily, compared to students from English-speaking backgrounds (9%).

Figure 22. Regularly drank sugar-sweetened drinks, children 2-15 years, NSW 2017-2018[†]



Source: NSW Population Health Survey.

[†]In this report, regular consumption of sugar-sweetened drinks is defined as any daily intake.

Variation in estimates of sugar-sweetened drink consumption between data sources

Prevalence estimates vary by data source due to differing survey data collection methods, including the use of different categories of drinks and children's age groups. The NSW PHS reports on a sugar-sweetened drink category which includes soft drinks, cordials, sports drinks, energy drinks and iced teas. Whereas SPANS reports on soft drinks and cordials, sports drinks and energy drinks as separate categories.

Comparing the latest estimates:

- NSW Population Health Survey (1 or more cups of sugar-sweetened drink daily): 14.0% in 2017-2018 (children 2-15 years)¹⁰
- SPANS (1 or more cups of soft drink daily): 9% in 2015 (students Kindergarten to Year 10 / children 5-16 years)⁵

Sugar-sweetened drink consumption

Sugar-sweetened drinks such as soft drinks, cordials, sports drinks and energy drinks are considered in the *Australian Dietary Guidelines* as an unhealthy food, recommended for no more than occasional consumption and in small amounts.²⁰

The best evidence for a link between sugar intake and obesity is for the consumption of sugar-sweetened drinks with no nutritional value, such as soft drinks and cordials. The consumption of sugar-sweetened drinks (particularly soft drinks) has been associated with lower intakes of various nutrients as well as an increased risk of weight gain and obesity, diabetes and tooth decay.²⁴ A recent survey of parents showed that most have a good understanding of the health impacts of sugar-sweetened drinks and agree that drinking sugar-sweetened drinks too often is a cause of overweight and obesity.¹⁶

When parents were asked about the likelihood of reducing their child's soft drink intake, around 1 in 3 surveyed parents reported an intention to reduce their child's soft drink intake. Intention rates were higher among parents whose children drank soft drink daily (compared to those who didn't).¹⁶ Although many parents express a desire to change their child's behaviour, it remains a challenge to make and maintain these changes.

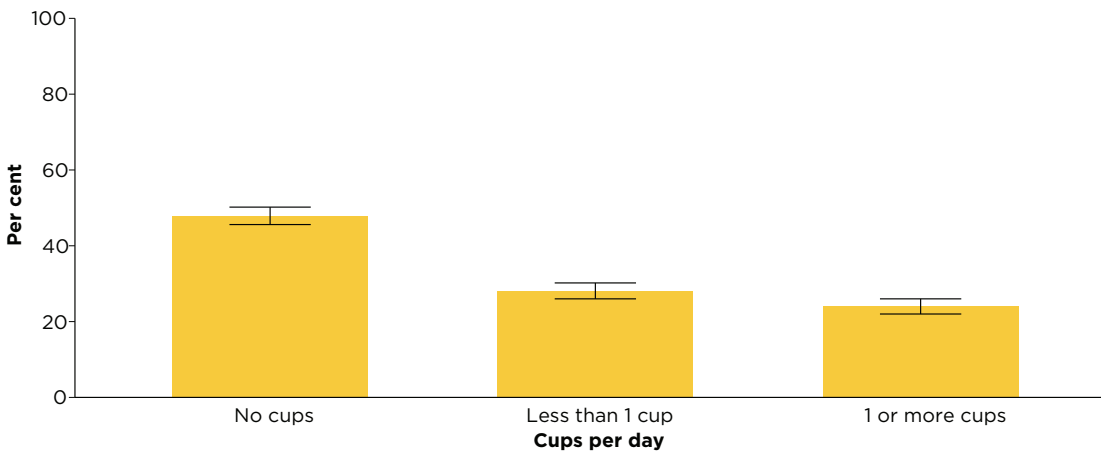
About half of children drink fruit juice regularly

In 2017-2018, over 1 in 2 children (52.1%) regularly drank fruit juice and 24.0% drank 1 or more cups per day (Figure 23).[†]

Fruit juice intake has decreased

NSW PHS estimates indicate that the proportion of children who drink fruit juice regularly has decreased from 73.0% in 2009-2010 to 52.1% in 2017-2018 (Figure 24). While children's consumption of fruit juice has decreased, levels are still too high (Figure 25).

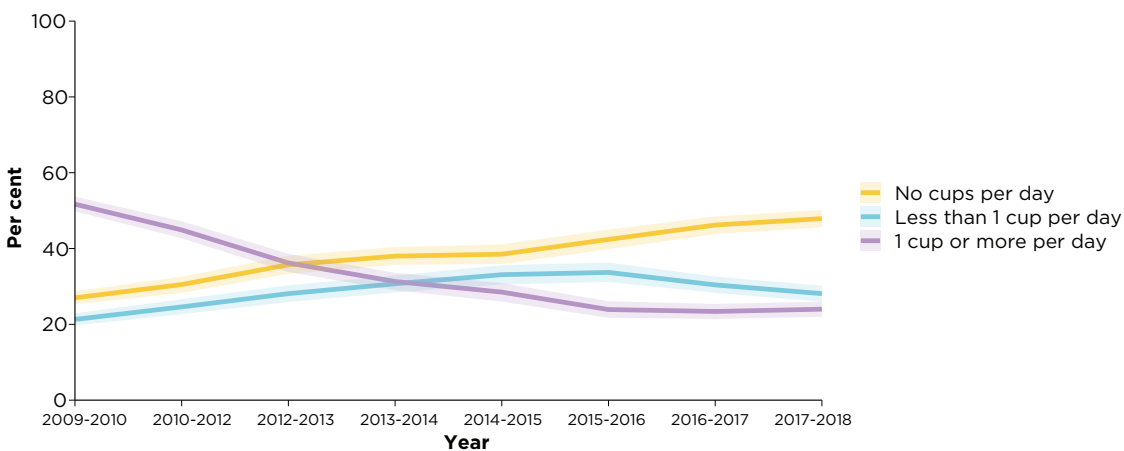
Figure 23. Daily fruit juice intake, children 2-15 years, NSW 2017-2018[†]



Source: NSW Population Health Survey.

[†]In this report, regular consumption of fruit juice is defined as any daily intake.

Figure 24. Daily fruit juice intake, children 2-15 years, NSW trend[†]



Source: NSW Population Health Survey.

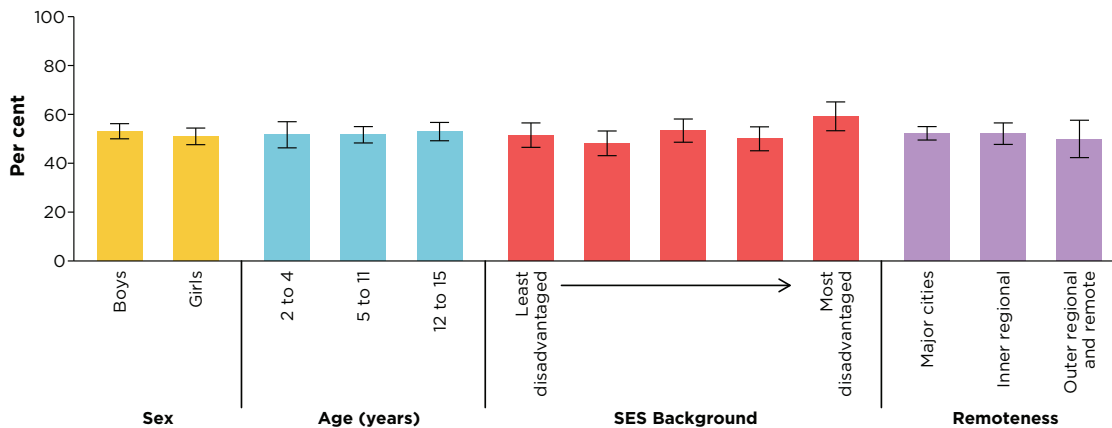
[†]In this report, regular consumption of fruit juice is defined as any daily intake.

Consumption of fruit juice is similar across age, SES background and remoteness

NSW PHS 2017-2018 estimates of children who consumed juice regularly:

- Sex: Boys (53.1%); Girls (51.0%).
- Age: 2-4 years (51.7%); 5-11 years (51.7%); 12-15 years (53.0%).
- SES background: Least disadvantaged (51.5%); Most disadvantaged (59.2%).
- Remoteness: Major cities (52.2%); Inner regional (52.1%); Outer regional and remote (49.9%) (Figure 25).†

Figure 25. Regularly drank fruit juice, children 2-15 years, NSW 2017-2018†



Source: NSW Population Health Survey.

†In this report, regular consumption of fruit juice is defined as any daily intake.

Fruit juice consumption

Fruit juices naturally contain sugar but do provide nutrients such as vitamins and minerals. The *Australian Dietary Guidelines* state that the occasional consumption of fruit juice may assist with nutrient intake when fruit supply is low. If consumed in excess, fruit juice may contribute to problems such as obesity.²⁰

Around one-third of children eat a baked good daily

The unhealthy or ‘Occasional’ foods category captures a wide range of foods. In 2017-2018, children regularly consumed unhealthy foods:

- Salty snacks (49.8% weekly, 17.0% daily) (eg. potato crisps, corn chips and savoury biscuits)
- Baked goods (50.5% weekly, 33.2% daily) (eg. sweet biscuits, cakes, pastries and snack bars)
- Hot fried potatoes (54.5% weekly, 1.5% daily) (eg. hot chips, french fries, wedges)
- Confectionery (65.8% weekly, 15.4% daily) (eg. chocolate, confectionery bars and lollies, and ice cream) (Figure 26).

Daily intake of salty snacks has increased

PHS estimates indicate the proportion of children who consumed salty snacks daily increased over the past 7 years (10.3% in 2012-2013, 17.0% in 2017-2018). However, this trend should be interpreted with caution as savoury biscuits were included in this category for the first time in 2018. Daily consumption of other unhealthy foods remained stable (Figure 27). The proportion of children regularly consuming unhealthy (‘Occasional’) foods is still too high. ‘Treat foods’ are no longer being consumed as occasional treats.

Daily intake of salty snacks is higher among older children and those of low SES

There were few differences between population groups in the proportion of children consuming unhealthy foods daily. Differences were observed for:

Children who ate salty snacks daily:

- Age: 2-4 years (10.0%) < 5-11 years (18.4%) and 12-15 years (19.2%).
- SES background: Least disadvantaged (12.2%) < Most disadvantaged (21.6%).

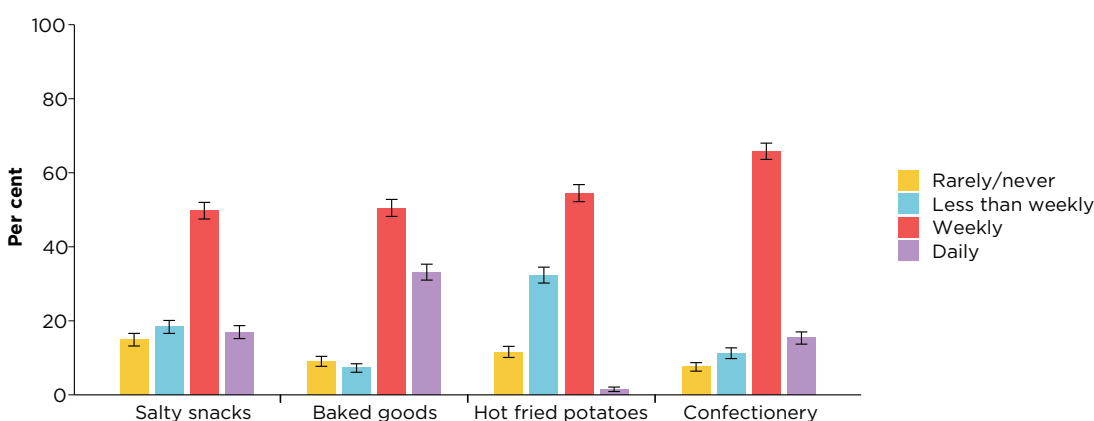
Children who ate baked goods daily:

- Age: 2-4 years (27.2%) < 12-15 years (36.8%); 5-11 years (33.3%)

Children who ate hot fried potatoes daily:

- Remoteness: Major cities (1.7%) > Outer regional and remote (0.3%); Inner regional (0.8%).

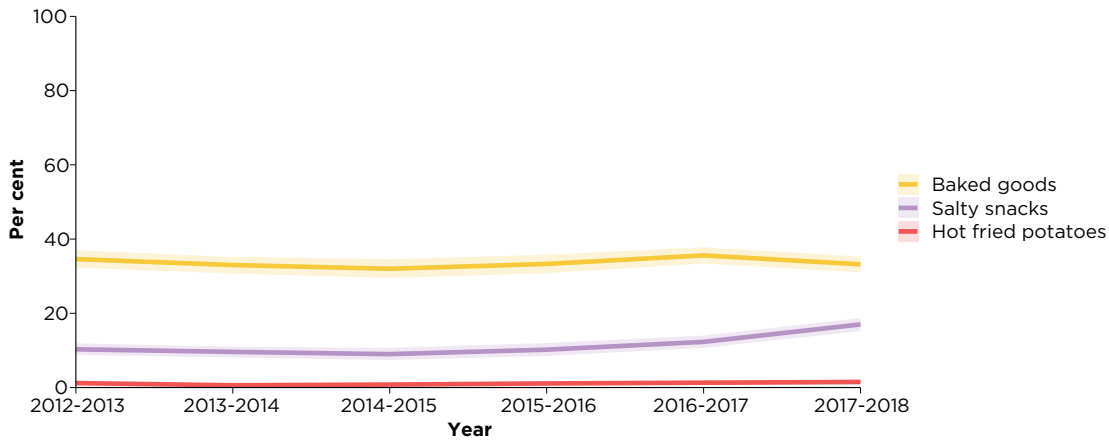
Figure 26. Unhealthy food eaten, children 2-15 years, NSW 2017-2018



Source: NSW Population Health Survey



Figure 27. Ate unhealthy food at least daily, children 2-15 years, NSW trend*



*Trend data not available for confectionery.
Source: NSW Population Health Survey.



Around 2 in 5 children eat takeaway foods at least once a week

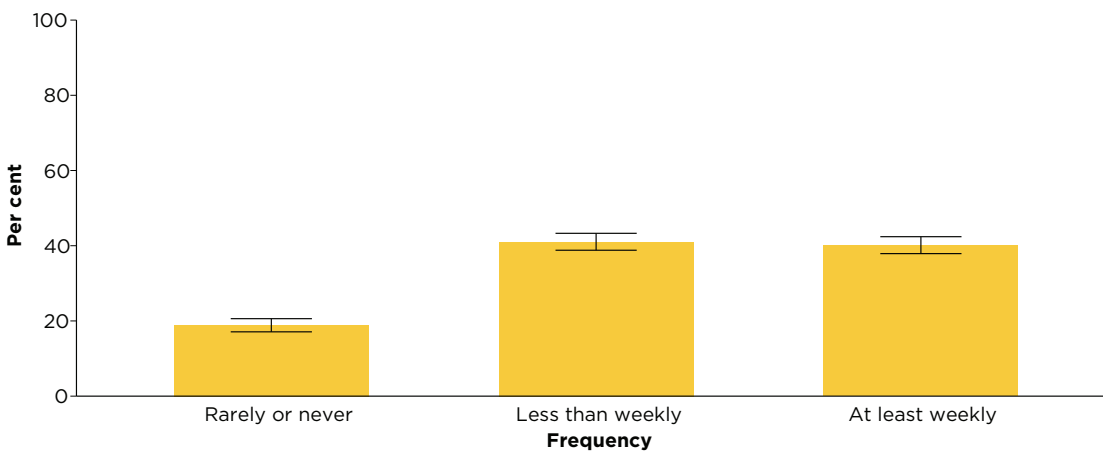
Takeaway (fast) foods refer to meals or snacks such as burgers, pizza, chicken or chips from fast-food restaurants or local takeaway shops. Commercial takeaway foods are often high in saturated fat, salt and/or sugar and should only be eaten occasionally.

In 2017-2018, about 2 in 5 children (40.1%) ate takeaway food at least once a week (Figure 28). Only 1 in 5 children (18.9%) rarely or never ate takeaway food, which is more in line with recommended intake levels.

Consumption of takeaway foods has increased

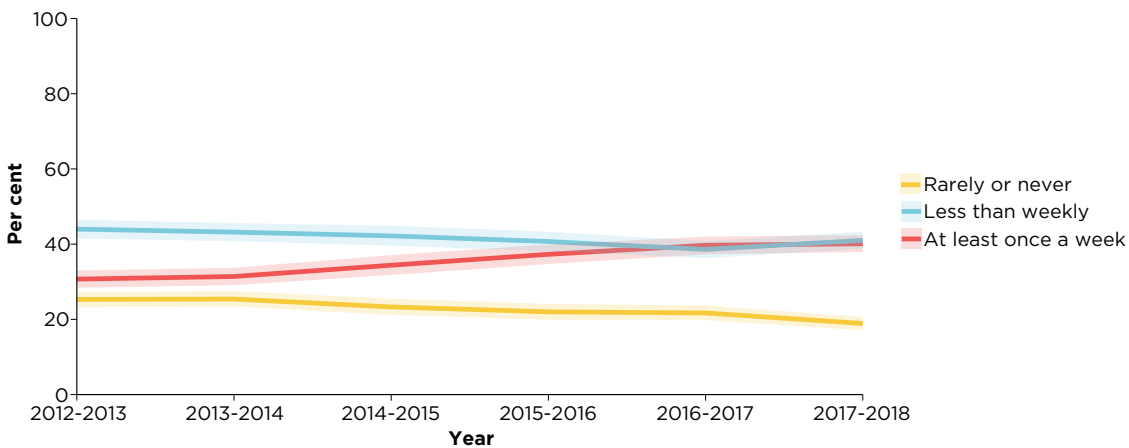
NSW PHS estimates indicate that the proportion of children who ate takeaway foods at least once a week increased from 30.7% in 2012-2013 to 40.1% in 2017-2018 (Figure 29).

Figure 28. Takeaway food eaten, children 2-15 years, NSW 2017-2018



Source: NSW Population Health Survey

Figure 29. Takeaway food consumption, children 2-15 years, NSW trend



Source: NSW Population Health Survey

Consumption of takeaway food is higher in older children and those of low SES

NSW PHS 2017-2018 estimates of children who ate takeaway foods at least once a week:

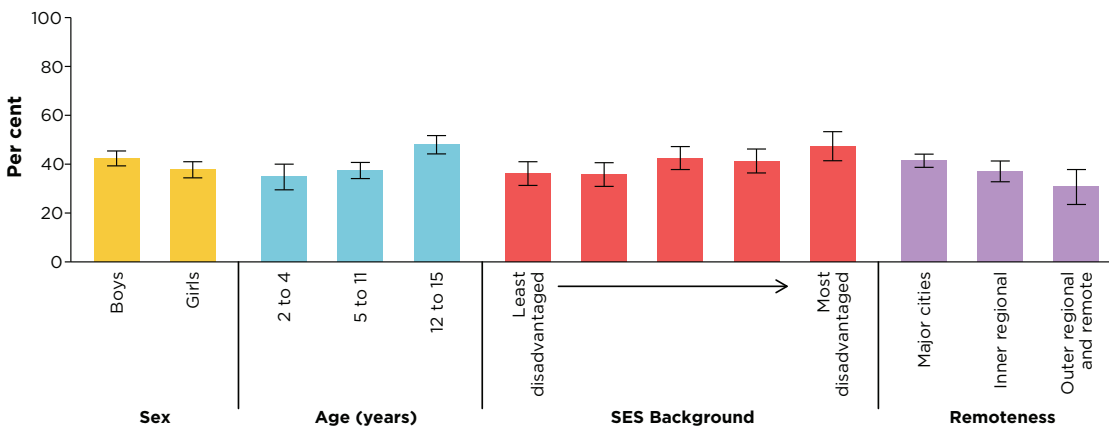
- Sex: Boys (42.4%); Girls (37.7%).
- Age: 2-4 years (34.8%) and 5-11 years (37.4%) < 12-15 years (47.9%).
- SES background: Least disadvantaged (36.2%) < Most disadvantaged (47.3%).
- Remoteness: Major cities (41.4%) > Outer regional and remote (30.7%); Inner regional (37.1%) (Figure 30).

Unhealthy food intake recommendations

The *Australian Dietary Guidelines* recommend that energy-dense nutrient poor foods and drinks are consumed only occasionally and in small amounts.²⁰

NSW research suggests that many parents try to limit their child's intake of these unhealthy foods, yet there are vastly different interpretations of acceptable limits. While parents generally have a reasonable awareness of 'unhealthy foods', there may be a tendency for parents to underreport their children's intake or not consider these foods when provided as 'treats' or when balanced with physical activity.¹⁵

Figure 30. Ate takeaway food at least weekly, children 2-15 years, NSW 2017-2018



Source: NSW Population Health Survey

What eating habits are common among children?

Food environments play an important role in food choices and purchasing, ultimately contributing to dietary habits and energy intake.²⁵ Parents contribute to the home food environment through food purchasing, provision and role-modelling for their children and family.²⁶ Policies and standards on nutritional information and food labelling can contribute toward healthier food environments, providing information to support healthier food and purchases.²⁵

Most children eat breakfast daily; rates for secondary students have decreased

Eating breakfast daily is recognised as a healthy eating pattern. Skipping breakfast is associated with reduced intake of calcium and dietary fibre, and an increased risk of overweight and obesity.²⁷ Evidence also suggests that eating a healthy breakfast is associated with better academic outcomes in primary school students.²⁸

In 2015, SPANS data showed that 3 in 4 students (76%) ate breakfast daily. Between 2010 and 2015, the proportion of secondary students who ate breakfast daily decreased from 65.8% to 59.7%. No difference was observed among primary school students.

Younger students and those from high SES and English-speaking backgrounds are more likely to eat breakfast daily

SPANS 2015 estimates of children who ate breakfast daily:

- School year: Primary students (84.0%) > Secondary students (59.7%).
- SES background: High (82%) > Middle (76%) and Low (65%).
- Cultural background: English-speaking backgrounds (77%) > Middle Eastern (55%) and Asian cultural backgrounds (71%).

Most children do not regularly eat dinner in front of the TV

Watching TV during mealtimes has been associated with a poorer diet quality and an increased risk of overweight and obesity.^{29,30} In 2015, around 1 in 8 students (12%) ate dinner in front of the TV, on 5 or more days each week.

Students of rural, high SES and English-speaking backgrounds are less likely to eat dinner in front of the TV

SPANS 2015 estimates of children who regularly ate dinner in front of the TV (on 5 or more days per week):

- Remoteness: Urban (13%) > Rural (9%).
- SES background: Low (15%) and Middle (12%) > High (9%).
- Cultural background: Middle Eastern (19%) and Asian (19%) > English speaking backgrounds (11%).

Younger children are more likely to be offered sweets as rewards

There is an association between offering food as a reward and long-term negative health consequences such as over-eating and increased intake of unhealthy foods.³¹

In 2015, around 1 in 16 students (6%) were usually offered sweets as a reward for good behaviour. Over half of primary students (51.7%) and 40.0% of secondary students were sometimes offered sweets as rewards. Around 2 in 5 primary students (41.9%) and just over 1 in 2 secondary students (53.8%) reported never/rarely being offered sweets as rewards.⁵

Sweet foods are often referred to as 'treats' or used as rewards, although some parents report trying to avoid this language in an effort to reduce reinforcing the positive value of these foods.¹⁵ There is value in parents changing their language around the positive references to these foods and to emphasise the recommended 'Occasional' nature of their intake.

Older children are more likely to have unrestricted snacking at home

Approximately two-thirds of children's daily food intake is eaten in the home.³⁰ The home food environment therefore plays an important role in shaping and influencing healthy eating habits. If children are provided with control over their own snack food choices, it is important for parents to ensure healthy food choices are available as research suggests that snacking patterns track from childhood into adulthood.³¹

In 2015, around 1 in 3 students (30%) had unrestricted snacking in the home. Secondary students were 4 times more likely (60.9%) to have unrestricted snacking at home, compared to primary school students (14.2%).⁵



Older children are more likely to have access to soft drinks at home

National dietary intake data show that around 60% of sugar-sweetened drinks are consumed at home; children who have soft drink at home are almost 5 times more likely to be high consumers of soft drink.³²

In 2015, around 1 in 8 (12%) students usually had access to soft drinks at home (7.4% primary and 19.7% secondary students).⁵

Soft drinks are more available at home for students of low SES and Middle Eastern backgrounds

SPANS estimates indicate some variation in availability of soft drinks at home by SES background and cultural background.

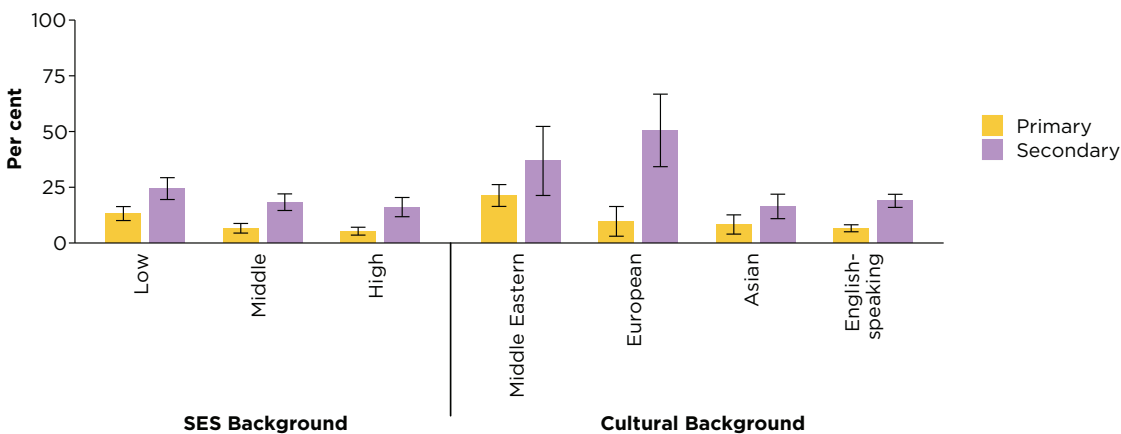
Primary students:

- SES background: Low (13.2%) > High (5.3%)
- Cultural background: Middle Eastern (21.3%) > English-speaking (6.6%)

Secondary students:

- SES background: Low (24.4%) > High (16.1%)
- Cultural background: Middle Eastern (36.8%) and European (50.5%) > English-speaking (18.9%) (Figure 31).

Figure 31. Soft drink usually available at home, students 5–16 years, NSW 2015†



Source: SPANS

† Where figures using SPANS survey data show estimates with overlapping confidence intervals but the estimates are noted in the text as being somehow different, the statement was based on formal significance testing. See Appendix 1 for more detail.

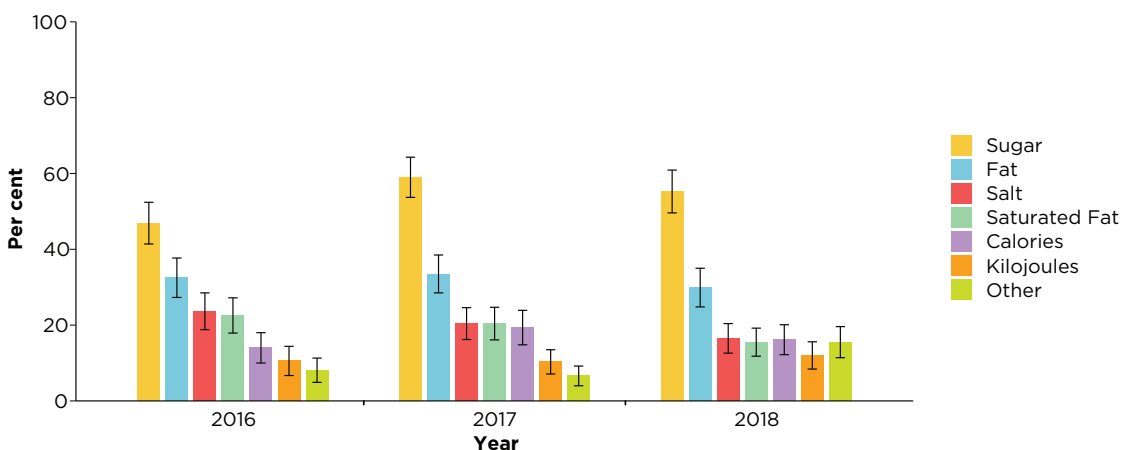


Around 1 in 2 parents consider nutritional information when purchasing food

The Nutrition Information Panel and food labelling offers consumers an easy way to make healthy choices, including choosing foods that are lower in sugar, salt, fat and kilojoules.³³

In 2018, almost 1 in 2 (46.6%) parents (of children under 16 years of age) stated that nutritional information had an influenced on their food purchases. The items which most influenced parents' food purchasing were sugar (55.2%), fat (29.9%), salt (16.5%) and calories (16.1%).

Figure 32. Factors influencing food purchases, parents with children under 16 years, NSW trend



Source: NSW Population Health Survey

PHYSICAL ACTIVITY

Physical Activity NSW children



1 in 4 children achieve adequate levels of physical activity

24.2% of children (5–15 years)
Source: NSW PHS 2017-2018



Physical activity levels have **decreased** over the past 10 years



1 in 2 parents are aware of the physical activity recommendations for children

52.8% of parents (of children 5–15 years)
Source: NSW PHS 2018



Awareness of activity recommendations has remained **stable** over the past 10 years



Around 1 in 3 children have an adequate level of muscular fitness

36% of children (5–16 years)
Source: SPANS 2015



3 in 5 children participate in organised sport at least once per week

61.4% of children (0–14 years)
Source: AusPlay 2018

Physical Activity NSW children



Around 2 in 3 children have an adequate level of cardiorespiratory fitness

65% of children (5–16 years)
Source: SPANS 2015



Cardiorespiratory fitness has remained **stable** over the past 5 years

Sedentary Behaviours NSW children



Over 2 in 5 children spend too long on screen time each day

44.9% of children (5–15 years)
Source: NSW PHS 2017–2018



Levels of screen time activities have remained **stable** over the past 10 years



1 in 7 children use active travel to get to school each day (around 2 in 5 are driven by car)

14.5% of children (5–16 years)
Source: SPANS 2015



Car travel to school by primary children has **increased** over the past 5 years



Around 1 in 10 parents/students are aware of the daily screen time recommendation for children

13.2% (primary parents/students) and
10.5% (secondary students)

Source: SPANS 2015



Awareness of daily screen time limits **decreased** among secondary students over the past 5 years

How are we influencing change at a population level?

State-wide interventions aim to increase **KNOWLEDGE** and **LEVELS** of physical activity and decrease **LEVELS** of sedentary behaviour

Munch & Move in early childhood services (children 0-5 years)			
	Level of adoption of Munch & Move program as at June 2019		
	All services	Major cities / Inner regional	Outer regional / Remote / Very remote
As at 30 June 2019, 3,464 out of 3,954 early childhood services across NSW have participated in Munch & Move training.			
Services meeting the targets for adoption of the strengthened Munch & Move practices (achieving 65% of practices)	68% of services	67% of services	78% of services
	Level of achievement of healthy practices as at June 2019		
	All services	Major cities / Inner regional	Outer regional / Remote / Very remote
Practice 6: Service provides opportunities for physical activity for 1-5 year olds at least 30% of the daily opening hours	88% of services	88% of services	87% of services
Practice 7: Service provides a supportive physical activity environment	93% of services	92% of services	93% of services
Practice 8: Service provides daily opportunities for fundamental movement skills for children 3-5 years of age	68% of services	68% of services	75% of services
Practice 9: Service use of small screen recreation for all children is appropriate	86% of services	86% of services	84% of services
Practice 11: Service has a written policy, procedure or guideline encouraging physical activity	42% of services	42% of services	43% of services
Practice 12: Service has a written policy, procedure or guideline restricting small screen recreation	38% of services	38% of services	43% of services

Live Life Well @ School in primary schools (children 5–12 years)			
	Level of adoption of Live Life Well @ School program as at June 2019		
As at 30 June 2019: LLW@S is implemented in 2,142 out of 2,595 primary schools in NSW.	All schools	Major cities / Inner regional	Outer regional / Remote / Very remote
Schools meeting the targets for adoption of the strengthened LLW@S practices (achieving 65% of practices)	66% of schools	67% of schools	66% of schools
	Level of achievement of healthy practices as at June 2019		
	All schools	Major cities / Inner regional	Outer regional / Remote / Very remote
Practice 1: School provides curriculum learning experiences or lessons regarding healthy eating and physical activity	78% of schools	77% of schools	82% of schools
Practice 2: School teaches and assesses fundamental movement skills development as part of the PDHPE program	65% of schools	66% of schools	61% of schools
Practice 4: School provides a supportive outdoor physical activity environment	87% of schools	87% of schools	87% of schools
Practice 7: School has provided information on healthy eating and physical activity to families within the past 12 months	58% of schools	59% of schools	55% of schools
Practice 11: School promotes active travel	78% of schools	79% of schools	78% of schools

Active Kids Vouchers (children enrolled from Kindergarten to Year 12)					
Parents, guardians and carers could access a \$100 voucher per school-enrolled child each year to cover registration, participation and membership costs for sport, fitness and active recreation activities.	Vouchers created	Vouchers redeemed	Vouchers created by remoteness, eligible child population		
			Major cities	Regional	Remote
Participation in the Active Kids program as at 18 December 2018	671,320	549,108	43%	43%	34%



What are we trying to achieve?

Physical activity is important for the health and wellbeing of children. Regular physical activity can help reduce the risk and prevent the development of a range of chronic diseases and help to promote psychological wellbeing and a healthy weight. A suite of NSW initiatives aims to model the benefits and support children to be physically active. Achieving the following outcomes in the NSW population will contribute towards increasing the proportion of children at a healthy weight:

- Increase levels of incidental, moderate and vigorous physical activity
- Decrease time spent on sedentary behaviours.

The *Australian 24-Hour Movement Guidelines for Children and Young People (5-17 years)* provide evidence-based advice about the type and amount of physical activity required for health benefits.³⁴ Many children's activity levels are falling short of the recommendations as children typically do not spend enough time being active each day, and spend too long on sedentary behaviours. Insufficient levels of physical activity can contribute to weight gain, leading to overweight and obesity.

A range of individual, social and economic risk factors have led to an environment that promotes excessive energy (kilojoule) intake while decreasing opportunities for incidental and structured physical activity.

Overweight and obesity is the result of people consuming more energy (kilojoules) from food on a daily basis than they are able to use up through movement and exercise. An additional 200-300kJ per day over several years is all a child needs to become overweight.²² This is equivalent to around 20 minutes of walking per day.

Unhealthy eating, physical activity and unhealthy weight have complex causes and differential impacts among populations. This chapter presents information on children's physical activity and sedentary behaviours. Where data were available, differences between population groups are also reported. See **Appendices 1 and 2** for more information on data sources.

Australian 24-Hour Movement Guidelines for Children and Young People³⁴

For optimal health benefits, children and young people (aged 5-17 years) should achieve the recommended balance of high levels of physical activity, low levels of sedentary behaviour, and sufficient sleep each day. A healthy 24 hours includes:

Physical Activity

- Accumulating 60 minutes or more of moderate to vigorous physical activity per day involving mainly aerobic activities;
- Several hours of a variety of light physical activities;
- Activities that are vigorous, as well as those that strengthen muscle and bone should be incorporated at least 3 days per week.

Moderate physical activities are those which require some effort, but allow you to speak easily while undertaking the activity. eg. active play, fast walking, swimming, dancing and riding a scooter. Vigorous physical activities are those which require more effort and make you breathe harder and faster ("huff and puff"). eg. running, fast cycling and many organised sports.

Sedentary Behaviour

- Limiting sedentary recreational screen time to no more than 2 hours per day;
- Breaking up long periods of sitting as often as possible;
- For greater health benefits, replace sedentary time with additional moderate to vigorous physical activity, while preserving sufficient sleep

Sleep

- An uninterrupted 9 to 11 hours of sleep per night for those aged 5-13 years and 8 to 10 hours per night for those aged 14-17 years; and
- Consistent bed and wake-up times.

For more information visit the Australian 24-Hour Movement Guidelines for Children and Young People website: <http://www.health.gov.au/internet/main/publishing.nsf/Content/health-24-hours-phys-act-guidelines>

Are children achieving an adequate level of activity?

Children can be active in many ways throughout the day and can accumulate their 60 minutes through a combination of activities. These include organised sports, incidental activities, active travel and active play.

Most children are not active enough

In 2017-2018, 1 in 4 children aged 5-15 years (24.2%) achieved adequate levels of physical activity (one or more hours of physical activity per day outside of school hours).

In 2018, more than 1 in 4 children (28.0%) did physical activity on 3 or less days of the week (Figure 33).

The prevalence of adequate physical activity has decreased

NSW PHS estimates show that the proportion of children undertaking adequate levels of physical activity has decreased over the past 10 years from 30.8% in 2009-2010 to 24.2% in 2017-2018 (Figure 34).

Figure 33. Frequency of physical activity (outside of school hours), children 5-15 years, NSW 2017-2018

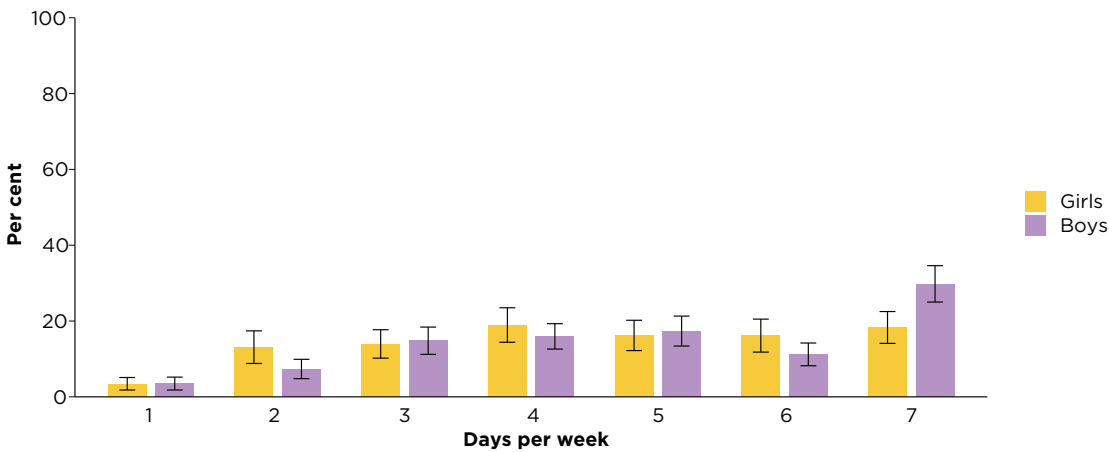
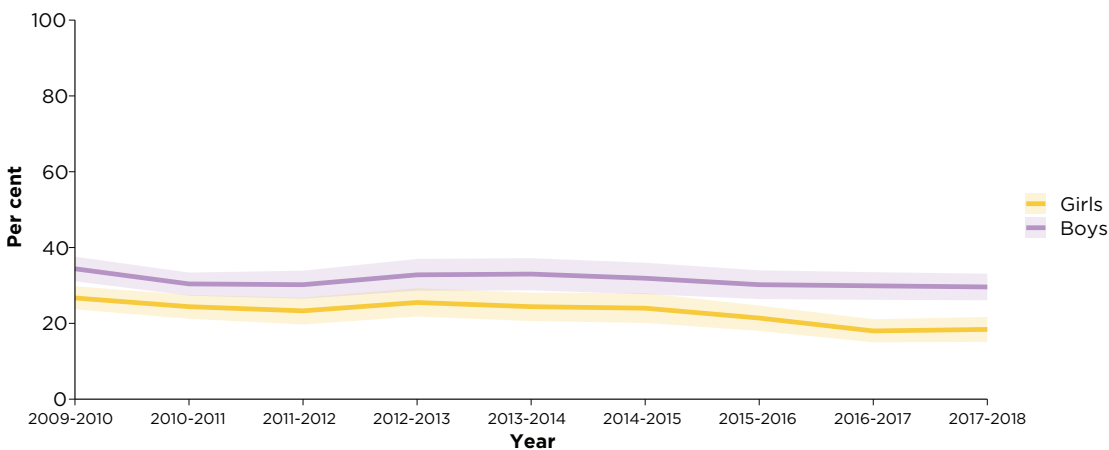


Figure 34. Adequate physical activity levels (one or more hours per day outside of school hours), children 5-15 years, NSW, trend



Boys, younger children and those of English-speaking backgrounds are more likely to meet physical activity recommendations

NSW PHS 2017-2018 estimates of children undertaking adequate levels of physical activity:

- Sex: Boys (29.6%) > Girls (18.4%)
- Age: 5-11 years (27.4%) > 12-15 years (18.4%)
- SES background: Least disadvantaged (20.7%); Most disadvantaged (25.6%)
- Remoteness: Major cities (23.2%); Inner regional (25.5%); Outer regional and remote (33.0%) (Figure 35).

SPANS 2015 estimates of students undertaking adequate levels of physical activity:

- Boys (24%) > Girls (15%)
- Remoteness: Rural (22%) > Urban (18%)
- Cultural background: English-speaking backgrounds (20%) > Middle Eastern (13%) and Asian cultural backgrounds (9%).

Recent research with parents indicates that achieving an adequate amount of exercise was less of a challenge for families from regional areas as the local environment was more conducive to activity.¹⁵

Variation in physical activity estimates between data sources

Prevalence estimates vary by data source due to differing survey data collection methods and definitions.

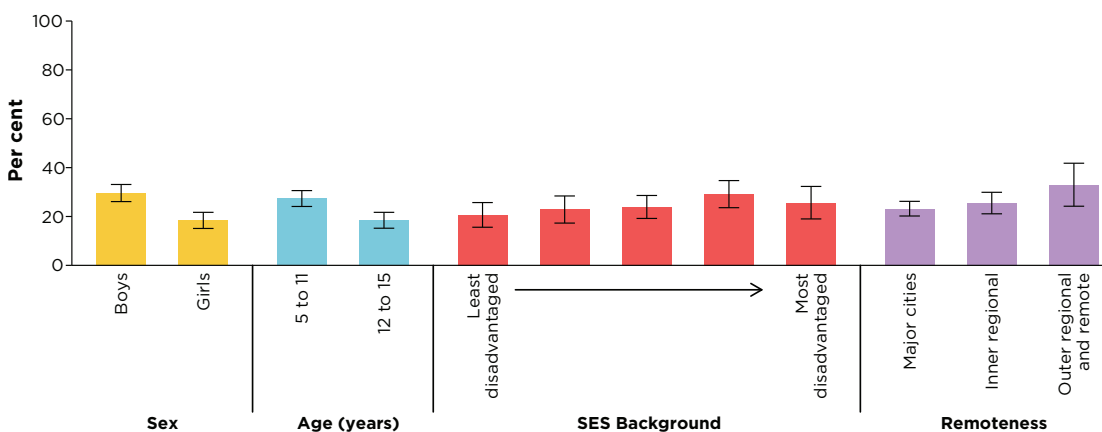
The *Australian 24-Hour Movement Guidelines for Children and Young People (5-17 years)*³⁴ recommend children undertake 1 hour or more of moderate to vigorous physical activity per day.

The NSW PHS separately measures physical activity undertaken inside and outside of school hours. Adequate physical activity is defined as children who undertake 1 hour or more physical activity outside of school hours, per day. SPANS does not differentiate between physical activity during and outside school hours.

Comparing the latest estimates of children undertaking 60 minutes or more of physical activity per day:

- NSW PHS: 24.2% in 2017-2018 (5-15 years)¹⁰
- SPANS: 19.0% in 2015 (students Kindergarten to Year 10 / children 5-16 years)⁵

Figure 35. Adequate physical activity levels (one or more hours per day outside of school hours), children 5-15 years, NSW 2017-2018



Source: NSW Population Health Survey

Physical activity during school hours

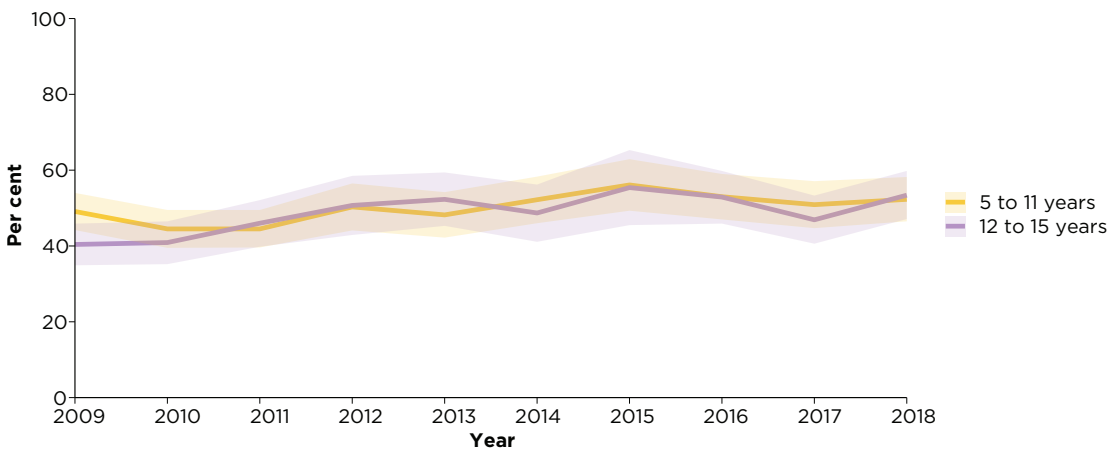
In 2018 the PHS showed that most children 5-15 years (54.3%) undertook between 60-119 minutes of physical activity during school hours across a school week. Rates were similar between boys and girls and for older and younger children.



Awareness of daily physical activity recommendations for children is low

Parents of children aged 5 to 15 years were asked if they knew how many minutes of physical activity were recommended for children each day. In 2018, around 1 in 2 parents (52.8%) were aware of the physical activity recommendations for children. This rate has remained relatively stable over the past 10 years and is similar for parents of older and younger children (Figure 36).

Figure 36. Parental awareness of physical activity recommendations for children, by age of child, NSW trend



Source: NSW Population Health Survey

Active travel is used by less than 20% of students

In 2015, SPANS showed that around 1 in 7 children aged 5-16 years used active travel to get to (14.5%) and from (16.6%) school on five school days. Most children were driven to (43.2%) and from (37.2%) school by car. Active travel was used by less than 20% of students. Active travel refers to any mode of travel used to travel from one destination to another which involves physical activity, including walking, cycling, scootering and skateboarding.

Travel to school by car has increased for primary students

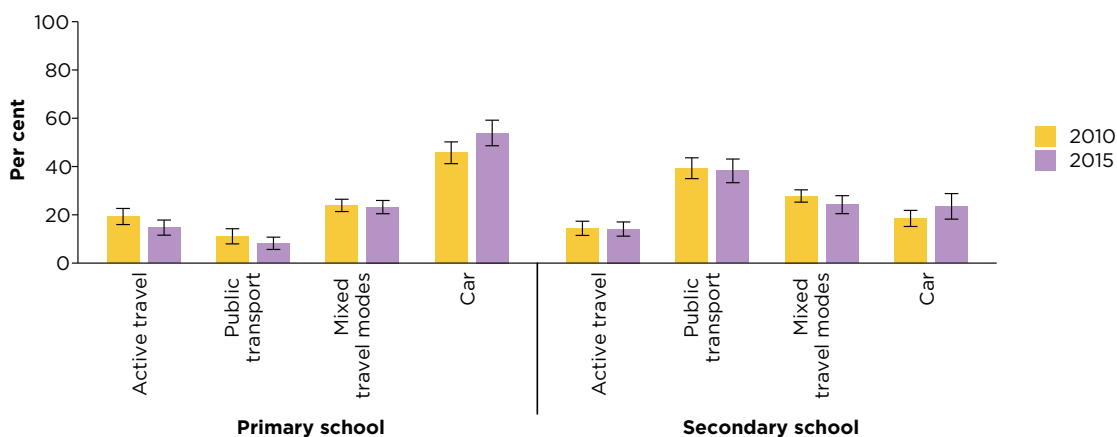
Between 2010 and 2015, there was an increase in the proportion of primary students who were driven to school by car (from 45.7% to 53.9%). There was no change in the proportion of students using active travel to get to or from school (Figure 37).

Car travel has also increased among students from urban areas, high SES and some cultural backgrounds

Between 2010 and 2015, there was an increase in the proportion of students driven to school by car in the following groups:

- Students from urban areas increased from 37% to 47%
- Students from high SES backgrounds increased from 33% to 45%
- Students from English speaking backgrounds increased from 36% to 42% and Middle Eastern cultural backgrounds from 45% to 66%.

Figure 37. Type of travel to school, students 5-16 years, NSW 2010 and 2015[†]



Source: SPANS

[†] Where figures using SPANS survey data show estimates with overlapping confidence intervals but the estimates are noted in the text as being somehow different, the statement was based on formal significance testing. See Appendix 1 for more detail.

Cardiorespiratory fitness levels are relatively high, but muscular fitness levels are low

Physical activity and physical fitness are closely related, as more time spent undertaking moderate and vigorous physical activities will result in improvements in the domains of physical fitness (cardiorespiratory and musculoskeletal fitness).

In 2015, around 2 in 3 students (65%) achieved the healthy fitness zone (HFZ) for cardiorespiratory fitness and 1 in 3 students (36%) achieved the HFZ for muscular fitness.

Cardiorespiratory fitness has decreased among girls and students of high SES and Asian backgrounds

Between 2010 and 2015, there was no change in the proportion of primary or secondary school students achieving the HFZ for cardiorespiratory fitness (trend not available for musculoskeletal fitness). A decrease in cardiorespiratory fitness was observed among some groups including girls (68% to 61%) and students from high SES (75% to 67%) and Asian cultural backgrounds (59% to 44%).

Fitness levels are higher among students of high SES and English-speaking backgrounds

NSW SPANS 2015 estimates of children achieving cardiorespiratory and muscular fitness levels:

- **SES background:** Students from high SES backgrounds were more likely to achieve the HFZ in both domains, compared to children from low SES backgrounds.
- **Cultural background:** Students from English-speaking backgrounds were more likely to achieve the HFZ in both domains than students from Middle Eastern and Asian cultural backgrounds.

Measuring physical fitness

While 'adequate physical activity' (as above) reports on a child's behaviour, 'physical fitness' reflects a child's ability to achieve performance standards for physical activity. Two commonly used measures of physical fitness are:

Cardiorespiratory fitness: Ability of the circulatory and respiratory systems to supply oxygen to working muscles during ongoing bouts of physical activity. Measured using a shuttle run test.

Muscular fitness: Ability of the muscles to undertake short duration, strength based activities. Measured using a standing broad jump.

Fundamental movement skills

Fundamental movement skills are related to the health of young people. Studies have shown that children and adolescents with greater fundamental movement skill proficiency tend to be more physically active; have higher levels of aerobic fitness and self-esteem; and are less likely to be overweight.

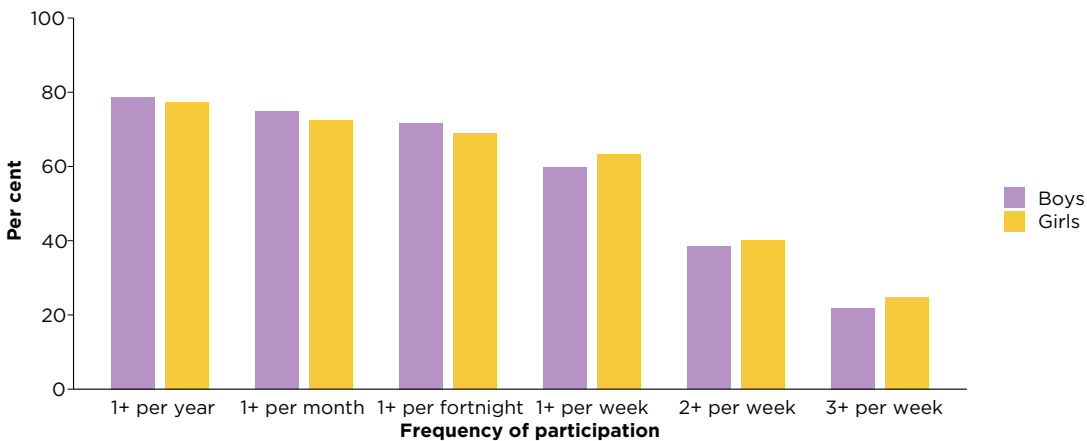
Fundamental movement skills form an integral part of the primary and early secondary school Personal Development, Health and Physical Education curriculum in NSW.⁴

Many children participate in sport outside school hours

Organised sport provides many physical, mental and social benefits to children and plays an important role in assisting children to meet the physical activity recommendations. Yet too few children are participating regularly in organised sport activities.

In 2018, it was estimated that around 3 in 5 NSW children aged 0-14 years (61.4%) participated in organised sport at least once per week (outside of school hours). Less than 1 in 4 children (23.4%) participated in organised sport 3 or more times per week (Figure 38).³⁵

Figure 38. Participation in organised sport (outside of school hours), children 0-14 years, NSW 2018



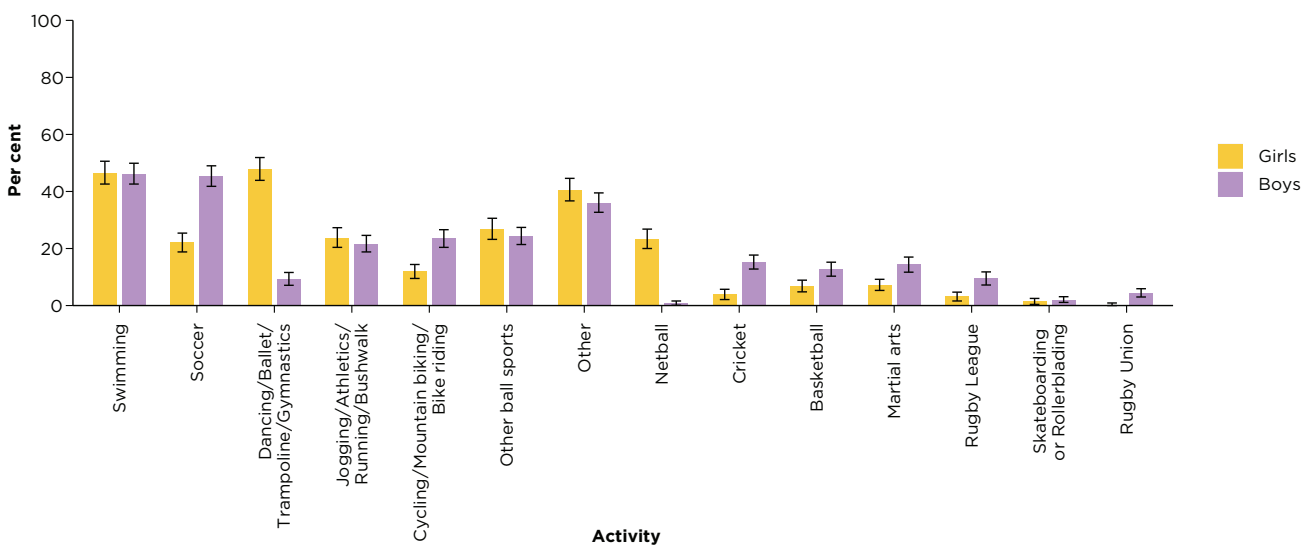
Source: AusPlay Survey

There are several main barriers to children participating in organised sport outside of school hours, including:

- Being the wrong age (too old or too young)
- Not having enough time or having too many other commitments
- Not liking physical activity
- Not being able to afford it, or not being able to afford transport.³⁶

Children participate in a wide variety of sports, including both team and individual sports. There is some variation in children’s sports participation between boys and girls (Figure 39).

Figure 39. Type of sport participation in past 12 months, children 5-15 years, NSW 2017-2018



Source: NSW Population Health Survey

Are children reducing their sedentary time?

While using electronic devices (screen time) is the most common sedentary activity among children, there are many other activities that children do sitting or lying down. It is advised that children break up long periods of sitting as often as possible, as lower levels of sedentary behaviours are associated with reduced health risks.³⁴

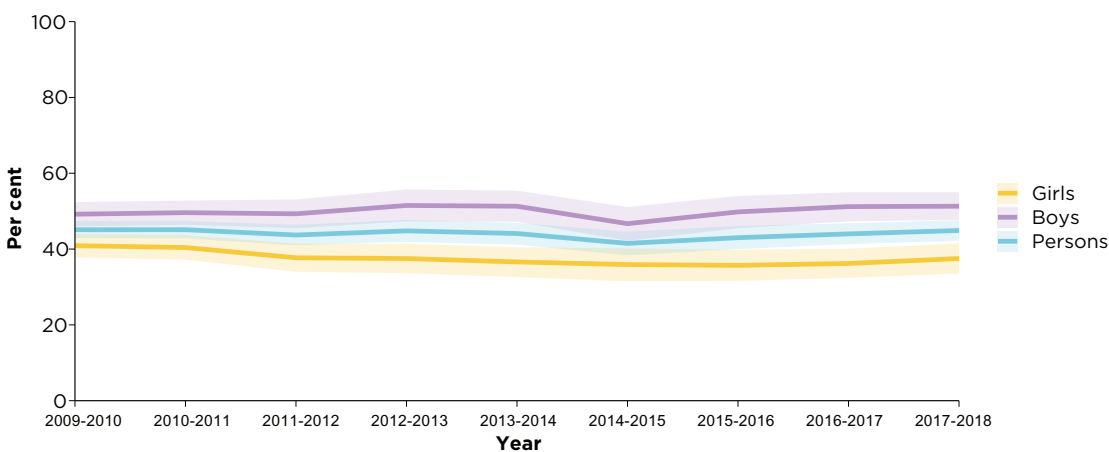
Over 2 in 5 children spend too long on screen time activities and levels are stable

In 2017-2018, over 2 in 5 children aged 5-15 years (44.9%) spent more than 2 hours per day on screen

time activities (for entertainment at home). Over the past 10 years, the proportion of children exceeding daily screen time limits has remained stable (45.1% in 2009-2010 and 44.9% in 2017-2018) (Figure 40).

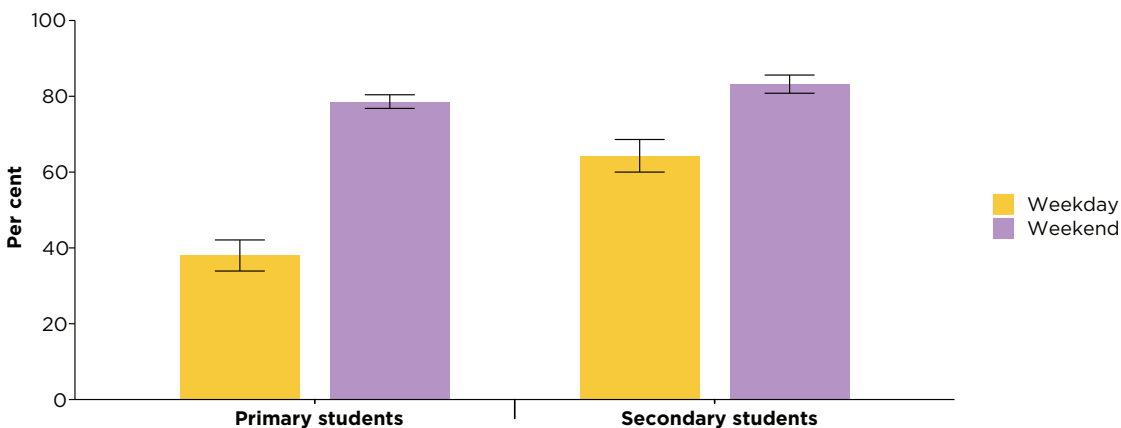
In 2015, SPANS data showed that close to 1 in 2 students (47%) exceeded the screen time recommendation on weekdays. This increased to 4 in 5 students (80%) on weekends. Secondary students were more likely to exceed screen time recommendation than primary students (Figure 41). There was no change in these rates between 2010 and 2015.

Figure 40. Exceeding screen time activity limits, children 5-15 years, NSW trend



Source: NSW Population Health Survey

Figure 41. Exceeding screen time activity limits, children 5-16 years, NSW 2015[†]



Source: SPANS

[†] Where figures using SPANS survey data show estimates with overlapping confidence intervals but the estimates are noted in the text as being somehow different, the statement was based on formal significance testing. See Appendix 1 for more detail.

Recommended limits for children's sedentary behaviours

The *Australian 24-Hour Movement Guidelines for Children and Young People* recommend that children and young people should minimise the time they spend being sedentary every day. To achieve this, it is recommended that screen time (use of electronic media for entertainment eg. television, seated electronic games and computer use) are limited to **no more than two hours per day for children aged 5-17 years**.³⁴

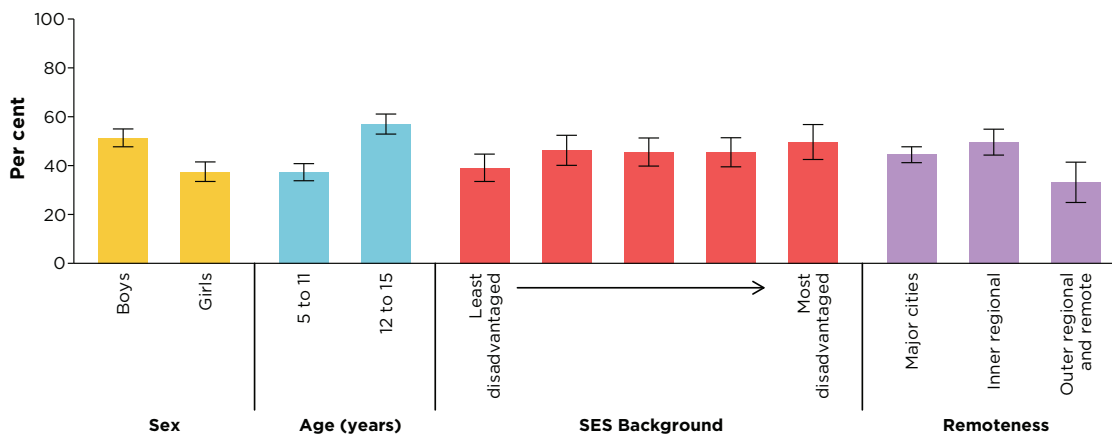
Parents report a significant challenge in limiting children's screen time, particularly due to increasing reliance on screens at school and for homework. Parents' concerns about excessive screen time were commonly about the impacts on eye sight, posture, sleep and social skill development, rather than the physical health consequences of excessive time being sedentary.¹⁵

Boys and older children are more likely to exceed screen time limits

NSW PHS 2017-2018 estimates of children exceeding daily limits on screen time activities:

- Sex: Boys (51.3%) > Girls (37.5%).
- Age: 5-11 (37.3%) < 12-15 (57.0%)
- SES background: Least disadvantaged (39.1%); Most disadvantaged (49.7%).
- Remoteness: Major cities (44.5%); Inner regional (49.6%) > Outer regional and remote (33.1%) (Figure 42).

Figure 42. Exceeding screen time activity limits, children 5-15 years, NSW 2017-2018



Source: NSW Population Health Survey

There is a low level of awareness of recommended daily screen time limits

In 2015, around 1 in 8 primary parents/students (13.2%) and 1 in 10 secondary students (10.5%) correctly reported <2 hours as the recommended limit on daily screen time. Between 2010 and 2015, there was no change in the rate for primary students, yet the awareness among secondary students decreased (from 14.2% in 2010).

Although awareness of the recommended daily screen time limits was low, 3 in 5 primary school parents reported that they usually impose rules on their child's screen time (59.3%), compared to just over 1 in 5 secondary school students (22.3%) (Figure 43).

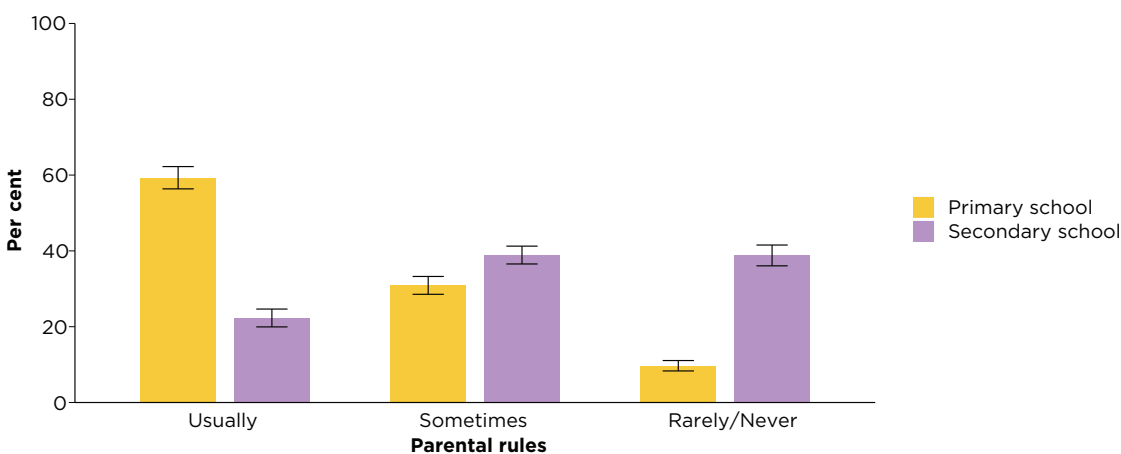
Variation in estimates of sedentary behaviour between data sources

Prevalence estimates vary by data source due to differing survey data collection methods. The NSW PHS provides an estimate for the proportion of children who spend more than 2 hours per day on screen time averaged over a usual week, whereas SPANS provides a separate estimate of the proportion spending ≥ 2 hours per day on weekdays and weekends. There is also some variation in the types of screen based activities included in the 'screen time' category for each source.

Comparing the latest estimates of children exceeding screen time limits:

- NSW PHS: 44.9% in 2017-2018 (5-15 years)¹⁰
- SPANS: weekdays (47%), weekends (80%) in 2015 (students Kindergarten to Year 10 / children 5-16 years)⁵

Figure 43. Parental rules imposed on daily screen time, students 5–16 years, NSW 2015[†]



Source: SPANS

[†] Where figures using SPANS survey data show estimates with overlapping confidence intervals but the estimates are noted in the text as being somehow different, the statement was based on formal significance testing. See Appendix 1 for more detail.

IMPACTS OF OVERWEIGHT AND OBESITY

Health conditions associated with overweight and obesity



Around 1 in 10 NSW adults have diabetes or high blood glucose

11.1% of adults (16 years and over)

Source: HealthStats NSW 2018



Change over time:

Prevalence of diabetes or high blood glucose has **increased** over the past 10 years



Hospitalisations for dental caries are disproportionately higher for Aboriginal children (0-14 years)

Source: HealthStats NSW 2016-17



Change over time:

Rates of hospitalisations for dental caries have **increased** over the past 10 years



Around 1 in 7 mothers have maternal diabetes

14.5% of NSW mothers

Source: NSW Perinatal Data Collection 2018



Change over time:

Rates of maternal diabetes have **increased** over the past 10 years

Health impacts of overweight and obesity



Impact on chronic disease

In 2017-18 in NSW, adults who were overweight or obese were:

- 3.0 times more likely to report diabetes
- 2.7 times more likely to report hypertension
- 2.0 times more likely to report arthritis

Source: National Health Survey 2017-18



BMI attributable hospitalisations

In 2017-18 in NSW, there were 66,869 hospitalisations attributed to high body mass (734.5 per 100,000 population).

BMI attributable deaths

In NSW in 2017, there were 3,758 deaths attributable to high body mass (37.0 per 100,000 population).

Source: HealthStats NSW



Change over time:

Rates of hospitalisation attributable to high body mass have **decreased** over the past 8 years



Rates of death attributable to high body mass have **decreased** over the past 10 years

What are we trying to achieve?

Overweight and obesity is a leading driver of chronic disease. It is the second highest contributor to the Australian burden of disease and has an economic impact in NSW of \$19 billion per annum.³⁷ Overweight and obesity is a major risk factor for a range of chronic conditions such as cardiovascular disease (mainly heart attack and stroke), diabetes, musculoskeletal disorders (such as osteoarthritis) and some cancers (including endometrial, breast, ovarian, prostate, liver, gall bladder, kidney and colon).³

Childhood overweight and obesity is a strong predictor of adult overweight and obesity and has significant health impacts for children. Children who are above a healthy weight are more likely to have poor health and wellbeing outcomes, compared with children who are at a healthy weight. They

are also more likely to carry their excess weight into adulthood, placing them at increased risk of developing chronic diseases later in life.

A range of individual, social and economic risk factors have led to an environment that promotes excessive energy (kilojoule) intake while decreasing opportunities for incidental and structured physical activity, resulting in significant weight gain across the NSW population. Unhealthy eating, physical inactivity and unhealthy weight have complex causes and differential impacts among populations.

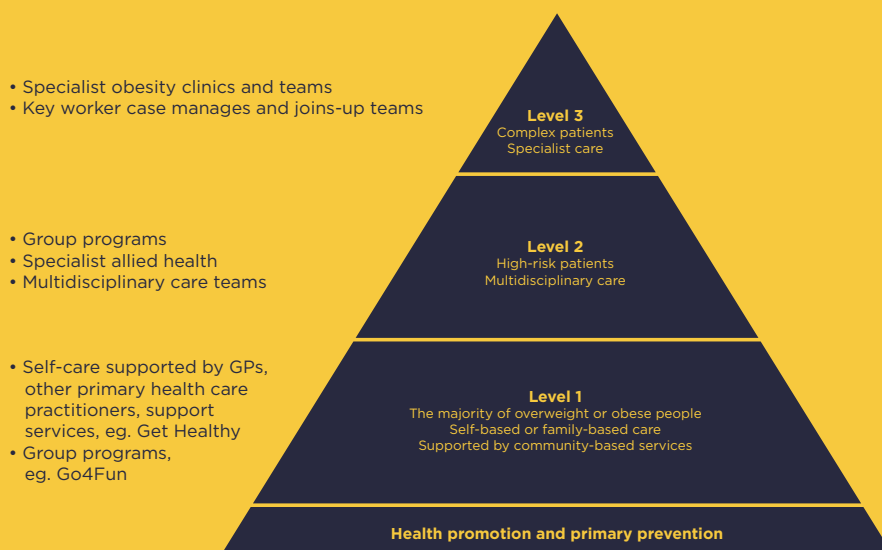
This chapter presents information on the health and economic impacts associated with overweight and obesity. Where data were available, differences between population groups are also reported. See **Appendices 1 and 2** for more information on data sources.

Chronic disease care model for childhood overweight and obesity

Overweight and obesity is increasing in severity among some population groups, so a tiered approach which includes prevention through to speciality weight-management is required.

An approach adapted from the chronic disease pyramid of care recognises the need for a tiered settings-based delivery model, which provides population-level and patient-level health services to support the needs of the whole community.³⁸

Population level approaches (with a focus on health promotion and primary prevention) aim to prevent unhealthy weight gain. See page 11 for an outline of NSW Health programs and initiatives. Clinicians and specialist health services play a vital role in supporting children already above a healthy weight.



What are the health impacts of obesity among children?

Obesity during childhood increases the risk of breathing difficulties, fractures, hypertension, early markers for cardiovascular disease and insulin resistance (pre-diabetes).² There is accumulating evidence of an association between overweight and obesity and asthma in children.³ Children who are above a healthy weight are also more likely to carry excess weight into adulthood, and are at an increased risk of developing chronic disease and premature death and disability in adulthood.¹⁷

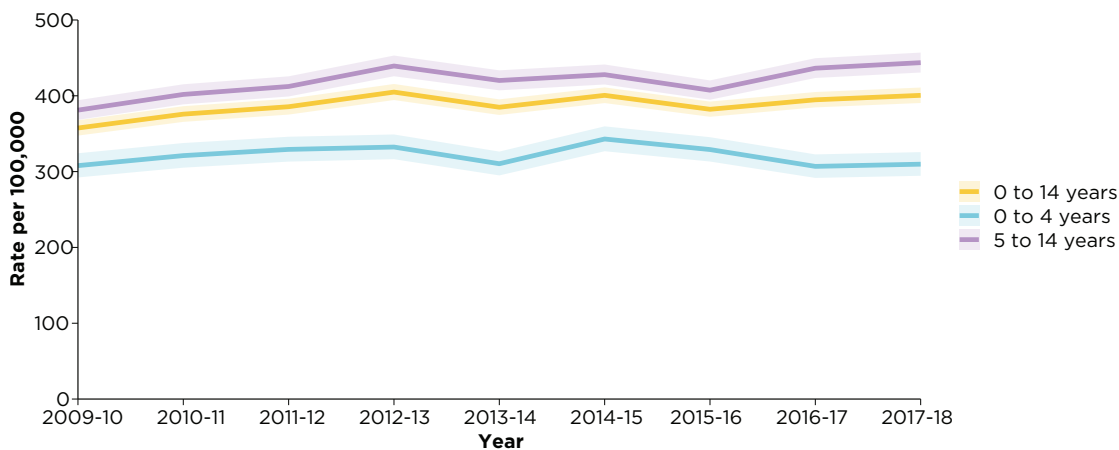
The best evidence for a link between sugar intake and obesity is for the consumption of sugar-sweetened drinks with no nutritional value, such as

soft drinks and cordials. The consumption of sugar-sweetened drinks (particularly soft drinks) has been associated with lower intakes of various nutrients as well as an increased risk of weight gain and obesity, diabetes and tooth decay.²⁴

Rates of hospitalisations for dental caries have increased and are higher in Aboriginal children

In 2017-18, there were 5,961 children aged 0-14 years admitted to hospital for dental caries (removal and/or restoration of teeth). Rates of hospitalisations for removal and/or restoration of teeth for dental caries have increased over recent years (from 357.5 per 100,000 in 2009-10 to 400.6 per 100,000 in 2017-18). This means that for every 100,000 children aged 0-14 years, just over 400 were hospitalised for dental caries in 2017-18. (Figure 44).³⁹

Figure 44. Hospitalisations for removal and/or restoration of teeth for dental caries, children 0-14 years, NSW trend



Source: HealthStats NSW

Oral Health

Oral health is an important component of lifelong health. At a population level, a key indicator of oral health status is the measure of dental caries (number of teeth that are decayed, missing or filled because of dental caries). Whilst dental caries is mostly preventable, it remains the most common chronic childhood disease requiring costly treatment with adverse impact on their quality of life. Children may be admitted to hospital to have extensive dental treatment under general anaesthesia.³⁹

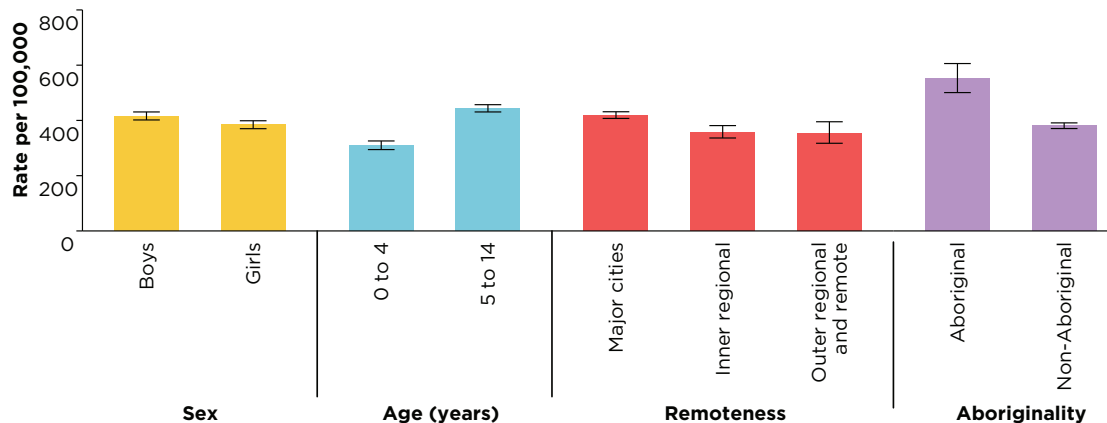
Oral health problems can be prevented by regular tooth brushing with fluoride toothpaste, avoiding sugar-sweetened foods and drinks, visiting the dentist regularly and drinking fluoridated water.

Boys, older children, children in major cities and those of Aboriginal backgrounds are more likely to be hospitalised for removal and/or restoration of teeth for dental caries

Rates of hospitalisations for removal and/or restoration of teeth for dental caries for children 0-14 years in 2017-18:

- Sex: Boys (416.0 per 100,000) > Girls (384.3 per 100,000)
- Age: 0-4 years (309.8 per 100,000) < 5-14 (443.7 per 100,000)
- Remoteness: Major cities (419.2 per 100,000) > Inner regional (358.3 per 100,000) and Outer regional and Remote (354.7 per 100,000)
- Aboriginality*: Non-Aboriginal (380.7 per 100,000) < Aboriginal (551.5 per 100,000) (Figure 45).³⁹

Figure 45. Hospitalisations for the removal and/or restoration of teeth for dental caries, children 0-14 years, NSW 2017-18*



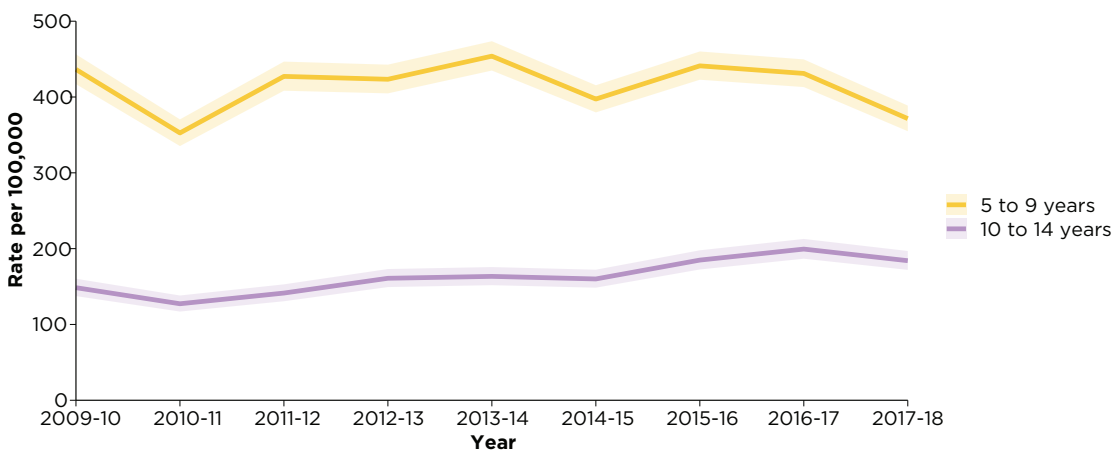
Source: HealthStats NSW

*Data relating to Aboriginal and non-Aboriginal people are for 2016-17, as population projections were not available to the NSW Ministry of Health at the time of publication.

Hospitalisation rates for asthma have increased for older children

In 2017-18, there were 2,733 children aged 5-14 years hospitalised for asthma. Rates were higher for younger children aged 5-9 years (371.5 per 100,000) compared to older children aged 10-14 years (184.1 per 100,000). Hospitalisation rates for asthma have decreased for 5-9 year olds in the last year and increased progressively for 10-14 year olds over recent years. (Figure 46).⁴⁰

Figure 46. Hospitalisations for asthma, children 5-14 years, NSW trend



Source: HealthStats NSW



What are the health impacts of obesity among adults?

Being well above a healthy weight in childhood is associated with a higher chance of obesity in adulthood, premature death and disability in adulthood.¹⁴

There is evidence to support a strong relationship between overweight and obesity in adulthood and an increased risk of conditions such as cancer, cardiovascular disease, chronic kidney disease, diabetes and musculoskeletal problems.³

Around 1 in 10 adults report having diabetes and rates are slowly increasing

In 2018, it was estimated that 11.1% of persons aged 16 years and over in NSW were diabetic or had high blood glucose (including both type 1 and type 2 diabetes). Between 2009 and 2018, the prevalence of diabetes increased significantly from 8.3% to 11.1%.⁴¹

Type 2 diabetes

Diabetes is a chronic condition marked by high levels of sugar (glucose) in the blood, caused by the body being unable to produce insulin, or use insulin effectively, or both. When blood glucose levels can no longer be maintained at optimal levels through diet and exercise and other medication, insulin replacement may be required.

Type 2 diabetes accounts for about 90% of all diabetes cases in the community. As the condition tends to develop over a long period of time it generally has later onset. Several modifiable risk factors play a role in the onset of type 2 diabetes, including obesity, physical inactivity and poor nutrition, as do genetic predisposition and ageing.

There are several ways of measuring the prevalence of diabetes within the population, including:

- Self-reported diabetes among adults (Type 1 and 2 combined): determined by asking respondents if they had ever been told by a doctor or hospital they had diabetes or high blood glucose (*NSW Population Health Survey - see HealthStats NSW*)⁴¹

- Hospitalisations for diabetes among children and adults (principal diagnosis): a reflection of disease complications and the level of access to quality hospital care for the population (*NSW Combined Admitted Patient Epidemiology Data - see HealthStats NSW*)⁴²

As type 2 diabetes usually takes a long time to develop, the impact of childhood obesity on the development of type 2 diabetes may not be observed until later in life. Monitoring the prevalence of diabetes in the child and adult population provides a more complete understanding of the impact of the condition in the wider community.

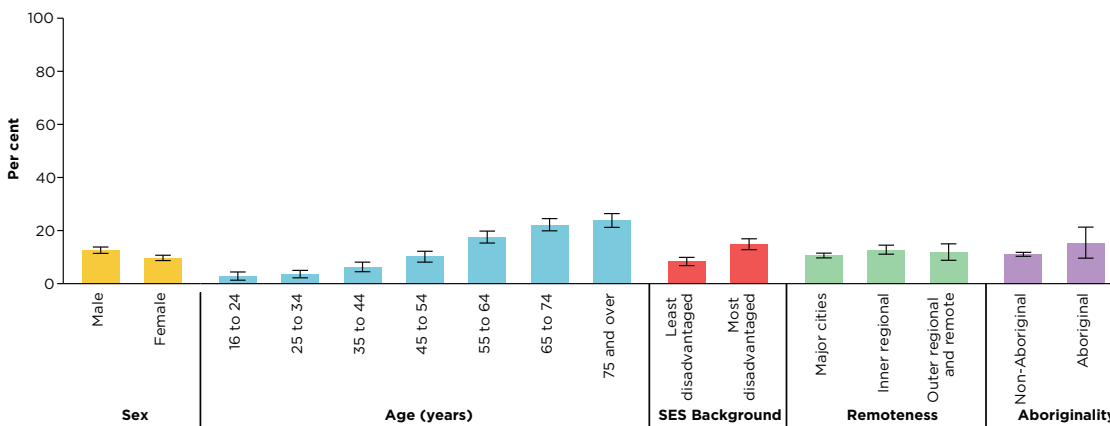
Diabetes prevalence increases with age and is higher among men and those of low SES

Estimates of diabetes prevalence in adults 16 years and over in 2018:

- Sex: Men (12.6%) > Women (9.7%)
- Age: 16–24 years (2.8%) < 75 years and over (23.8%)
- SES: Least disadvantaged (8.4%) < Most disadvantaged (14.8%)
- Remoteness: Major cities (10.6%); Inner regional (12.8%); Outer Regional and Remote (11.9%)
- Aboriginality: Non-Aboriginal persons (11.0%); Aboriginal persons (15.4%) (Figure 47).

It is likely that these figures underestimate the actual prevalence as there could be many people with undiagnosed diabetes in NSW.

Figure 47. Prevalence of diabetes or high blood glucose, persons aged 16 years and over, NSW 2018



Source: HealthStats NSW

There are few hospitalisations for type 2 diabetes among children

In 2017-18, there were 8,352 people in NSW admitted to hospital for type 2 diabetes (hospitalisation rate of 89.6 per 100,000 population). Of these, very few hospitalisations (0.6 per 100,000 population) were persons aged 0-14 years. Rates increased with age (Figure 48).⁴²

Hospitalisations for type 2 diabetes have increased, but not among children

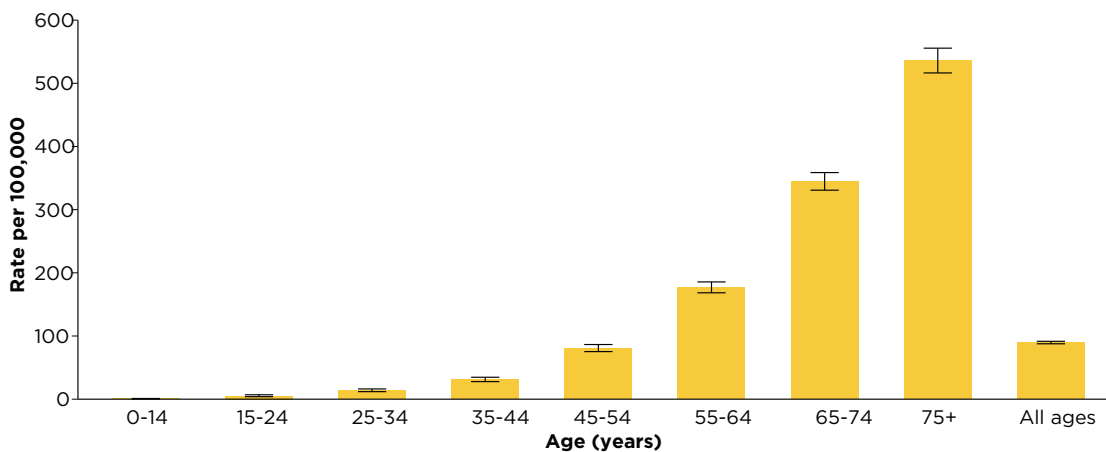
Between 2010-11 and 2017-18, the hospitalisation rate for type 2 diabetes for all ages increased (from 74.1 per 100,000 to 89.6 per 100,000). During this period, the hospitalisation rate for type 2 diabetes remained stable for children aged 0-14 years.

Hospitalisations for type 2 diabetes are higher for Aboriginal children and young adults and those of low SES

Hospitalisation rate for type 2 diabetes for children and young adults (0-24 years) in 2017-18:

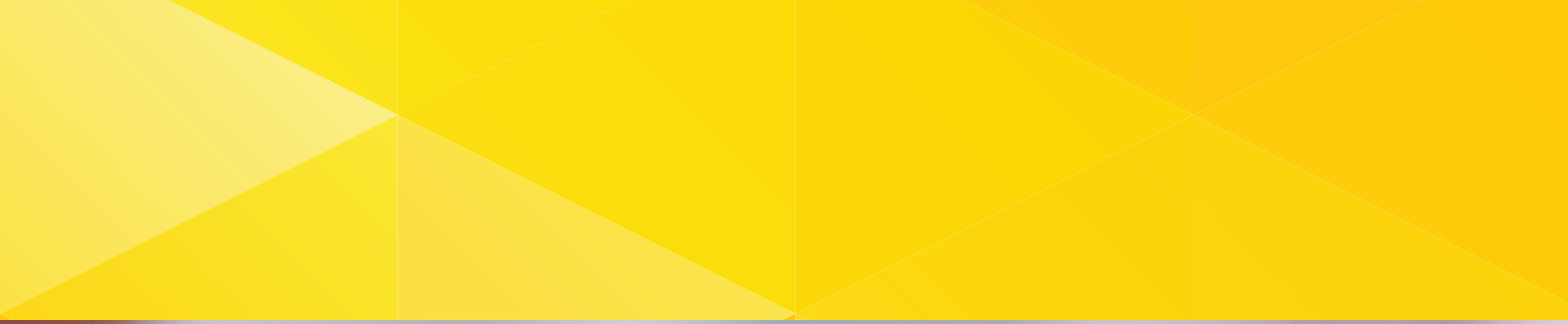
- SES background: Least disadvantaged (0.6 per 100,000) < Most disadvantaged (3.8 per 100,000)
- Aboriginality*: Non-Aboriginal people (1.6 per 100,000) < Aboriginal people (6.8 per 100,000).⁴²

Figure 48. Type 2 diabetes hospitalisations by age, NSW, 2017-18



Source: HealthStats NSW

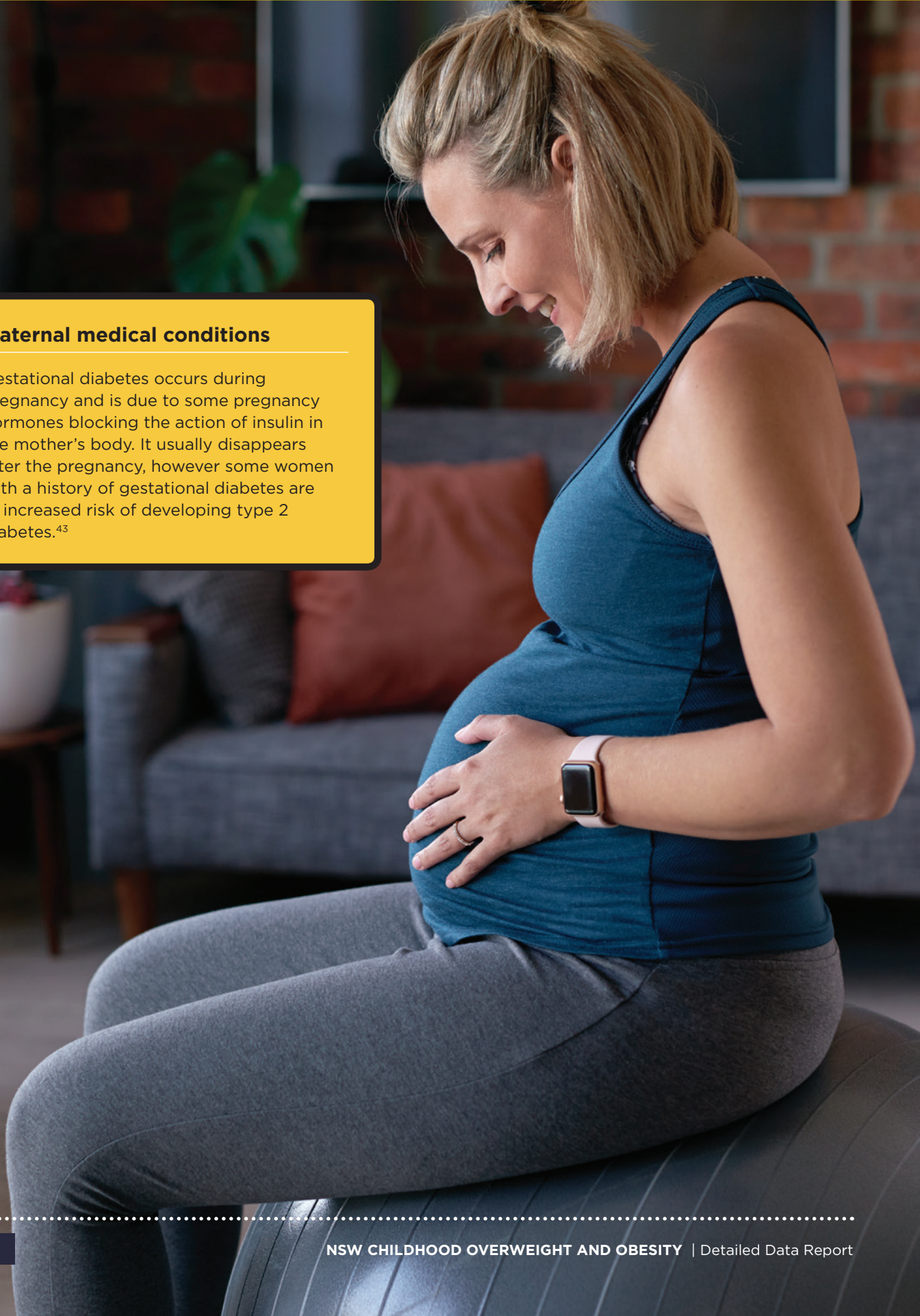
*Data relating to Aboriginal and non-Aboriginal people are for 2016-17, as population projections were not available to the NSW Ministry of Health at the time of publication.





Maternal medical conditions

Gestational diabetes occurs during pregnancy and is due to some pregnancy hormones blocking the action of insulin in the mother's body. It usually disappears after the pregnancy, however some women with a history of gestational diabetes are at increased risk of developing type 2 diabetes.⁴³



Rates of maternal diabetes are increasing

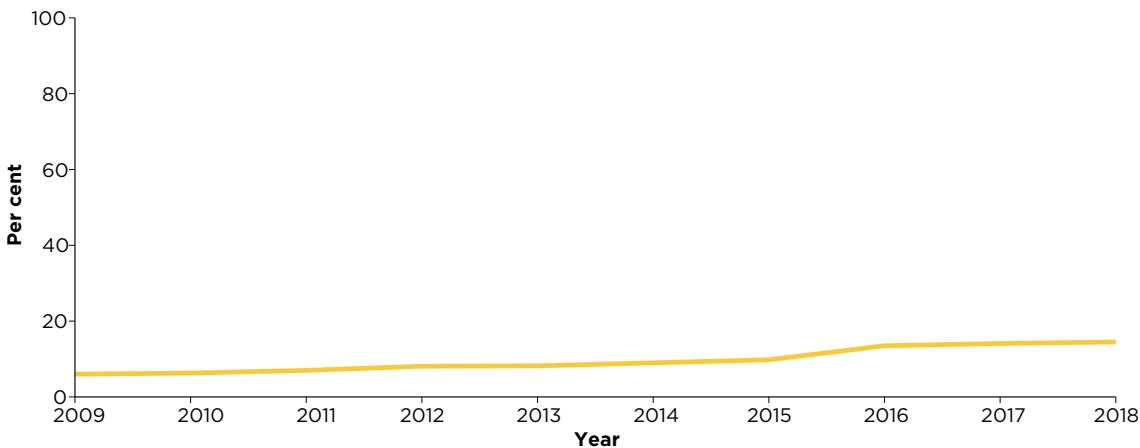
In 2018, around 1 in 7 mothers (14.5%) who gave birth in NSW had diabetes. There was a large increase in the reported rate of gestational diabetes between 2015 and 2016, following widespread implementation of the *Australasian Diabetes in Pregnancy Society (ADIPS) Consensus Guidelines* during 2016 (Figure 49).⁴⁴ Prior to the introduction of the guidelines, there was an increase in maternal diabetes prevalence from 4.9% in 2007 to 9.8% in 2015.

Maternal diabetes is more common among those from major cities, of low SES and non-Aboriginal backgrounds^{†‡}

2018 prevalence of maternal diabetes (gestational and pre-existing):

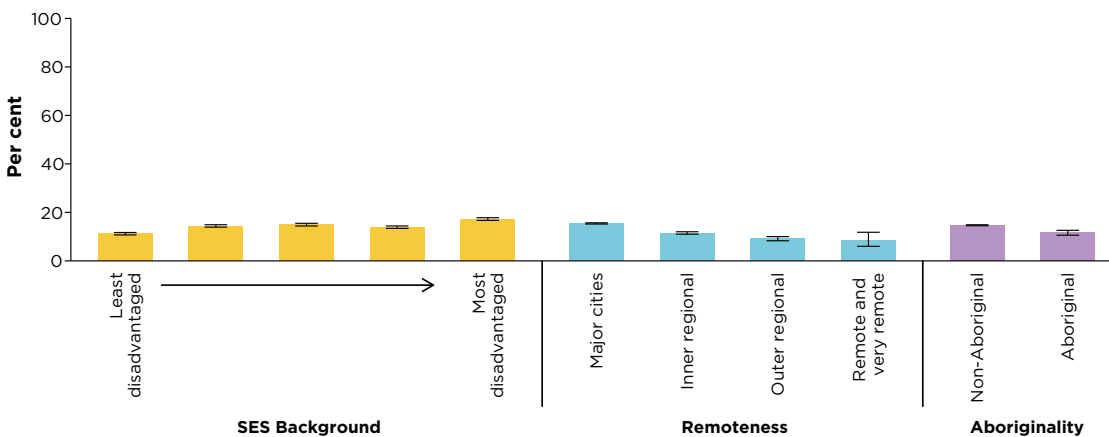
- Remoteness: Major cities (15.4%) > Inner regional (11.5%) > Outer regional (9.1%); Remote and very remote (8.6%)
- SES: Least disadvantaged (11.2%) < Most disadvantaged (17.2%)
- Aboriginality: Non-Aboriginal (14.7%) > Aboriginal (11.6%) (Figure 50).

Figure 49. Maternal diabetes prevalence, NSW trend[†]



Source: NSW Perinatal Data Collection
[†]Maternal diabetes includes pre-existing and gestational

Figure 50. Maternal diabetes prevalence, NSW 2018[†]

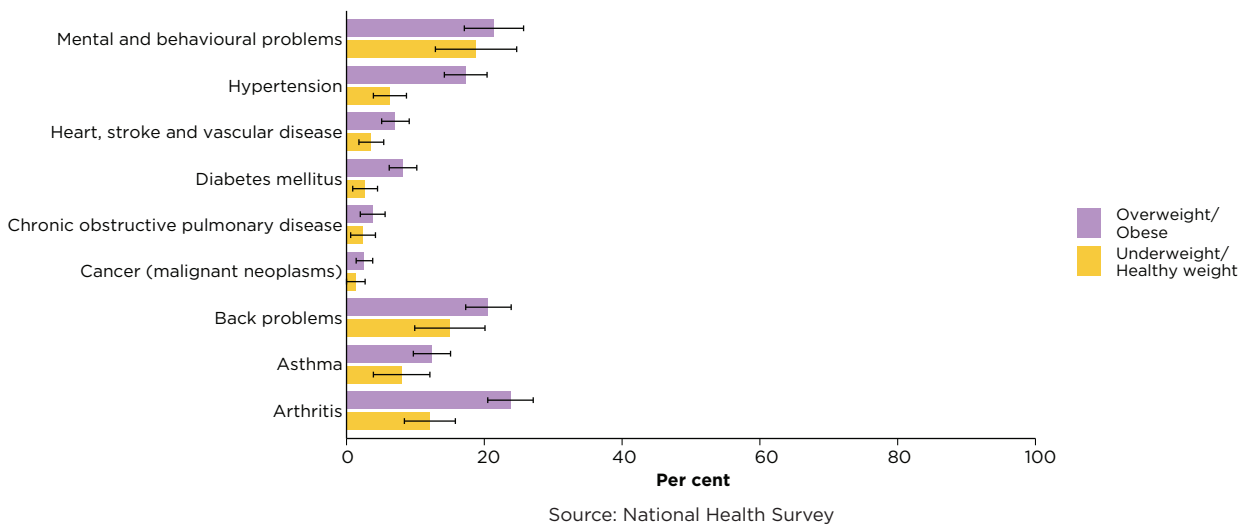


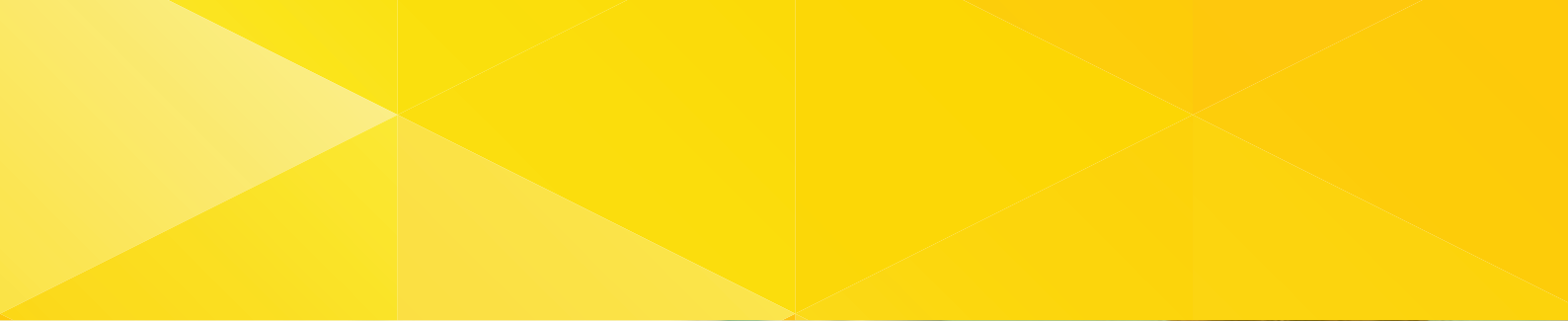
Source: NSW Perinatal Data Collection
[†]Variation may reflect differences in access to antenatal care and screening between population groups

Overweight and obesity increases the likelihood of developing chronic disease

In 2017-18, NSW adults who were overweight or obese reported higher rates of many chronic conditions compared to adults who were underweight or at a healthy weight. Adults who were overweight or obese were 3.0 times more likely to report diabetes, 2.7 times more likely to report hypertension and 2.0 times more likely to report arthritis (Figure 51).⁶

Figure 51. Prevalence of long-term health conditions by weight status, NSW adults, 2017-18





Awareness of chronic disease risks

Research shows that most parents agree that making small changes to what you eat (85%) and to how physically active you are (87%) will reduce your risk of chronic disease.¹⁶ As parents play an important role in influencing their child's behaviour, it is important that the risks and health impacts of overweight and obesity are well understood. Public communications and programs aim to educate and inform parents and children in an effort to support the adoption of healthy lifestyle choices.

What is the burden of disease due to overweight and obesity in Australia?

Burden of disease estimates capture both the quantity (years of life lost due to premature death (YLL)) and quality (years lived in ill health or with disability (YLD)) of life impacted as a result of overweight and obesity. The DALY (or disability-adjusted life year) is the summary measure which combines YLL and YLD to count the total years of healthy life lost from disease.³

The disease burden due to obesity has increased, while the burden due to overweight has decreased

In 2015, 8.4% of the total health burden in Australia was due to overweight and obesity. Overweight and obesity contributed 9.1% of fatal burden (YLL) and 7.7% of non-fatal burden (YLD). Overweight and obesity was the second highest risk factor for burden of disease in 2015, behind tobacco use.³

The age standardised rate of total burden of disease attributable to obesity was higher in 2015 than in 2003 (6% higher in 2015), while the burden attributable to overweight was lower (16% lower in 2015). The total age standardised burden attributable to overweight and obesity was 4.6% lower in 2015 than 2003.

Overweight and obesity burden is higher among men and those of low SES

Proportion of total health burden due to overweight and obesity:

- Sex: There was a larger burden among males (8.7% of total burden), compared to females (8.1%)
- SES: The burden among the lowest SES group was 2.0 times higher than the highest SES group.

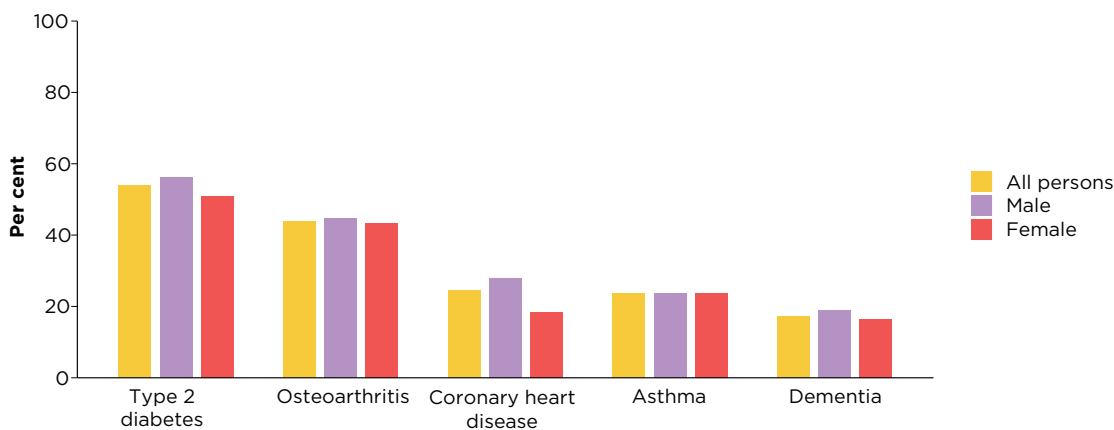
Overweight and obesity accounts for over half of the burden from type 2 diabetes

Overweight and obesity contributes to the burden of 30 diseases. Asthma is the only disease linked to overweight and obesity in children aged less than 15 years.

Proportion of total burden attributable to overweight and obesity for the top five linked diseases in 2015 (Figure 52):

- Type 2 diabetes: 53.9%
- Osteoarthritis: 43.8%
- Coronary heart disease: 24.6%
- Asthma: 23.7%
- Dementia: 17.3%.³

Figure 52. Proportion of total burden attributable to overweight and obesity, Australia 2015



Source: AIHW 2019, Burden of Disease Study

Impact of overweight and obesity

The *Australian Burden of Disease Study* assessed the impact of overweight and obesity and showed it as one of the leading risk factors for ill health and death. The analysis included 30 diseases resulting from overweight and obesity, including: 17 types of cancer, 4 cardiovascular diseases, 3 musculoskeletal conditions, type 2 diabetes, dementia, asthma and chronic kidney disease.

Burden of disease studies compare the impact of different diseases or injuries on a population. These studies are able to attribute a proportion of burden to risk factors. The *Australian Burden of Disease Study 2015* found that around 38% of the burden of disease was preventable; being due to modifiable risk factors such as tobacco use, high body mass, alcohol use, physical inactivity and high blood pressure.³

Hospitalisations due to high body mass are decreasing

In 2017-18 there were 66,869 hospitalisations in NSW which were attributed to high body mass. The rate of high body mass attributable hospitalisations has decreased over the past 8 years (839.7 per 100,000 in 2010-11 to 734.5 per 100,000 in 2017-18).⁴⁵

Hospitalisations due to high body mass are higher among men, Aboriginal people and those of low SES*

Rates of high BMI attributable hospitalisations in 2017-18:

- Sex: Males (867.6 per 100,000) > Females (613.8 per 100,000)
- Aboriginality*: Non-Aboriginal (687.9 per 100,000) < Aboriginal (1353.9 per 100,000)
- SES: Least disadvantaged (675.4 per 100,000) < Most disadvantaged (811.9 per 100,000).

Deaths due to high body mass have decreased

Overweight and obesity is a major risk factor for a range of chronic conditions that can lead to premature death.³

In 2017, there were 3,758 deaths in NSW attributable to high body mass. The rate of high body mass attributable deaths has decreased over the past 10 years from 42.1 deaths per 100,000 population in 2008 to 37.0 deaths per 100,000 in 2017.⁴⁶

Deaths due to high body mass are higher among those of low SES and lower for those in major cities

2017 rates of high BMI attributable deaths:

- SES: Least disadvantaged (26.5 per 100,000) < Most disadvantaged (48.8 per 100,000)
- Remoteness: Major cities (35.9 per 100,000) < Inner regional (42.8 per 100,000) and Outer regional (46.1 per 100,000) and Remote and very remote (59.8 per 100,000).

*Data relating to Aboriginal and non-Aboriginal people are for 2016-17, as population projections were not available to the NSW Ministry of Health at the time of publication.

What are the economic impacts of overweight and obesity?

Obesity and obesity related illness have a significant impact on the Australian economy.

In 2008, the financial cost of obesity in Australia was estimated to be \$8.3 billion. Of this, \$3.6 billion was estimated to be related to productivity costs, \$2.0 billion related to health system costs and carer costs were in the order of \$1.9 billion.³⁷

The costs of individuals' lost wellbeing was valued at \$49.9 billion; bringing the total cost of obesity to \$58.2 billion across Australia. Of this, \$19.0 billion was apportioned to NSW.³⁷

The OECD estimates that overweight and obesity accounts for 8.6% of health expenditure in Australia.⁴⁷ Obese individuals have been found to have medical costs that are approximately 30% greater than those of a healthy weight.⁴⁸

Overweight and obesity, and related chronic diseases, also have a negative impact on the labour market and the economy through lack of employment, absenteeism and presenteeism.⁴⁹ It is estimated that overweight and obesity lowers labour market outputs by the equivalent of 371,000 full-time workers per year.⁴⁸

APPENDICES

Appendix 1: Data sources and interpretation of data

This report presents data from various sources, for a range of weight-related behaviours and health outcomes for NSW children. The methods used to collect information vary between data sources; as such, each provides a unique perspective on the issues reported.

In this report, for some indicators, estimates are reported from multiple sources. Comparing estimates from multiple sources is a valuable tool to validate findings and gain a better understanding of the true nature of the issue. In other cases a single source has been chosen following an assessment of the data quality.

Data sources, caveats and limitations

For most of the weight-related behaviours, the NSW Population Health Survey is the primary data source used to report outcomes and monitor progress. This is because the survey is administered every year, which makes it possible to monitor long-term trends in weight-related behaviours and health outcomes. For many of the weight-related behaviours (Nutrition and Physical Activity Chapters) SPANS data are also reported. SPANS captures a large cohort of students, which improves the accuracy of estimates and allows for more detailed analysis of population sub-groups. SPANS data are collected infrequently and cannot be used to monitor annual trends for the indicators included in this report.

The main reasons for variation between these two data sources are described below.

Self-report vs objective measures of height and weight

The NSW PHS provides an annual estimate of the prevalence of childhood overweight and obesity for children aged 5 to 16 years. This is based on parent-reported estimates of their child's height and weight for children 5-15 years and self-reported height and weight for children 16 years of age. The PHS is valuable as an ongoing source to monitor prevalence trends however there is a likelihood that the child's weight will be underestimated.

Conversely, SPANS collects physical height and weight measurements for students in Kindergarten and Years 2, 4, 6, 8 and 10. Although physical measurements provide a more accurate estimate, this survey is conducted infrequently and so cannot be used to monitor annual progress.

Parent-report vs self-reported measures of health behaviours

The NSW PHS collects information from parents for children up to 15 years of age, with 16 year olds completing the interview themselves. SPANS collects information from parents of students in Kindergarten, Years 2 and 4, and collects information directly from students in Years 6, 8 and 10. This variation between methods may account for some of the variation between sources for many of the indicators included in this report.

There are a range of other factors that may also contribute to variation in estimates from different sources – see Appendix 2. These include age groups reported, survey sampling methodology and indicator definitions.

This report also uses data sourced from HealthStats NSW, an interactive, web-based application that allows users to freely access data and tailor reports about the health of the NSW population. This report mainly uses HealthStats NSW for impacts-related data, but many of the reported weight-related behaviours from the NSW PHS can also be found on HealthStats NSW.

Presentation and interpretation of data

Throughout this report:

- data have been presented to one decimal place, where this level of detail is available,
- the convention for presentation of time periods is consistent with that used in HealthStats NSW, i.e.:
 - 2016-2017 represents two calendar years' of data - 2016 plus 2017 (combined)
 - 2016-17 represents a financial year
- where an estimate is said to have increased or decreased over time, or to be higher or lower than another estimate, the difference is statistically significant
- data presented from the SPANS Survey have undergone formal statistical testing. Where there are instances of data from the SPANS Survey showing overlapping confidence intervals and an estimate is noted in the text to have increased or decreased, or otherwise be different from another estimate, this statement was based on formal significance testing carried out by the authors of the SPANS 2015 Full Report.⁵ The SPANS 2015 Full Report notes that formal significance testing was carried out using methods that accounted for the complex sampling strategy used in that survey. For more information, please see Chapter 2: Methods in the SPANS 2015 Full Report.⁵

The following examples show how to interpret the abbreviated presentation of statistically significant differences used in this report:

Sex: Boys (6.1%); Girls (8.9%) – interpretation = no significant difference between boys and girls

Sex: Boys (29.9%) > Girls (18.0%) – interpretation = boys significantly higher than girls

Age: 2-4 years (9.8%) < 5-11 years (25.9%) < 12-15 years (33.6%) – interpretation = children aged 2-4 years significantly lower than those aged 5-11 years and those aged 5-11 years significantly lower than those aged 12-15 years

Age: 2-4 years (17.4%) > 5-11 years (5.2%) and 12-15 years (4.4%) – interpretation = children aged 2-4 years significantly higher than those aged 5-11 and higher than those aged 12-15 years; no significant difference between 5-11 and 12-15 year olds

Remoteness: Major cities (7.0%); Inner regional (9.6%); Outer regional and remote – interpretation = there are no significant differences between any of the groups

Remoteness: Major cities (26.3%) > Inner regional (20.0%); Outer regional and remote (23.7%) – interpretation = Major cities significantly higher than Inner regional; no significant differences between Outer regional and remote and either of the other two groups



Reliability of estimates

For some of the sub-group analyses in this report, sample sizes are relatively small. For instance, the small sample of children surveyed in the Population Health Survey from outer regional and remote areas means there is a larger degree of uncertainty (wider confidence intervals) around the estimate. Although the estimate of the prevalence of overweight and obesity in outer regional and remote areas is higher than for major cities and inner regional areas, the larger sampling error suggests that the difference in prevalence estimates between areas may not be statistically significant (see Figure 7).

Accurate data on the prevalence of overweight and obesity are not available for Local Health Districts as the sample size surveyed for each district in the PHS is not large enough to make reliable comparisons.

The sample size is also not large enough to provide accurate data on the prevalence of overweight and obesity, or other primary and secondary indicators, for priority populations, including Aboriginal people.

In this report the margins of error, representing 95% confidence intervals, are shown as error bars ('wings') on bar charts and shaded areas on line charts.

Future opportunities

In order to provide a comprehensive report on the nature of the issue of childhood overweight and obesity, future iterations of this report will explore and report on new and emerging data sources as they become available. Data sources that include a large number of children, such as the Active Kids Program, will be able to give very precise measures of overweight and obesity for different groups of children, but may not be representative of children generally.

With increasing recording of childhood height and weight in computer systems in NSW Health services, it will be possible to determine the level of childhood overweight and obesity for groups of children that are in contact with these services. When combined with information from surveys on the use of these health services and participation in programs such as the Active Kids Program, it may be possible to use data from multiple sources to provide a more detailed and precise picture of overweight and obesity in NSW children in the future.

Appendix 2: Description of survey data sources

Data source	NSW POPULATION HEALTH SURVEY (PHS)	NSW SCHOOLS PHYSICAL ACTIVITY AND NUTRITION SURVEY (SPANS)	NATIONAL HEALTH SURVEY (NHS)	GLOBAL HEALTH OBSERVATORY DATA REPOSITORY	AUSPLAY SURVEY
Primary purpose	To provide detailed information on the health of adults and children in NSW and to support planning, implementation and evaluation of health services and programs in NSW.	Cross-sectional population survey of NSW schoolchildren. Primary purpose is to report on the change in rates of overweight, obesity and weight related behaviours.	Designed to collect a range of information about the health of Australians.	Aim is to provide easy access to: <ul style="list-style-type: none"> Country data and statistics with a focus on comparable estimates; World Health Organization's analyses to monitor global, regional and country situation and trends. 	Objectives are to: <ul style="list-style-type: none"> Provide insights to help sports grow participation and track trends Provide data that informs government investment, policy and program delivery; and Identify and describe links between sport participation and other influential factors.
Collection methodology	Collected through computer-assisted telephone interviewing (CATI). Interviews are carried out continuously between February and December each year.	SPANS is comprised of two parts: <ul style="list-style-type: none"> A questionnaire: identical questions formatted according to children's year group, completed by either parents (of children in K, 2 and 4) or students (Years 6, 8 and 10) Objective measurements: collected by trained field staff. 	Trained ABS interviewers conducted personal interviews with selected residents in sampled dwellings. The sample is spread randomly across the 12-month enumeration period.	Household surveys. Methodology varies between countries.	Conducted by CATI. The sample is spread evenly across the year.

Data source	NSW POPULATION HEALTH SURVEY (PHS)	NSW SCHOOLS PHYSICAL ACTIVITY AND NUTRITION SURVEY (SPANS)	NATIONAL HEALTH SURVEY (NHS)	GLOBAL HEALTH OBSERVATORY DATA REPOSITORY	AUSPLAY SURVEY
<p>Target population is all state residents living in private households.</p> <p>Uses an overlapping dual-frame design. Respondents reached by a landline phone number undergo a within-household selection process.</p> <p>When an adult respondent that lives in a household with a child or children is selected, they are offered the opportunity to complete a secondary interview about one of their children.</p> <p>Sample methodology</p>	<p>The sample includes primary and secondary schools that were randomly sampled from Government, Catholic and Independent schools across NSW.</p>	<p>Dwellings selected at random using a multistage area sample of private dwellings. Within each selected dwelling, one adult (18 years and over) and one child (0-17 years) is randomly selected for inclusion.</p>	<p>Dwellings selected at random using a multistage area sample of private dwellings. Within each selected dwelling, one adult (18 years and over) and one child (0-17 years) is randomly selected for inclusion.</p>	<p>Varies between countries.</p>	<p>All Australian residents are in scope.</p> <p>Uses an overlapping dual frame design. Respondents reached by a landline phone number undergo a within-household selection process.</p> <p>For either the landline or mobile sample, a random child is selected for a child interview.</p>
<p>Sample size</p>	<p>In 2015, surveyed children and adolescents in 84 schools, and obtained information from 7,556 school students. These students were representative of all school students in NSW.</p>	<p>In 2017-18, 16,384 private dwellings across Australia (3,272 NSW dwellings), yielding a total sample for the survey of 21,315 persons (4,273 NSW persons).</p>	<p>The annual target sample size for AusPlay is 20,000 adults aged 15 years and over (approximately 5,200 NSW adults), and approximately 3,600 children aged 0-14 (approximately 870 NSW children).</p>	<p>Varies between countries.</p>	<p>The annual target sample size for AusPlay is 20,000 adults aged 15 years and over (approximately 5,200 NSW adults), and approximately 3,600 children aged 0-14 (approximately 870 NSW children).</p>

Appendix 2: Description of data sources

Data source	NSW POPULATION HEALTH SURVEY (PHS)	NSW SCHOOLS PHYSICAL ACTIVITY AND NUTRITION SURVEY (SPANS)	NATIONAL HEALTH SURVEY (NHS)	GLOBAL HEALTH OBSERVATORY DATA REPOSITORY	AUSPLAY SURVEY
Age range used for 'child'	Different ranges used depending on the indicator: <ul style="list-style-type: none"> • 2-15 • 5-15 • 5-16 	NSW schoolchildren aged 5-16	0-17	5-19	0-14
Remoteness	<p>Categories:</p> <ul style="list-style-type: none"> • Major cities • Inner regional • Outer regional and remote (including very remote) <p>Postcodes of residence are grouped according to the Australian Statistical Geographical Standard (ASGS) remoteness categories on the basis of Accessibility/Remoteness Index for Australia (ARIA+ version) score.</p>	<p>Categories:</p> <ul style="list-style-type: none"> • Urban • Rural <p>Postcode of residence was used to determine locality, using the Australian Statistical Geography Standard (ASGS) Volume 5 – Remoteness Areas (RA). Children living in 'major cities' were classed as 'urban'; with those living in the remaining remoteness areas classed as 'rural'.</p>	n/a	n/a	n/a

Data source	NSW POPULATION HEALTH SURVEY (PHS)	NSW SCHOOLS PHYSICAL ACTIVITY AND NUTRITION SURVEY (SPANS)	NATIONAL HEALTH SURVEY (NHS)	GLOBAL HEALTH OBSERVATORY DATA REPOSITORY	AUSPLAY SURVEY
<p>Socio-economic status</p>	<p>SES Quintiles:</p> <ul style="list-style-type: none"> • Most Disadvantaged to • Least Disadvantaged <p>SES is based on the Socioeconomic Indexes for Areas (SEIFA) Index of Relative Socioeconomic Disadvantage (IRSD) for the postcode.</p>	<p>SES Tertiles:</p> <ul style="list-style-type: none"> • High • Middle • Low <p>The postcode of residence was used as a proxy for SES, based on the ABS' IRSD.</p>	n/a	n/a	n/a

Appendix 2: Description of survey data sources

Data source	NSW POPULATION HEALTH SURVEY (PHS)	NSW SCHOOLS PHYSICAL ACTIVITY AND NUTRITION SURVEY (SPANS)	NATIONAL HEALTH SURVEY (NHS)	GLOBAL HEALTH OBSERVATORY DATA REPOSITORY	AUSPLAY SURVEY
Cultural background	<p>Reported categories:</p> <ul style="list-style-type: none"> • Non English-speaking countries • English speaking countries • Australia <p>Determined by survey 'country of birth' variable.</p>	<p>Categories:</p> <ul style="list-style-type: none"> • English-speaking • European • Middle Eastern • Asian <p>Language spoken most often at home coded according to the ABS' Australian System for Classification of Languages and used to categorise children into four main cultural backgrounds.</p>	n/a	n/a	n/a
Calculation of child overweight and obesity	Calculated using International Obesity Task Force (IOTF) cut-offs.	Calculated using extended IOTF cut-offs.	Calculated using International Obesity Task Force (IOTF) cut-offs.	BMI greater than 1 standard deviation above the median, according to the WHO child growth standards.	n/a
More information	https://www.health.nsw.gov.au/surveys/Pages/default.aspx	https://www.health.nsw.gov.au/health/Pages/spans-2015-full-report.aspx	https://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/4364.0.55.001 Explanatory%20Notes%2017-18? OpenDocument	https://www.who.int/gho/en/	https://www.clearinghouseforsport.gov.au/research/smi/ausplay

Appendix 3: Summary of indicators

	Indicator	Current Estimate	Long-term trend	Measure details
PRIMARY OUTCOMES	Overweight and obesity	24.0% (2018)	→ Stable 2009 to 2018	Children 5-16 years above a healthy weight <i>Source: NSW PHS</i>
	Vegetable intake	6.7% (2017-2018)	→ Stable 2009-2010 to 2017-2018	Children 2-15 years consuming 2.5-5.5 or more serves of vegetables daily (depending on age) <i>Source: NSW PHS</i>
	Fruit intake	64.0% (2017-2018)	↓ Decrease 2009-2010 to 2017-2018	Children 2-15 years consuming 1-2 or more serves of fruit daily (depending on age) <i>Source: NSW PHS</i>
	Physical activity	24.2% (2017-2018)	↓ Decrease 2009-2010 to 2017-2018	Children 5-15 years undertaking 60 minutes or more of physical activity per day (outside of school hours) <i>Source: NSW PHS</i>
	Sedentary behaviours	44.9% (2017-2018)	→ Stable 2009-2010 to 2017-2018	Children 5-15 years spending more than 2 hours per day on screen time (at home) <i>Source: NSW PHS</i>
SECONDARY OUTCOMES	Water intake	54.0% (2017-2018)	→ Stable 2009-2010 to 2017-2018	Children 2-15 years drinking 4 or more cups per day <i>Source: NSW PHS</i>
	Sugar-sweetened drink consumption	41.9% (2017-2018)	↓ Decrease 2009-2010 to 2017-2018	Children 2-15 years drinking sugar-sweetened drinks regularly <i>Source: NSW PHS</i>
	Juice consumption	52.1% (2017-2018)	↓ Decrease 2009-2010 to 2017-2018	Children 2-15 years drinking juice regularly <i>Source: NSW PHS</i>
	Unhealthy snacks (salty snacks) consumption	17.0% (2017-2018)	↑ Increase 2012-2013 to 2017-2018	Children 2-15 years eating salty snacks daily <i>Source: NSW PHS</i>
	Takeaway (fast food) consumption	40.1% (2017-2018)	↑ Increase 2012-2013 to 2017-2018	Children 2-15 years consuming takeaway at least weekly <i>Source: NSW PHS</i>
	Breastfeeding	72.6% (2018)	↓ Decrease 2009 to 2018	Infants fully breastfed at time of discharge from hospital <i>Source: HealthStats NSW</i>
	Travel by car (Active travel proxy)	53.9% (2015)	↑ Increase 2010 to 2015	Primary school children driven to school by car 5 days per week <i>Source: SPANS</i>
	Influence of nutritional information	46.6% (2018)	Long-term trend unavailable	Parents of children under 16 years, reporting nutritional information has an influence on purchasing <i>Source: NSW PHS</i>
	Dental caries	Rate 400.6 per 100,000 (2017-18)	↑ Increase 2009-10 to 2017-18	Children 0-14 years hospitalised for removal and/or restoration of teeth for dental caries <i>Source: HealthStats NSW</i>
	Diabetes or high blood glucose	11.1% (2018)	↑ Increase 2009 to 2018	Persons 16 years and over with diabetes or high blood glucose <i>Source: HealthStats NSW</i>
	Maternal diabetes	14.5% [^] (2018)	[^] Increase the result of a change to guidelines in 2016	Mothers with maternal diabetes <i>Source: Perinatal Data Collection</i>

ACRONYMS

ABS	Australia Bureau of Statistics
AHS	Australian Health Survey
AIHW	Australian Institute of Health and Welfare
BMI	Body mass index
CATI	Computer assisted telephone interviewing
DALY	Disability-adjusted life years
ECHS	Early childhood health service
EDNP	Energy dense nutrient poor
HFZ	Healthy fitness zone
NHS	National Health Survey
PDHPE	Personal Development, Health and Physical Education
PHS	Population Health Survey
SES	Socioeconomic status
SPANS	Schools Physical Activity and Nutrition Survey
WHR	Waist-to-height ratio
YLD	Years lived with disability
YLL	Years of life lost

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