

6.6 Childhood overweight and obesity

Overweight and obesity is an important public health issue in Australia and around the world. It reflects abnormal or excessive fat accumulation in the body that can present significant risks to health. It generally occurs when more energy is consumed through eating and drinking than is expended through physical activity (energy imbalance).

Childhood overweight and obesity is a major concern that puts children at an increased risk of poor physical health in the short term and of developing many chronic diseases later in life (Daniels 2006). In 2008, the total annual cost of obesity to Australia, including health system costs, loss of productivity costs and carers' costs, was estimated at around \$58 billion (Access Economics 2008). The future implications of obesity in terms of the population's health and wellbeing, and the resources necessary for the health system to respond are likely to be considerable.

This article looks at the prevalence of overweight and obesity in children, and key contributing factors: physical activity and nutrition. In this article, children are defined as aged 5–14. Overweight and obesity is measured using body mass index (BMI) (See Box 6.1). Unless otherwise stated, data are drawn from customised reports from the ABS 2011–12 Australian Health Survey and the 2011–12 National Nutrition and Physical Activity Survey.

Box 6.1

Defining and measuring overweight and obesity

Body mass index (BMI) is used to indirectly measure overweight and obesity in the child population. It is calculated as the ratio of weight in kilograms divided by height in metres squared (kg/m^2).

At the population level, **international cut-off points** are used to determine the number of children either overweight or obese based on their age and sex (Cole et al. 2000). In children, BMI changes substantially with age and can differ between boys and girls, rising steeply in infancy, falling during the preschool years and increasing through to adolescence and into adulthood (DoHA 2009).

The ABS 2011–12 Australian Health Survey collected physical measurements of the height and weight of around 85% of the children aged 5–14 sampled for the survey. Therefore, the estimate of the number of overweight and obese children presented below assumes that the pattern of overweight/obesity amongst those children who were not measured is the same as for those who were.

What do we know?

In 2011–12, of children aged 5–14 who had their measurements taken for the ABS Australian Health Survey, an estimated 26% were either overweight (19%) or obese (7%). This is equivalent to around 716,000 Australian children aged 5–14 (see Box 6.1). Over two-thirds (69%) of children had a healthy weight, with the remaining 5% being underweight. There was no significant difference between boys and girls, or between age groups 5–9 years and 10–14 years.

Implications of overweight and obesity

In the short term, overweight and obesity increases a child's risk of developing conditions that can affect physical health, such as sleep apnoea, breathlessness on exertion and/or reduced exercise tolerance, some orthopaedic and gastrointestinal problems, and non-alcoholic fatty liver disease (NHMRC 2013).

Overweight and obese children also frequently experience discrimination, bullying and teasing by their peers. This may contribute to poor peer relationships, school experiences and psychological wellbeing, particularly among older overweight or obese children (Griffiths et al. 2006; Hayden-Wade et al. 2005; NHMRC 2013; Sawyer et al. 2006).

In the long term, obese children are at greater risk of persistent obesity, cardiovascular risk factors, diabetes, certain cancers, depression, arthritis, and premature mortality (Guo et al. 2002; Reilly & Wilson 2006).

While research from the Longitudinal Study of Australian Children (LSAC) found that some children who were overweight at a young age (4–5 years) did return to a healthy body weight at 8–9 years, obesity generally becomes increasingly entrenched throughout early childhood and possibly less reversible by the middle school years (Wake & Maguire 2012). Overweight and obese children are subsequently at risk of being overweight and obese in adulthood.

Overweight and obese adults have increased likelihood of illness and early death (Daniels 2006; Guo et al. 2002). Conditions such as cardiovascular disease, diabetes and some cancers (such as colon, kidney, endometrial and breast cancer) have been associated with obesity. In addition, carrying extra weight can lead to musculoskeletal problems such as osteoarthritis and back pain (Crowle & Turner 2010). As a consequence, more bariatric surgeries are being performed, as are knee replacements and hip replacements (Bourne et al. 2007; Gilbert & Wolfe 2012). Obesity can also adversely affect fertility (Pasquali et al. 2007), and is associated with an increased rate of caesarean birth (Callaway et al. 2006; Chu et al. 2007; HAPO 2010). Obesity can also have an intergenerational health effect for the mother and baby (Li et al. 2009).

Costs

Little is known about the costs of childhood obesity. However, research based on data from the Longitudinal Study of Australian Children found that being overweight at age 4–5 was associated with significantly higher medical and pharmaceutical costs for children in their first 5 years at school (Au 2012). In addition, the ill health that arises from overweight and obesity in adults is an added burden for the health system. The costs of overweight and obesity in 2008–09 were estimated to be \$37.7 billion. This comprises direct health-care costs (associated with 4 main medical conditions: cardiovascular disease, type 2 diabetes, osteoarthritis, and some specific forms of cancer), indirect costs (productivity loss from both missing work or working when unwell and premature mortality) and burden of disease costs (financial and social costs) (Medibank 2010).

Causes of overweight and obesity

While genetic factors strongly influence an individual's predisposition to excess weight gain, the increase in overweight and obesity prevalence around the world in recent decades suggests that there are other important contributors to the energy imbalance that leads to these conditions (WHO 2000). These socio-environmental factors include the increased availability, decreased relative costs and the increased marketing of food and drinks that tend to be more energy dense and relatively nutrient-poor (NHMRC 2013). Less physical activity from an increased reliance on car travel due to urban design, an increase in sedentary pursuits, and reduced perceptions of safety leading to fewer opportunities for physical activity are also involved. Economic and consumer changes, such as a greater number of women in the paid workforce, decreased food literacy and cooking skills, and greater reliance on convenience and takeaway foods are also probable contributors (NHMRC 2013). The key components of successful weight management in children include an increase in physical activity, dietary modification, reducing sedentary behaviours and the involvement of parents (Hughes & Reilly 2008). Early childhood is an ideal period for prevention and early intervention, particularly as food preferences and dietary habits are firmly established in the early years of life (Benton 2004; Daniels et al. 2009).

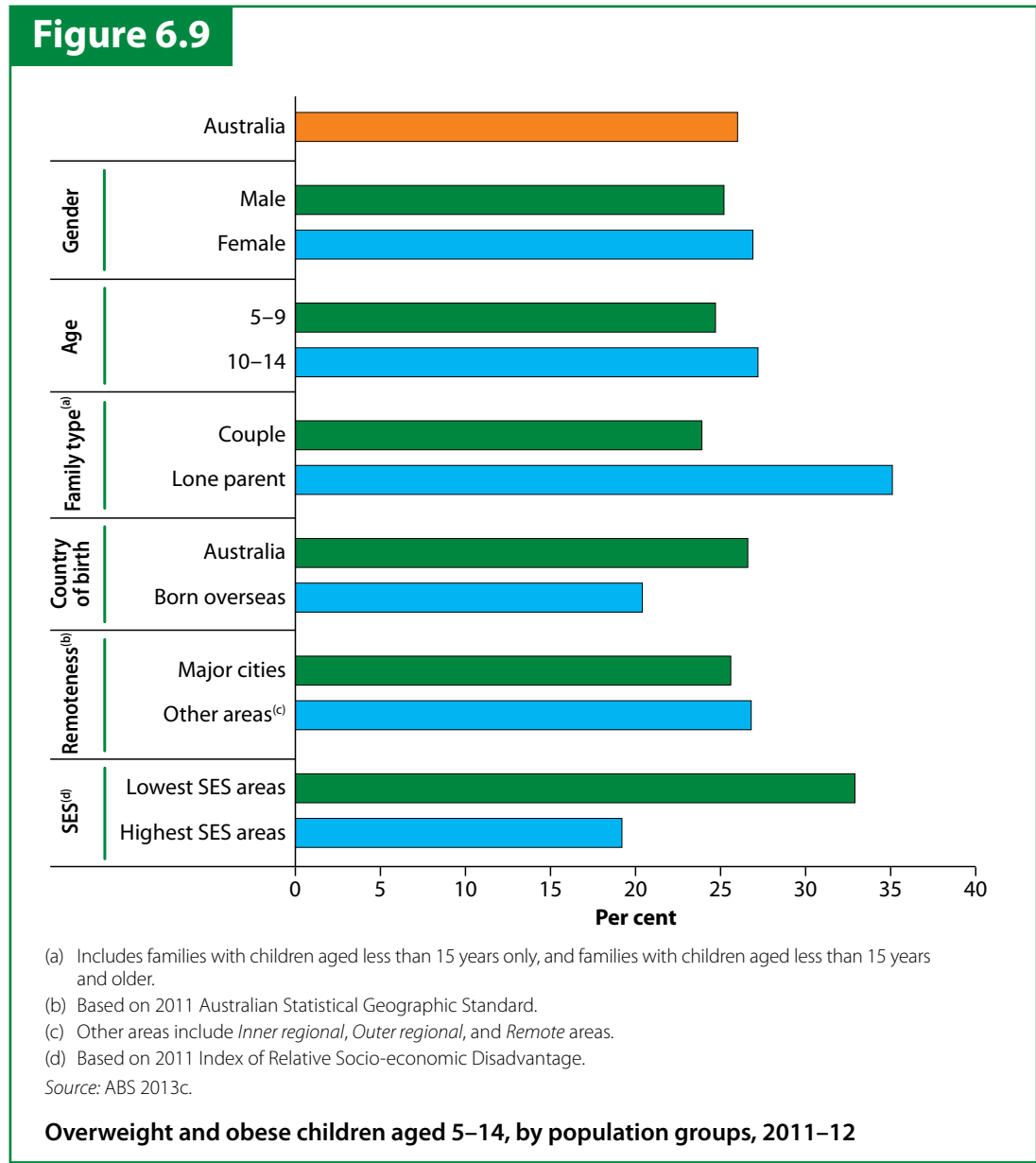
Children are central to the National Partnership Agreement on Preventive Health (NPAPH) which focuses on the rising prevalence of behaviour-related chronic diseases, including those caused by overweight and obesity, and aims to lay the foundations for healthy behaviours in the daily lives of Australians. The NPAPH came into effect in 2009.

Does overweight and obesity vary across population groups?

Children living in couple families were less likely to be overweight or obese than those living in one-parent families (24% compared with 35%) (see Figure 6.9). Overseas-born children were less likely to be overweight or obese (20%) than their Australian-born counterparts (27%). Children living in areas with the lowest socioeconomic status (33%) were more likely to be overweight or obese compared with those living in the highest socioeconomic status areas (19%). These differences are consistent with findings on overweight and obesity for the total population (see Chapter 5, 'Behavioural risk

factors'; Wake & Maguire 2012). In 2012–13, 33% of Indigenous children aged 5–14 years were overweight or obese (ABS 2013a).

There were no significant differences in levels of childhood overweight and obesity between those who lived in *Major cities*, and those who lived elsewhere (26% compared with 27%). (Data were not collected for children living in *Very remote* areas.)



Has there been a change over time?

Obtaining a picture of trends of overweight and obesity over time for 5–14 year olds is difficult because of a lack of directly comparable data. Between 1985 and 1995, levels of excess body weight in children showed an apparent dramatic increase for both boys (from 10.7% to 20.5%) and girls (from 11.8% to 21.1%). However, these surveys (the 1985 Australian Health and Fitness survey and the 1995 National Nutrition Survey) looked at different age groups, 7–15 years and 5–17 years respectively, which can affect comparability (AIHW 2010).

Between 1995 and 2007–08, estimates from large-scale national surveys for children aged 5–12 showed only a slight increase in measured overweight and obesity, from 21% in 1995 to 22% in 2007–08 (ABS 2009).

The 2011–12 Australian Health Survey showed that in the 4 years since the 2007–08 National Health Survey there was no statistically significant difference in the proportion of overweight or obese 5–14 year olds (23% in 2007–08 and 26% in 2011–12). Other research also suggests that childhood obesity rates plateaued between 1996 and 2008 (Olds et al. 2011).

The overall conclusion that can be drawn from this variety of data sources is that the prevalence of overweight and obesity among children and adolescents has shown little change in Australia over the last 17 years—but the rates remain high, and are therefore a cause for concern.

International comparisons

International comparisons are limited due to differences in data collection methods between countries, and the years of data collection. Data from the International Association for the Study of Obesity reported by the OECD in 2013 showed that Australia ranked 18th out of 40 countries in the proportion of overweight and obese boys. The United Kingdom reported the same proportion as Australia (22%). However, the news was not as good for Australian girls, where Australia ranked 10th in the proportion of girls who were overweight or obese, with Spain and Canada reporting the same proportion as Australia (24%). Greece had the highest values for both boys and girls (44% and 38% respectively) while Indonesia had the lowest values for both boys and girls (11% and 8% respectively) (OECD 2013).

Physical activity and screen time

How many children met the physical activity recommendations?

Based on the 2011–12 National Nutrition and Physical Activity Survey, only about one-quarter (23%) of Australian children aged 5–14 met the national physical activity recommendations every day (see Box 6.2). About half collectively met the recommendations on either 5–6 days (32%) or 3–4 days (22%) a week, while the remaining one-quarter (23%) met the guidelines even less frequently (see Figure 6.10).

Box 6.2

Physical activity and screen time recommendations for children

The National Physical Activity Recommendations provide guidance on the number of hours to spend on particular types of activities to help become healthier.

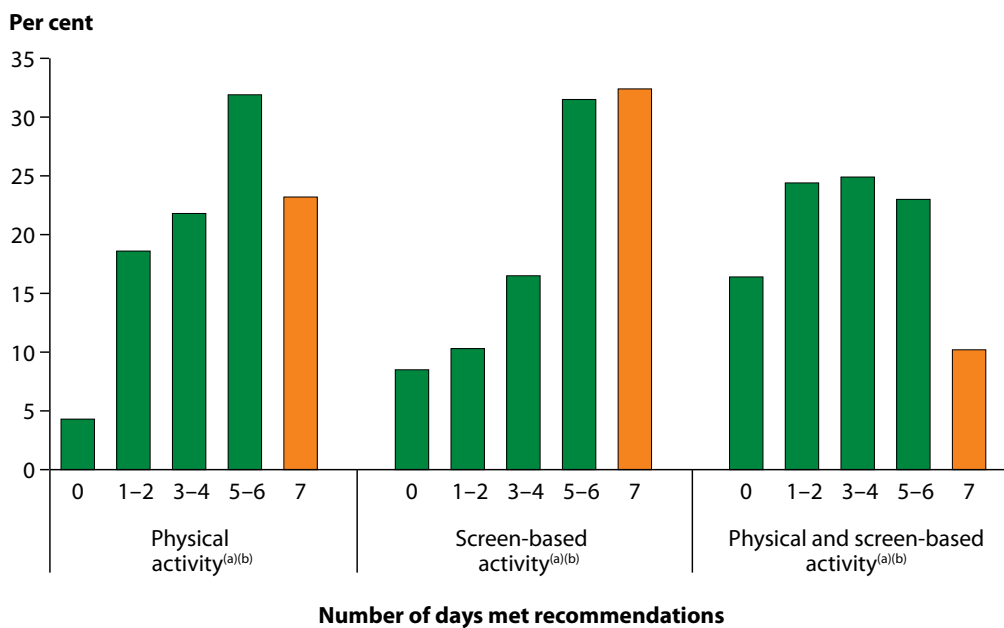
The recommendations cover 3 separate age groups for children: 0–5 years, 5–12 years and 12–18 years.

The current recommendations for children aged 5–12 and 12–18 are the same, and are:

- at least 60 minutes of moderate to vigorous physical activity every day
- a maximum of 2 hours screen-based activity for entertainment/non-educational purposes a day.

The ABS 2011–12 National Nutrition and Physical Activity Survey collected information on whether children met these physical activity and screen-based activity recommendations.

Figure 6.10



(a) See Box 6.2 for physical activity and screen activity recommendations.

(b) In 7 days prior to interview.

Source: ABS 2013d.

Number of days per week children aged 5–14 met physical and screen-based activity recommendations, 2011–12

There was no significant difference between boys and girls in meeting the recommendations (24% and 22% respectively); however, younger children (aged 5–9) were twice as likely as older children (aged 10–14) to meet the physical activity recommendations on all 7 days (32% and 15% respectively). Children living in *Inner regional*, *Outer regional* and *Remote* areas combined were more likely than children living in *Major cities* to meet the recommendations (30% to 20%).

There was little difference between children living in areas of most and least disadvantage (23.5% and 24.7% respectively). While the proportion of children of healthy weight who met the physical activity recommendations was higher than for children who were overweight/obese (23% compared with 19%), the difference was not statistically significant.

Trends in levels of physical activity among children are difficult to determine. The physical activity questions used in 2011–12 National Nutrition and Physical Activity Survey have not been used previously in ABS surveys. And while some other one-off surveys have collected relevant data, differences in collection methods make comparisons, and therefore determination of trends, problematic.

How many children met the screen-based activity recommendations?

About one-third (32%) of children met the national screen-based activity recommendations (Box 6.2) on all 7 days in a week, according to the 2011–12 National Nutrition and Physical Activity Survey. An additional one-third (32%) met the recommendation on 5–6 days. Girls were more likely to meet the guidelines than boys (38% compared with 27%). Younger children (aged 5–9) were also more likely to meet the guidelines than 10–14 year olds (39% compared with 26%).

There was no significant difference between children living in *Major cities* compared with other areas, nor was there a significant difference between children living in the most disadvantaged areas compared with those living in the least disadvantaged areas. There was also no significant difference between children with healthy weight and those who were overweight or obese.

It is not possible to determine national trends in children's screen-based activities because the questions on these activities in the 2011–12 National Nutrition and Physical Activity Survey have not been used before in ABS surveys. Some other surveys have collected data relevant to the topic, but due to differences in collection methods direct comparisons are not recommended.

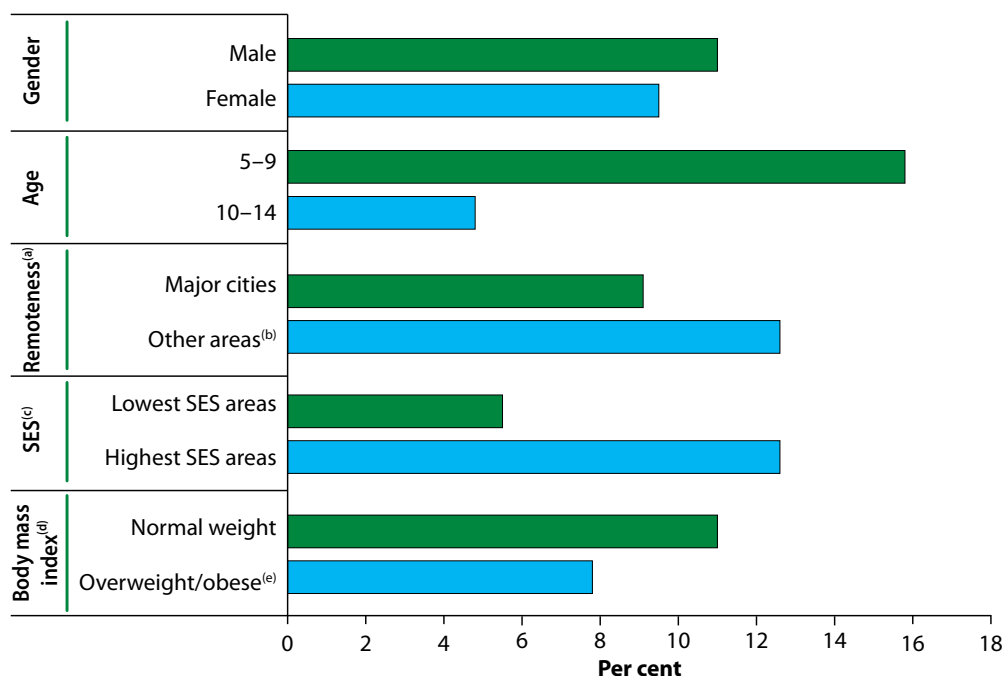
How many children met physical activity *and* screen-based recommendations?

Only around 10% of children met both physical and screen-based activity recommendations on all 7 days in a week. Around 23% of children met the guidelines on 5–6 days, a further 25% on 3–4 days, and 24% on 1–2 days. Sixteen per cent of children never met the guidelines on any day (See Figure 6.10).

There was little difference between boys and girls; however, younger children (aged 5–9) were over 3 times as likely to meet both guidelines (16%) as older children (5%) (see Figure 6.11). Children in the highest socioeconomic status areas were twice as likely to meet both guidelines as children in the lowest socioeconomic areas (13% compared with 6%).

Despite an apparent difference between children in *Major cities* meeting both sets of recommendations (around 9%) compared with *Inner regional/Outer regional/Remote* areas (around 13%), the difference was not statistically significant. Nor was there a statistically significant difference in meeting both sets of guidelines between children of a healthy weight and those who were overweight or obese (11% compared with around 8%) (Figure 6.11). These conclusions nevertheless need to be treated with caution due to high variability (or 'relative standard error' in statistical terms) in the results for overweight or obese children.

Figure 6.11



(a) Based on 2011 Australian Statistical Geographic Standard.

(b) Other areas include *Inner regional*, *Outer regional*, and *Remote* areas.

(c) Based on 2011 Index of Relative Socio-economic Disadvantage.

(d) Only includes children for whom height and weight were measured.

(e) Has a relative standard error between 25% and 50% and should be used with caution.

Note: Met recommendations in the 7 days prior to interview.

Source: ABS 2013d.

Children aged 5–14 who met both physical and screen-based activity recommendations, by population groups, 2011–12

How many children eat enough fruit and vegetables?

Good nutrition is part of maintaining the 'energy balance'. The National Health and Medical Research Council (NHMRC) reports that there is a suggestive association between the consumption of fruit and vegetables and a reduced risk of obesity and weight gain (NHMRC 2013).

In 2011–12, fewer than 1 in 3 (30%) of children aged 5–14 met fruit and vegetable consumption recommendations specified in the 2003 *Dietary guidelines for children and adolescents* (see Box 6.3). As these guidelines recommended a lower intake of fruit and vegetables than the revised 2013 *Australian dietary guidelines*, the proportion of children meeting the revised guidelines would be even lower.

Box 6.3

Fruit and vegetable intake for children

The following 2003 NHMRC guidelines for the daily consumption of fruit and vegetables (from the 2003 *Dietary guidelines for children and adolescents in Australia*) were used in the 2011–12 Australian Health Survey:

- 4–7 years: 1 serve of fruit and 2 serves of vegetables
- 8–11 years: 1 serve of fruit and 3 serves of vegetables
- 12–17 years: 3 serves of fruit and 4 serves of vegetables.

Usual daily intake of fruit and vegetables was based on self-reported data.

One serve of vegetables can be:



1/2 cup cooked vegetables
or cooked legumes

=



1 medium potato

=



1 cup salad vegetables

One serve of fruit can be:



1 medium piece
(e.g. apple)

=



2 small pieces
(e.g. apricots)


=



1 cup chopped
or canned fruit

In 2013, the NHMRC released revised dietary guidelines (*Australian dietary guidelines 2013*), with the following recommendations:

- 4–8 years: 1½ serve of fruit and 4½ serves of vegetables
- 9–11 years: 2 serve of fruit and 5 serves of vegetables
- 12–13 years: 2 serves of fruit and 5½ (boys) and 5 (girls) serves of vegetables
- 14–18 years: 2 serves of fruit and 5½ (boys) and 5 (girls) serves of vegetables.



There were no significant differences in fruit and vegetable consumption between boys and girls; however, younger children (aged 5–9 years) were more likely to meet the guidelines compared with those aged 10–14 (44% compared with 15%). Children living in *Major cities* (26%) were less likely to meet the guidelines than children living in *Inner regional/Outer regional/Remote* areas combined (38%).

There was no significant difference in fruit and vegetable consumption between children living in areas of the greatest disadvantage compared to those living in areas of the least disadvantage; nor was there any significant difference between children of a healthy weight, and those who were overweight or obese.

In 2012–13, only around 7% of Indigenous children aged 5–17 met the 2013 recommended guidelines for fruit and vegetable consumption (ABS 2013a).

Direct comparisons of fruit and vegetable intake in children between the 2007–08 National Health Survey and the 2011–12 Australian Health Survey are difficult because the definition of a serve of vegetables changed between the 2 surveys.

‘Treat’ foods consumption

A substantial proportion of children’s overall energy intake comes from ‘extra’ or treat foods, which are generally high in energy and low in nutrients, such as potato crisps, soft drinks, cakes and biscuits.

Results from the 2007 Australian National Children’s Nutrition and Physical Activity Survey found that ‘extra’ foods contributed 35% of the energy intake for children aged 2–16 (Rangan et al. 2011). This was less than the 40% figure from the 1995 National Nutrition Survey. Nevertheless, consumption remains well above the recommended limit of 5–20% of energy intake as set out in the *Australian guide to healthy eating* (Rangan et al. 2011). The ‘extra’ foods that contributed most to average energy intakes in the 2007 Survey were ‘fried potatoes’, ‘cakes, muffins and slices’ and ‘potato crisps and similar snacks’.

Some Australian parents may face barriers to providing healthier foods such as fruit, vegetables and wholegrain foods, to their children. This may be due to the unavailability of fresh foods in some regions, or because healthier food is not as affordable as other food for some families. A recent study published in the *British Medical Journal* found that healthy food cost more, and that cost was a barrier to a better diet (Rao et al. 2013). The authors argued that the difference in cost between healthy and unhealthy food was minor compared with the financial burden on individuals and society caused by diet-related chronic diseases.

What is missing from the picture?

With 26% of Australian children being overweight or obese, there is a need for close ongoing national monitoring of this aspect of health through the collection of comparable data so that an accurate time series can be established. As happened in 2011–12, measured body mass index will again be included in the 2014–15 ABS Australian Health Survey. More detailed monitoring is needed, however, of the composition of young people’s diets and their physical activity, particularly for overweight and obese children, to determine whether patterns are changing and whether changes accord with physical and dietary guideline recommendations.

Determining how factors such as physical inactivity, nutrition, technology use and urbanisation interact to increase rates of childhood overweight and obesity can be difficult when information about these factors comes from different data sources (Crowle & Turner 2010). While there is evidence to show that patterns in overweight and obesity in children are similar to trends in behavioural and environmental risk factors (Swinburn et al. 2011), direct relationships cannot be verified if the information is collected from different sources. Improved coverage and coordination of data collection is required so that we can have a more comprehensive and cogent view of how these factors may interact to better inform policy and affect a positive change. More research is also needed to know exactly how to extrapolate from childhood obesity to adult health and associated costs.

Where do I go for more information?

More information on children's health status is available at www.aihw.gov.au/child-health-development-and-wellbeing and in the AIHW's data portal for Children's Headline Indicators at www.aihw.gov.au/chi. The report *A picture of Australia's children 2012* and other recent publications are available for free download.

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