Overweight and obesity in Australia: an updated birth cohort analysis

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Latest edition

Overweight and obesity is a major public health issue and a leading risk factor for ill-health in Australia. This report shows that:

- when comparing between birth cohorts at the same age, those born more recently are more likely to be overweight or obese
- the prevalence of overweight and obesity has generally increased with age within most birth cohorts.

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Findings from this report:

- For most age groups, those born most recently were more likely to be obese than those born 10 years earlier
- For every age group, the median BMI of those born most recently was higher than that of those born 10 years earlier
- The prevalence of obesity among people born in 1973–1982 increased from 6.5% at age 13–22 to 31% at age 35–44
- For people born in 1963–1972, the median BMI increased from 24.4 kg/m2 at age 23–32 to 28.1 kg/m2 at age 45–54

Background, data sources and methods

Overweight and obesity is a major public health issue in Australia and globally. Excess body weight among adults is a risk factor for several chronic conditions, such as cardiovascular disease, type 2 diabetes, and some cancers. Children and adolescents who are overweight or obese are more likely to become adults who are obese than children and adolescents of a normal weight (Venn et al. 2007).

What is a birth cohort analysis?

A birth cohort is a group of people born in the same year or years.

Birth cohort analysis can be used to identify birth cohorts that are particularly at risk of a health outcome (Keyes et al. 2010). A birth cohort effect could occur because:

- a population-level environmental cause of the health outcome is unequally distributed across a population and across time (for example, younger people today may have higher access to and consumption of energy-dense foods than younger people of previous generations)
- a population-level environmental cause of the health outcome differentially affects age groups who are in a critical developmental period (for example, exposure to an obesogenic environment may affect younger people more than older people through shaping of lifelong food and physical activity behaviours) (Keyes et al. 2010; Wilson & Abbott 2018).

The prevalence of a health outcome is also affected by age effects (accumulated exposure to a cause and/or physiological changes that occur with aging) and period effects (population-wide exposures that occur at a particular point in time) (Keyes et al. 2010). Age, period and cohort effects are all related—the analysis in this web report does not attempt to separate these effects.

Australian data have shown that, when compared at the same age, more recent birth cohorts were often more likely to be obese than earlier birth cohorts (AIHW: Bennett et al. 2004; AIHW 2017; Allman-Farinelli et al. 2008; Pilkington et al. 2014). For example, the proportion of those born in 1994–1997 who were obese at age 18–21 (15.2%) was almost double the proportion of those born in 1974–1977 who were obese at the same age (8.0%) (AIHW 2017).

The increased obesity prevalence among those born more recently, at younger ages especially, has potentially significant implications—it could result in earlier onset of obesity-related chronic conditions, higher health-care costs, impacts on workforce productivity, greater prevalence of obesity later in life and increased risk of mortality. For example, Australian men who are obese at age 25 are projected to live 8.3 fewer years than their healthy weight peers, while Australian women who are obese at age 25 are projected to live 6.1 fewer years than their healthy weight peers (Lung et al. 2019).

This web report looks at how overweight and obesity prevalence varies between birth cohorts when compared at the same age, and at how overweight and obesity prevalence changes within birth cohorts as they age. The report extends *Overweight and obesity in Australia: a birth cohort analysis* (AIHW 2017) by including the most recent nationally representative data (2017–18) and analysing new birth cohorts. It focuses on changes over more recent periods, given patterns over the longer term are better established.

Data sources

The analyses in this report are based on data from 3 surveys conducted by the Australian Bureau of Statistics (ABS):

- 1995 National Nutrition Survey
- 2007–08 National Health Survey
- 2017–18 National Health Survey.

These data sources were chosen because they provided nationally representative measured height, weight, and waist circumference data.

Detailed information about these data sources is provided in Detailed data sources and methods.

Methods

This report did not track the same individuals over time—instead, birth cohorts were constructed using cross-sectional survey data representing the Australian population at various time points.

This approach treated, for example, survey participants aged 25–34 in 2007–08, and survey participants aged 35–44 in 2017–18 as representative of the same group of people (those born in 1973–1982) as they aged 10 years between the surveys.

The birth cohorts were constructed in 10-year age groups, from 1923–1932 (aged 75–84 in 2007–08) to 2003–2012 (aged 5–14 in 2017–18).

For each birth cohort, at each survey year, 2 measures of overweight and obesity were calculated: body mass index (BMI) and waist circumference.

For adults:

- overweight and obesity was classified as a BMI of 25.00 kg/m^2 or more
- obesity was classified as a BMI of 30.00 kg/m^2 or more
- severe obesity was used to describe the combined prevalence of class II (BMI of 35.00–39.99 kg/m^2) and class III (BMI of 40.00 kg/m^2 or more) obesity
- abdominal obesity was used to describe a waist circumference of 102 cm or more for men, and of 88 cm or more for women (WHO 2000).

Assessing overweight and obesity among children and adolescents is more complicated due to their growing bodies. For children and adolescents, age- and sex-specific half-year BMI cut-off points were used to classify overweight and obesity (Cole et al. 2000).

Data for age groups that included children and adolescents were not included in analysis of severe or abdominal obesity as there is not yet consensus on the definitions of these among children and adolescents.

Median BMI (or 50th percentile) and other measures of BMI distribution (including 10th and 90th percentiles) were calculated for adults. Data for age groups that included children and adolescents were not included in analysis of BMI distribution, as the age- and sex-specific BMI cut-offs points for overweight and obesity among children and adolescents complicate interpretation of BMI values.

Throughout this report, all reported differences between and within birth cohorts are statistically significant, unless stated otherwise.

Detailed information about the methods is provided in Detailed data sources and methods.

References

AIHW (Australian Institute of Health and Welfare) 2017. Overweight and obesity in Australia: a birth cohort analysis. Cat. no. PHE 215. Canberra: AIHW.

AIHW: Bennett S, Magnus P & Gibson D 2004. Obesity trends in older Australians. AIHW bulletin no. 12. Cat. no. AUS 42. Canberra: AIHW.

Allman-Farinelli M, Chey T, Bauman A, Gill T & James W 2008. Age, period and birth cohort effects on prevalence of overweight and obesity in Australian adults from 1990 to 2000. European Journal of Clinical Nutrition 62:898–907.

Cole TJ, Bellizzi MC, Flegal KM & Dietz WH 2000. Establishing a standard definition for child overweight and obesity worldwide: international survey. BMJ 320:1240–3.

Keyes KM, Utz RL, Robinson W & Li G 2010. What is a cohort effect? Comparison of three statistical methods for modeling cohort effects in obesity prevalence in the United States, 1971–2006. Social Science & Medicine 70:1100–8.

Lung T, Jan S, Joo Tan E, Killedar A & Hayes A 2019. Impact of overweight, obesity and severe obesity on life expectancy of Australian adults. International Journal of Obesity 43:782–9.

Pilkington R, Taylor A, Hugo G & Wittert G 2014. Are Baby Boomers healthier than Generation X? A profile of Australia's working generations using National Health Survey Data. PLOS ONE 9:e93087.

Venn A, Thomson R, Schmidt M, Cleland V, Curry B, Gennat H et al. 2007. Overweight and obesity from childhood to adulthood: a follow-up of participants in the 1985 Australian Schools Health and Fitness Survey. Medical Journal of Australia 186:458–60.

WHO (World Health Organization) 2000. Obesity: preventing and managing the global epidemic. Report of a WHO consultation. WHO Technical Report Series 894:i–xii, 1–253.

Wilson R & Abbott JH 2018. Age, period and cohort effects on body mass index in New Zealand, 1997–2038. Australian and New Zealand Journal of Public Health 42(4):396–402.

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Differences between birth cohorts

This section compares estimates of the prevalence of overweight and obesity combined, obesity alone, severe obesity and abdominal obesity, and median BMI between different birth cohorts when they are at the same age. The interactive graph below allows you to explore these different measures of overweight and obesity across the birth cohorts.

For each age group, the birth cohort born most recently (measured in 2017–18) is compared with the birth cohort born 10 years earlier at the same age (measured in 2007–08).

Figure 1: Prevalence of overweight and obesity, and median BMI, by age group; 2007–08 and 2017–18

These bar charts show the prevalence of 4 measures of overweight and obesity: overweight and obesity combined, obesity alone, severe obesity and abdominal obesity, as well as the median BMI. The measures are shown for 8 age groups, at 2 time points for each group (2007–08 and 2017–18). For most age groups, the prevalence of all measures of overweight and obesity was generally higher for the birth cohort born most recently (measured in 2017–18), compared with the cohort born 10 years earlier at the same age (measured in 2007–08). Median BMI of those born most recently was higher than that of those born 10 years earlier for all adult age groups included.

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Overweight and obesity

For all age groups except 5–14, 55–64 and 65–74, those born most recently were significantly more likely to be overweight or obese than those born 10 years earlier. The largest absolute difference was at age 75–84, where an additional 7 in every 100 adults were overweight or obese at age 75–84 in 2017–18 compared with 2007–08.

The 5–14, 55–64 and 65–74 age groups followed a similar pattern, however the difference in the prevalence of overweight and obesity between the birth cohorts was not statistically significant (Figure 1, tables S2 and S3).

Obesity

For all age groups except 5–14 and 15–24, those born most recently were significantly more likely to be obese than those born 10 years earlier. The largest absolute difference was at age 75–84, where an additional 11 in every 100 adults were obese at age 75–84 in 2017–18 compared with 2007–08.

The 5–14 and 15–24 age groups followed a similar pattern, however the difference in the prevalence of obesity between the birth cohorts was not statistically significant (Figure 1, tables S2 and S3).

Severe obesity

In this report, severe obesity is defined as a BMI of 35 kg/m^2 or more in adults. The analysis of severe obesity is limited to adults due to a lack of consensus on the definition for children and adolescents.

For all adult age groups except 35–44, those born most recently were significantly more likely to be severely obese than those born 10 years earlier. The largest absolute difference was at age 65–74, where an additional 7 in every 100 adults were severely obese at age 65–74 in 2017–18 compared with 2007–08.

The 35–44 age group followed a similar pattern, however the difference in the prevalence of severe obesity between the birth cohorts was not statistically significant (Figure 1, tables S2 and S3).

Abdominal obesity

In this report, abdominal obesity is defined as a waist circumference of 102 cm or more in men and 88 cm or more in women (WHO 2000). The analysis of abdominal obesity is limited to adults due to a lack of consensus on the definition for children and adolescents.

For the 45–54, 65–74 and 75–84 age groups, those born most recently were significantly more likely to be abdominally obese than those born 10 years earlier. The largest absolute difference was at age 45–54, where an additional 9 in every 100 adults were abdominally obese at age 45–54 in 2017–18 compared with 2007–08.

The 25–34 and 35–44 age groups followed a similar pattern, however the difference in the prevalence of abdominal obesity between the birth cohorts was not statistically significant, and the 55–64 age group showed little difference between the birth cohorts (Figure 1, tables S2 and S3).

Median BMI

Analysis of the median BMI (or 50^{th} percentile) shows the differences between cohorts in what is considered a typical BMI. This analysis is limited to adults due to the age- and sex-specific BMI cut-offs for measuring overweight and obesity in children and adolescents.

For all adult age groups, the median BMI of those born most recently was significantly higher than that of those born 10 years earlier (Figure 1, Table S4). The largest absolute difference was at age 75–84, where the median BMI was 1.4 kg/m^2 higher at age 75–84 in 2017–18 compared with 2007–08.

References

ABS (Australian Bureau of Statistics) 2009. Microdata: National Health Survey, Basic and Expanded CURF, 2007–08. ABS cat. no. 4324.0.55.001. Findings based on Expanded Confidentialised Unit Record File analysis. Canberra: ABS.

ABS 2019. Microdata: National Health Survey, 2017–18. ABS cat. no. 4324.0.55.001. Findings based on Detailed Microdata analysis. Canberra: ABS.

WHO (World Health Organization) 2000. Obesity: preventing and managing the global epidemic. Report of a WHO consultation. WHO Technical Report Series 894:i–xii, 1–253.

Changes over time

This section compares estimates of the prevalence of overweight and obesity combined, obesity alone, severe obesity and abdominal obesity, and median BMI within the same birth cohorts as they age. The interactive graph below allows you to explore these different measures of overweight and obesity within the birth cohorts over time.

For each birth cohort, prevalence estimates and the median BMI in 1995, 2007–08 and 2017–18 are reported.
Figure 1: Prevalence of overweight and obesity over time, and median BMI, by birth cohort and age group; 1995, 2007–08 and 2017–18

These line charts show the prevalence of 4 measures of overweight and obesity: overweight and obesity combined, obesity alone, severe obesity and abdominal obesity, as well as the median BMI. The measures are shown for 9 birth cohorts, with data for each cohort shown at the midpoint of the cohort's age group at up to 3 time points (1995, 2007–08 and 2017–18). For most birth cohorts, the prevalence of all measures of overweight and obesity generally increased with age over time, from 1995 to 2007–08, and 2007–08 to 2007–18. Median BMI also generally increased over time for most cohorts, except for the oldest cohort (those born in 1923–1932).

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Overweight and obesity

Between 1995 and 2007–08, the prevalence of overweight and obesity increased significantly for most birth cohorts, except for the 1923–1932 and 1933–1942 birth cohorts (Figure 1, tables S1, S2 and S3).

Between 2007–08 and 2017–18, the prevalence of overweight and obesity again increased significantly for almost all birth cohorts, except for the 1933–1942 birth cohort.

The largest absolute change in the prevalence of overweight and obesity over the 22 years was among the 1973–1982 birth cohort. The prevalence of overweight and obesity among people in the 1973–1982 birth cohort more than doubled from 24% when they were aged 13–22 (in 1995) to 54% when they were aged 25–34 (in 2007–08), then increased to 69% when they were aged 35–44 (in 2017–18).

Younger birth cohorts (those born more recently) tend to have a higher prevalence of overweight and obesity than older birth cohorts when compared at the same ages. See the Differences between birth cohorts page for further detail.

Obesity

Between 1995 and 2007–08, the prevalence of obesity increased significantly for almost all birth cohorts, except for the 1923–1932 birth cohort (Figure 1, tables S1, S2 and S3).

Between 2007–08 and 2017–18, the prevalence of obesity again increased significantly for all birth cohorts.

As with overweight and obesity, the largest absolute change in the prevalence of obesity over the 22 years was among the 1973–1982 birth cohort. The prevalence of obesity among people in the 1973–1982 birth cohort nearly tripled from 6.5% when they were aged 13–22 (in 1995) to 19% when they were aged 25–34 (in 2007–08), then increased to 31% when they were aged 35–44 (in 2017–18).

Severe obesity

In this report, severe obesity is defined as a BMI of 35 kg/m^2 or more in adults. The analysis of severe obesity is limited to adults due to a lack of consensus on the definition for children and adolescents.

Between 1995 and 2007–08, the prevalence of severe obesity increased significantly for most birth cohorts. The exceptions were the 1923–1932 and 1933–1942 birth cohorts, where the increase was not statistically significant (Figure 1, tables S1, S2 and S3).

Between 2007–08 and 2017–18, the prevalence of severe obesity again increased significantly for all birth cohorts.

The largest absolute change in the prevalence of severe obesity over the 22 years was among the 1953–1962 birth cohort. The prevalence of severe obesity among people in the 1953–1962 birth cohort more than doubled from 4.4% when they were aged 33–42 (in 1995) to 8.8% when they were aged 45–54 (in 2007–08), then increased to 15% when they were aged 55–64 (in 2017–18).

Abdominal obesity

In this report, abdominal obesity is defined as a waist circumference of 102 cm or more in men and 88 cm or more in women (WHO 2000). The analysis of abdominal obesity is limited to adults due to a lack of consensus on the definition for children and adolescents.

Between 1995 and 2007–08, the prevalence of abdominal obesity increased significantly for all adult birth cohorts (Figure 1, tables S1, S2 and S3).

Between 2007–08 and 2017–18, the prevalence of abdominal obesity again increased significantly for all adult birth cohorts.

The largest absolute change in the prevalence of abdominal obesity over the 22 years was among the 1963–1972 birth cohort. The prevalence of abdominal obesity among people in the 1963–1972 birth cohort more than doubled from 13% when they were aged 23–32 (in 1995) to 34% when they were aged 35–44 (in 2007–08), then increased to 48% when they were aged 45–54 (in 2017–18).

Median BMI

Analysis of the median BMI (or 50th percentile) shows the changes over time in what is considered a typical BMI. This analysis is limited to adults due to the age- and sex-specific BMI cut-offs for measuring overweight and obesity in children and adolescents.

Between 1995 and 2007–08, the median BMI increased significantly for almost all birth cohorts, except for the 1923–1932 birth cohort, where a non-significant decrease was observed (Figure 1, Table S4).

Between 2007–08 and 2017–18, the median BMI again increased significantly for almost all birth cohorts, except for 1933–1942.

The largest absolute change in median BMI over the 22 years was among the 1963–1972 birth cohort. The median BMI among this birth cohort increased from 24.4 kg/m^2 when they were aged 23–32 (in 1995), to 26.4 kg/m^2 when they were aged 35–44 (in 2007–08), to 28.1 kg/m^2 when they were aged 45–54 (in 2017–18), corresponding to an increase of 3.7 kg/m^2 over the 22 years.

References

ABS (Australian Bureau of Statistics) 2009. Microdata: National Health Survey, Basic and Expanded CURF, 2007–08. ABS cat. no. 4324.0.55.001. Findings based on Expanded Confidentialised Unit Record File analysis. Canberra: ABS.

ABS 2013. Microdata: National Nutrition Survey, 1995. ABS cat. no. 4807.0.30.001. Findings based on Basic Confidentialised Unit Record File analysis. Canberra: ABS.

ABS 2019. Microdata: National Health Survey, 2017–18. ABS cat. no. 4324.0.55.001. Findings based on Detailed Microdata analysis. Canberra: ABS.

WHO (World Health Organization) 2000. Obesity: preventing and managing the global epidemic. Report of a WHO consultation. WHO Technical Report Series 894:i–xii, 1–253.

Distribution of BMI

The interactive graphs below allow you to explore selected percentiles of BMI within the birth cohorts as they age. This allows for a better understanding of changes in the distribution of BMI over time, beyond changes in the prevalence of overweight or obesity.

The following interactive graph shows how the selected percentile of BMI has changed for each birth cohort over time. The percentiles available are the 90th percentile, 75th percentile, median (or 50th percentile), 25th percentile and 10th percentile. These selected percentiles show the changes over time at different points in the distribution of BMI, including near the bottom- and top-ends. See the Differences between birth cohorts and Changes over time sections for findings on the differences and changes in median BMI.
Figure 1: BMI percentiles, by birth cohort and age group; 1995, 2007–08 and 2017–18

These line charts show the 10th, 25th, 50th (median), 75th and 90th percentiles of BMI for 7 adult birth cohorts, with data for each cohort shown at the midpoint of the cohort's age group for up to 3 time points (1995, 2007–08 and 2017–18). For most cohorts, the 75th and 90th percentile of BMI increased between 1995 and 2007–08, and between 2007–08 and 2007–18. There was generally less change over time for the 10th and 25th percentile of BMI.

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90th percentile of BMI

The 90th percentile of BMI is the value at which 90% of people have a BMI value below it, or conversely, 10% of people have a BMI value above it. All cohorts had 90th percentile values that were within the obese range of BMI values.

Between 1995 and 2007–08, the 90th percentile of BMI increased significantly for most birth cohorts, excluding the 1923–1932 and 1933–1942 birth cohorts (Figure 1, Table S4).

Between 2007–08 and 2017–18, the 90th percentile of BMI increased significantly for all birth cohorts.

The largest absolute change in the 90th percentile of BMI over the 22 years was among the 1963–1972 birth cohort. For this cohort, the 90th percentile of BMI increased from 31.3 kg/m^2 at age 23–32 (in 1995) to 34.3 kg/m^2 at age 35–44 (in 2007–08), and increased again to 36.6 kg/m^2 at age 45–54 (in 2017–18), corresponding to an increase of 5.3 kg/m^2 over the 22 years.

10th percentile of BMI

The 10th percentile of BMI is the value at which 10% of people have a BMI value below it, or conversely, 90% of people have a BMI value above it. All cohorts had 10th percentile values that were within the normal weight range of BMI values (18.50–24.99 kg/m^2).

Between 1995 and 2007–08, the 10th percentile of BMI increased slightly for most birth cohorts, except there was no change for the 1933–42 birth cohort and the 1923–1932 birth cohort decreased slightly (Figure 1, Table S4).

Between 2007–08 and 2017–18, the 10th percentile of BMI again increased slightly for almost all birth cohorts, except there was no change for the 1933–1942 birth cohort.

The largest absolute change in the 10th percentile of BMI over the 22 years was among the 1963–1972 birth cohort. For this cohort, the 10th percentile of BMI increased from 20.2 kg/m^2 at age 23–32 (in 1995) to 21.3 kg/m^2 at age 35–44 (in 2007–08), and increased again to 22.2 kg/m^2 at age 45–54 (in 2017–18), corresponding to an increase of 2.0 kg/m^2 over the 22 years.

Overall there were much smaller increases in the 10th percentile of BMI within cohorts than there were for the 90th percentile of BMI, which indicates that the top-end of the BMI distribution is increasing faster than the bottom-end.

Box plots of BMI

Box plots give additional insights into changes in the shape of the distribution of BMI over time within birth cohorts and differences between birth cohorts.

The focus of this section is on how the distribution of BMI has changed over time for the 4 birth cohorts that were observed in all 3 of the selected years: 1995, 2007–08 and 2017–18. These birth cohorts range from 1963–1972 (youngest cohort) to 1933–1942 (oldest cohort). Data for the remaining birth cohorts can be shown in Figure 1 for the available survey years by ticking the check-box for each respective cohort.

How to read box plots

The values shown in the box plots below are the 10th percentile, 25th percentile, the median (or 50th percentile), 75th percentile and 90th percentile.

As an example of interpreting the percentiles, the 25th percentile shows at what BMI value 25% of the population has a BMI lower than this, and conversely 75% of the population has a BMI higher than this.

The interquartile range (IQR) is a measure of the variability or spread of the BMI values and is the difference between the 75th percentile (or 3rd quartile) and the 25th percentile (or 1st quartile) values.

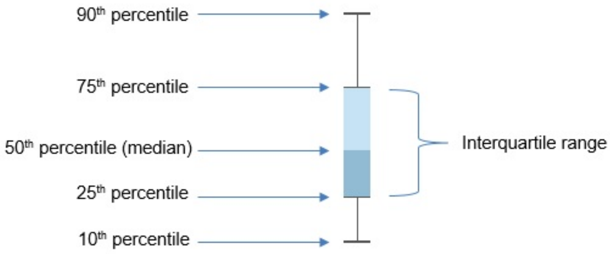

Figure 2: Box plots of BMI, by birth cohort and age group; 1995, 2007–08 and 2017–18

This chart presents box plots of BMI to show the changing distribution of BMI over time for 7 birth cohorts at different age groups, for up to 3 survey years (1995, 2007–08 and 2017–18). Of the 7 cohorts, 4 cohorts have data available for all 3 of the selected survey years (the 1933–1942, 1943–1952, 1953–1962 and 1963–1972 cohorts). In general, younger cohorts show a larger upwards shift in BMI distribution over time, especially in the upper end of BMI distribution (90th and 75th percentiles). The distribution of BMI values widened over time across all the birth cohorts measured in all 3 time points.

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The younger cohorts, especially the 1963–1972 and 1953–1962 birth cohorts, show a larger upwards shift in the distribution of BMI over time compared with the 1933–1942 cohort. The largest increases are occurring towards the upper end of the BMI distribution at the 75th and 90th percentiles (Figure 2, Table S4).

The distribution of BMI values widened over time across all the birth cohorts measured at all 3 time points. The interquartile range increased slightly more in the younger cohorts, from 5.6 kg/m^2 at age 23-32 to 7.7 kg/m^2 at age 45–54 for the 1963–1972 birth cohort. This is compared with the slightly smaller increase from 5.5 kg/m^2 at age 53–62 to 7.0 kg/m^2 at age 75–84 for the 1933–1942 birth cohort, which appears to be due to an increase in the 75th percentile while the 25th percentile remained stable over time.

References

ABS (Australian Bureau of Statistics) 2009. Microdata: National Health Survey, Basic and Expanded CURF, 2007–08. ABS cat. no. 4324.0.55.001. Findings based on Expanded Confidentialised Unit Record File analysis. Canberra: ABS.

ABS 2013. Microdata: National Nutrition Survey, 1995. ABS cat. no. 4807.0.30.001. Findings based on Basic Confidentialised Unit Record File analysis. Canberra: ABS.

ABS 2019. Microdata: National Health Survey, 2017–18. ABS cat. no. 4324.0.55.001. Findings based on Detailed Microdata analysis. Canberra: ABS.

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Discussion

The comparisons *between different birth cohorts when they were at the same age* show that the birth cohorts born most recently were more likely to be overweight or obese combined, obese alone or severely obese and to have a higher median BMI than those born earlier at most ages. The prevalence of abdominal obesity among the birth cohorts born more recently was significantly higher than those born earlier for only half of the adult age groups.

The comparisons *within the same birth cohorts as they aged* show that, generally, the prevalence of overweight and obesity combined, obesity alone, severe obesity and abdominal obesity, and median BMI, increased as people aged.

The comparisons of *the distribution of BMI values within birth cohorts as they aged* show that the BMI distribution for younger cohorts has shifted upwards to a larger extent than for older cohorts. The distribution of BMI values has also widened over time across all birth cohorts.

The largest absolute changes in the prevalence of overweight and obesity combined, and obesity alone with age were among the 1973–1982 birth cohort, while the largest absolute changes in severe obesity and abdominal obesity with age were among the 1953–1962 and 1963–1972 birth cohorts, respectively. This is likely to reflect the ages and life stages of these cohorts at the 3 survey points. For example, the 1973–1982 birth cohort were aged 13–22 at the first survey point and 35–44 at the final survey point—early adulthood is a life stage when the risk of weight gain may increase due to a reduction in physical activity and changes to diet and alcohol consumption (NHMRC 2013).

A limitation of this analysis is that it uses separate cross-sectional birth cohorts measured at different time points, rather than a longitudinal sample of the same people followed over time to see how their BMI changes as they age. There will be some variability in BMI values because each survey samples a different group of people. This means that the evidence regarding changes in overweight and obesity over time is weaker than if a similar analysis was done on a consistent longitudinal cohort.

Possible causes

This web report does not identify the factors contributing to changes in the prevalence of overweight and obesity. Overweight and obesity occur primarily because of an imbalance between energy intake and energy expenditure (which can be influenced by a range of factors, including genetics and environment). An increase in energy intake and/or a decrease in energy expenditure is the most plausible explanation for increases in the prevalence of overweight and obesity combined, and obesity alone among more recently born birth cohorts compared with those born 10 years earlier. Diet and physical activity are, however, difficult to measure, and trend data in Australia are limited.

The authors of a previous birth cohort study proposed that the greater prevalence of obesity among more recently born birth cohorts was likely due to the birth cohorts born more recently having spent greater proportions of their lives in an obesogenic environment (Allman-Farinelli et al. 2008).

An obesogenic environment is one that promotes obesity among individuals or populations, and includes aspects of the:

- physical environment—such as food availability in supermarkets, workplaces, and schools, and the availability of footpaths and recreational facilities
- economic environment—such as personal income, and the cost of food
- political environment—such as policies, regulations, and laws around food labelling and advertising
- sociocultural environment—such as media and social and cultural norms (Swinburn et al. 1999).

Examples of environmental factors that contribute to overweight and obesity include, among other things:

- a wide availability of cheap processed foods that provide excess kilojoules
- larger portion sizes
- replacement of physically active workplaces with more sedentary occupations
- longer working hours leaving less time for food preparation and physical activity (NHMRC 2013).

Several policy options included in the WHO's *Global action plan for the prevention and control of noncommunicable diseases 2013–2020* address the obesogenic environment. These include:

- policies to reduce marketing of less healthy foods to children
- taxes and subsidies to encourage consumption of healthier foods and discourage consumption of less healthy foods
- promotion of provision of healthier foods in public institutions, such as schools and workplaces (WHO 2013).

Possible implications

When combined and considered alongside the broader literature, the findings of this web report suggest a range of possible implications, including:

- a potential earlier onset of obesity-related chronic conditions, with previous research showing a longer duration of overweight and obesity is associated with increased risk of some cancers among women (Arnold et al. 2016)

- potentially higher health-care costs, with previous Australian research showing:
  - higher hospital admission rates, days spent in hospital, and hospital costs with increasing BMI among adults aged 45–64 and 65–79 (Korda et al. 2015)
  - health-care costs for a severely obese population to be more than double those for the general population, with the difference appearing to be due to greater use of services among the severely obese population (Keating et al. 2012)
- potential impacts on workforce productivity
- a potentially greater prevalence of overweight and obesity later in life, as children and adolescents who are overweight or obese are more likely to be overweight or obese as adults than children of a normal weight (Singh et al. 2008)
- a potential increased risk of mortality and lower life expectancy, with previous research showing:
  - a higher number of years lived with obesity is associated with increased risk of mortality (Abdullah et al. 2011)
  - Australian men who are obese at age 25 are projected to live 8.3 fewer years than their healthy weight peers, while Australian women who are obese at age 25 are projected to live 6.1 fewer years than theirs (Lung et al. 2019).

The analysis showed that at age 5–14, the birth cohort born most recently was only slightly more likely to be overweight or obese, or obese alone, than those born 10 years earlier, and these differences were not statistically significant. This is an encouraging finding and consistent with other findings that suggest that the prevalence of overweight and obesity among children has plateaued in recent years in Australia (Olds et al. 2010).

While it appears to have plateaued, the prevalence of overweight and obesity among children and adolescents remains high by historic standards and remains a major public health issue in Australia. Any stabilisation in the prevalence of childhood overweight and obesity could also be only temporary if efforts are not continued (Olds et al. 2010).

References

Abdullah A, Wolfe R, Stoelwinder J, de Courten M, Stevenson C, Walls H et al. 2011. The number of years lived with obesity and the risk of all-cause and cause-specific mortality. International Journal of Epidemiology 40:985–96.

Allman-Farinelli M, Chey T, Bauman A, Gill T & James W 2008. Age, period and birth cohort effects on prevalence of overweight and obesity in Australian adults from 1990 to 2000. European Journal of Clinical Nutrition 62:898–907.

Arnold M, Jiang L, Stefanick ML, Johnson KC, Lane DS, LeBlanc ES et al. 2016. Duration of adulthood overweight, obesity, and cancer risk in the Women's Health Initiative: a longitudinal study from the United States. PLoS Medicine 13:e1002081.

Keating C, Moodie M, Bulfone L, Swinburn B, Stevenson C & Peeters A 2012. Healthcare utilization and costs in severely obese subjects before bariatric surgery. Obesity 20:2412–9.

Korda R, Joshy G, Paige E, Butler J, Jorm L, Liu B et al. 2015. The relationship between body mass index and hospitalisation rates, days in hospital and costs: findings from a large prospective linked data study. PLOS ONE 10:e0118599.

Lung T, Jan S, Joo Tan E, Killedar A & Hayes A 2019. Impact of overweight, obesity and severe obesity on life expectancy of Australian adults. International Journal of Obesity 43:782–9.

NHMRC (National Health and Medical Research Council) 2013. Clinical practice guidelines for the management of overweight and obesity in adults, adolescents and children in Australia. Melbourne: NHMRC.

Olds T, Tomkinson G, Ferrar K & Maher C 2010. Trends in the prevalence of childhood overweight and obesity in Australia between 1985 and 2008. International Journal of Obesity 34:57–66.

Singh A, Mulder C, Twisk J, van Mechelen W & Chinapaw M 2008. Tracking of childhood overweight into adulthood: a systematic review of the literature. Obesity Reviews 9:474–88.

Swinburn B, Egger G & Raza F 1999. Dissecting obesogenic environments: the development and application of a framework for identifying and prioritizing environmental interventions for obesity. Preventive Medicine 29:563–70.

WHO (World Health Organization) 2013. Global action plan for the prevention and control of noncommunicable diseases 2013–2020. Geneva: WHO.

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Detailed data sources and methods

Data sources

The analyses presented in this report are based on data collected in 3 national cross-sectional surveys conducted by the ABS—the 1995 National Nutrition Survey, the 2007–08 National Health Survey and the 2017–18 National Health Survey.

These data sources were chosen because they provided nationally representative measured height and weight data over an extended period of time. Information on the surveys, including data quality statements, are available on the ABS website.

The 2007–08 National Health Survey and the 2017–18 National Health Survey were based on nationally representative samples that included only residents of private dwellings, and excluded residents of non-private dwellings such as hospitals, nursing homes, hotels, motels, boarding schools, and prisons.

The 1995 National Nutrition Survey was based on a subsample of participants from the 1995 National Health Survey. The subsample was designed to provide national estimates by fine age groups and sex. The 1995 National Nutrition Survey also included only residents of private dwellings.

The sample size in each survey varied, with about:

- 13,800 people surveyed in the 1995 National Nutrition Survey
- 20,800 people surveyed in the 2007–08 National Health Survey
- 21,000 people surveyed in the 2017–18 National Health Survey.

The 1995 National Nutrition Survey and the 2017–18 National Health Survey included measured height and weight data for people aged 2 and over, while the 2007–08 National Health Survey included these data for people aged 5 and over.

Each survey included collection of measured height, weight, and waist circumference by trained interviewers. The 1995 National Nutrition Survey used scales that could weigh a maximum weight of 140 kg. The 2007–08 National Health Survey used scales that could weigh a maximum weight of 150 kg. The 2017–18 National Health Survey used scales that could weigh a maximum weight of 200 kg.

The response rates for physical measures varied between surveys. The ABS imputed BMI for those people for whom BMI was not measured in the 2017–18 National Health Survey. In this method, participants with a missing response were given the response of similar participants. For adults, the similarity of participants was based on age group, sex, part of state, self-perceived body mass, level of exercise, whether or not a participant had high cholesterol as a long-term health condition, and self-reported BMI category (calculated from self-reported height and weight) (ABS 2019). For 2–14 year olds, the similarity was based on age group, sex, self-reported BMI and part of state, while for 15–17 year olds, level of exercise and self-perceived body mass (only if a person answered for themselves) were also used. There was no imputation of BMI in the 1995 National Nutrition Survey or the 2007–08 National Health Survey.

For each survey, the ABS allocated a person weight to each participant, corresponding to how many people in the population they represented. Estimates based on the person weights can be used to infer results for the in-scope population. Note that these person weights are separate to the body weight measurements that are used in the calculation of BMI.

Methods

Birth cohort analysis

This report did not track the same individuals over time. Rather, birth cohorts were constructed using cross-sectional survey data representing the Australian population at various time points. This approach treated, for example, survey participants aged 25–34 in 2007–08, and survey participants aged 35–44 in 2017–18 as representative of the same group of people (those born in 1973–1982) as they aged 10 years between the surveys.

Year of birth was approximated by subtracting age at survey from survey year. For the 2007–08 National Health Survey and the 2017–18 National Health Survey, interviews were conducted in 2 calendar years (for example, interviews for the 2007–08 National Health Survey were conducted from August 2007 to June 2008). Details of which year an individual was interviewed in were not available in the data sets. For these surveys, this analysis assigned survey year as 1995 for the National Nutrition Survey, 2007 for the 2007–08 National Health Survey and 2017 for the 2017–18 National Health Survey.

Records were then grouped into cohorts based on approximated year of birth, using 10-year spans. The width of the spans was chosen to ensure that there was no overlap of birth cohorts at the time points compared.

The statistical significance of any difference in prevalence (percentage) estimates between people in each birth cohort at each age, and also within a birth cohort as people aged, was assessed using 95% confidence intervals. The statistical significance of the difference in median BMI and other BMI percentile estimates between people in each birth cohort at each age, and also within a birth cohort as people aged, was also assessed using 95% confidence intervals. For further details, see 'Significance testing' on this page.

Crude prevalence estimates

Crude prevalence estimates are presented as percentages in this report. Crude prevalence, as a percentage, is defined as the number of people with a particular characteristic, divided by the number of people in the population of interest, multiplied by 100.

In calculating crude prevalence estimates, those people for whom the information of interest (for example, BMI or waist circumference) was not available were excluded from the denominator. For 2017–18, imputed data were used for those people for whom the information of interest had not been measured.

All crude prevalence estimates in this report are weighted estimates that use person weights allocated to each survey participant by the ABS.

Median and other percentile estimates of BMI

The median is defined as the midpoint of a list of observations that have been ranked from smallest to largest. The median BMI, for example, is the BMI value at which half the population has a BMI higher than that value and half have a BMI lower than that value. This is also known as the 50th percentile.

A percentile measure is the value below which a given percentage of values in the population will fall. For example, the 10th percentile of BMI is the BMI score for which 10% of people have a BMI that is equal to or lower than this. The percentiles used in this report are the 10th percentile and 90th percentile.

In calculating these estimates of BMI percentiles, those people for whom BMI was not available were excluded from the denominator. For 2017–18, imputed data were used for those people for whom BMI had not been measured.

All estimates of percentiles of BMI in this report are weighted estimates that use person weights allocated to each survey participant by the ABS.

Standard error, relative standard error, margin of error and confidence intervals

For all survey data, the jack-knife replication method was used to derive the standard error (SE) for each estimate, using replicate weights provided by the ABS.

The relative standard error (RSE) of an estimate is a measure of the error likely to have occurred due to sampling. The RSEs of the estimates were calculated using the SEs:

$$\text{RSE\%} = \frac{\text{SE(estimate)}}{\text{estimate}} \times 100$$

The margin of error (MoE) at the 95% confidence level for each estimate was calculated using 1.96 as the critical value:

$$\text{MoE} = 1.96 \times \text{SE(estimate)}$$

The MoE was then used to calculate the 95% confidence interval (CI) around each estimate:

$$\text{95\% CI} = \text{estimate} \pm \text{MoE(estimate)}$$

Significance testing

Variation or difference in observed values or rates may be due to a number of causes including, among other things, actual differences in the study's populations and sampling error. A statistical test of significance indicates how incompatible the observed data are with a specified statistical model. To assess whether differences between estimates are incompatible with a null hypothesis that the survey estimates are normally distributed and that there is no difference between the groups being compared, 95% CIs were used.

A difference between estimates was considered statistically significant if the 95% CIs around the estimates did not overlap. Where there was an overlap between 95% CIs, a 95% CI for the difference between estimates was calculated. To do this, the SE of the difference was approximated by:

$$\text{SE} = \sqrt{\text{SE(estimate}_1)^2 + \text{SE(estimate}_2)^2}$$

The 95% CI for the difference between estimates was then calculated as:

$$\text{95\% CI} = (\text{estimate}_1 - \text{estimate}_2) \pm (1.96 \times \text{SE(estimate}_1 - \text{estimate}_2)$$

If the 95% CI for the difference between estimates included 0, then the difference was not statistically significant. If it excluded 0, then the difference was considered to be statistically significant.

References

ABS (Australian Bureau of Statistics) 2019. National Health Survey: users' guide, 2017–18. ABS cat. no. 4363.0. Canberra: ABS.

Data

Data tables: Overweight and obesity in Australia - an updated birth cohort analysis
Download Data tables: Overweight and obesity in Australia - an updated birth cohort analysis. Format: XLSX 141Kb XLSX 141Kb

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