# Health Survey for England 2018

# Overweight and obesity in adults and children

**Published 3 December 2019**

This report examines the prevalence of overweight and obesity among adults and children in England in 2018. It compares prevalence rates in different population groups by age, sex, region and area deprivation, and looks at associated health risks. Children's BMI status is compared with that of their parents.

## Key findings

- The majority of adults in England in 2018 were overweight or obese; 67% of men and 60% of women. This included 26% of men and 29% of women in England who were obese. 2% of men and 4% of women were morbidly obese.
- 34% of men and 48% of women had a very high waist measurement, indicating central obesity.
- Adult obesity was associated with neighbourhood deprivation. In the least deprived areas 20% of adults were obese compared to 36% of adults living in the most deprived areas.
- More than half of adults (56%) were at increased, high or very high risk of chronic disease due to their waist circumference and BMI. Women were more likely than men to be in the high or very high risk categories (46% and 35% respectively).
- In 2018, 28% of children aged 2 to 15 were overweight or obese including 15% who were obese.
- Children's overweight and obesity was associated with that of their parents. 26% of children of obese mothers were also obese, compared with 16% of children whose mothers were overweight but not obese, and 7% of children whose mothers were neither overweight nor obese. Similarly, 22% of children of obese fathers were themselves obese, compared with 14% of children whose fathers were overweight but not obese, and 9% of children whose fathers were neither overweight nor obese.

Author: Anne Conolly and Sylvie Craig, NatCen Social Research
Responsible Statistician: Stephanie Gebert, Population Health

www.digital.nhs.uk
@nhsdigital

# Contents



# This is a National Statistics publication

National Statistics status means that official statistics meet the highest standards of trustworthiness, quality and public value.

All official statistics should comply with all aspects of the Code of Practice for Statistics. They are awarded National Statistics status following an assessment by the Authority's regulatory arm. The Authority considers whether the statistics meet the highest standards of Code compliance, including the value they add to public decisions and debate.

It is NHS Digital's responsibility to maintain compliance with the standards expected of National Statistics. If we become concerned about whether these statistics are still meeting the appropriate standards, we will discuss any concerns with the Authority promptly. National Statistics status can be removed at any point when the highest standards are not maintained, and reinstated when standards are restored.

Find out more about the Code of Practice for Statistics at https://www.statisticsauthority.gov.uk/code-of-practice/

This report may be of interest to members of the public, policy officials, people working in public health and to commissioners of health and care services to see the prevalence of overweight and obesity among adults and children in England.

# Introduction

## Contents

This report presents findings on the prevalence of overweight and obesity for adults and for children, including trends over time. The data are based on measurements of a representative sample of the general population who participated in the Health Survey for England (HSE) in 2018.[1]

The report includes estimates of the overall prevalence of overweight and obesity, with comparisons by sex, age, region and area deprivation. Abdominal obesity and the risks to health associated with obesity are presented for adults. Children's overweight and obesity are presented in the context of their parents' body mass index (BMI) status.

Detailed tables accompanying this chapter can be accessed via https://digital.nhs.uk/pubs/hse2018.

## Background

Obesity has long been identified as a major public health problem, both internationally and within the UK. Being overweight or obese is associated with an increased risk of a number of common diseases and causes of premature death, including diabetes, cardiovascular disease and some cancers.[2,3] For individuals with excess weight, the risk of poor health increases sharply with increasing BMI.[4]

Obesity in childhood is directly associated with various health conditions, including asthma[5,6], early onset type-2 diabetes[7,8], and cardiovascular risk-factors.[9,10,11] Children who are obese are also more likely to suffer from psychological problems,

[1] Some analyses include data from earlier survey years.

[2] Prospective Studies Collaboration. *Body-mass index and cause-specific mortality in 900,000 adults: collaborative analyses of 57 prospective studies.* Lancet 2009;373:1083-96

[3] Calle E, Rodriguez C, Walker-Thurmond K et al. *Overweight, obesity, and mortality from cancer in a prospectively studied cohort of U.S. adults.* New England Journal of Medicine 2003;348:1625-38.

[4] Kopelman P. *Health risks associated with overweight and obesity.* Obesity reviews. 2007 Mar 1;8(s1):13-7.

[5] Egan K, Ettinger A, Bracken M. *Childhood body mass index and subsequent physician-diagnosed asthma: a systematic review and meta-analysis of prospective cohort studies.* BMC Pediatrics. 2013;13:121.

[6] von Mutius E, Schwartz J, Neas LM et al. *Relation of body mass index to asthma and atopy in children: the National Health and Nutrition Examination Study III.* Thorax 2001;56:835-838.

[7] Haines L, Wan KC, Lynn R et al. *Rising incidence of type 2 diabetes in children in the U.K.* Diabetes Care 2007;30:1097-1101.

[8] The NS, Richardson AS, Gordon-Larsen P. *Timing and duration of obesity in relation to diabetes: findings from an ethnically diverse, nationally representative sample.* Diabetes Care. 2013:34:865-872.

[9] Cote AT, Harris KC, Panagiotopoulos C et al. *Childhood obesity and cardiovascular dysfunction.* Journal of the American College of Cardiology. 2013;62:1309-1319.

[10] Freedman D, Dietz WH, Srinivasan S et al. *The relation of overweight to cardiovascular risk factors among children and adolescents: The Bogalusa Heart Study.* Pediatrics 1999;103:1175-1182.

[11] van Emmerik NM, Renders CM, van de Veer M et al. *High cardiovascular risk in severely obese young children and adolescents.* Archives of Disease in Childhood. 2012;97:818-821.

such as depression[12,13], low-self-esteem[14,15,16] and dissatisfaction with their body.[17,18,19] An association between obesity and behavioural problems is also evident from a young age.[20]

In addition to these problems during childhood, being an obese child can have long term consequences for health in adulthood. Childhood obesity is a strong predictor of adult obesity.[21]

To address the issue of obesity, governments have put in place a number of policies and initiatives, aimed at individuals, the NHS, local authorities and food manufacturers and retailers. Physical activity and 'Eatwell' guidelines give informed advice for a healthier lifestyle, including a healthier weight.[22,23] The Change4Life public information campaign aims to improve diet and activity levels of parents and children.[24] The Public Health Responsibility Deal involved voluntary participation from food manufacturers and retailers in a number of areas including calorie reduction and improving food labelling systems.[25] The *Living Well for Longer* policy document aims to encourage local authorities and clinical commissioning groups (CCGs) to follow the lead of Public Health England in acting on obesity. In particular, local authorities were

[12] Sjoberg RL. *Obesity, shame, and depression in school-aged children: A population-based study*. Pediatrics 2005;116(3):389-392.

[13] Ball K, Burton NW, Brown WJ. *A prospective study of overweight, physical activity, and depressive symptoms in young women*. Obesity 2009;17:66-71

[14] Cornette R. *The emotional impact of obesity on children*. Worldviews on Evidence-based Nursing. 2008;5:136-141.

[15] Griffiths LJ, Parsons TJ, Hill AJ. *Review: Self-esteem and quality of life in obese children and adolescents: a systematic review.* International Journal of Pediatric Obesity. 2010 Aug; 5(4):282-304.

[16] Rankin J, Matthews L, Cobley S, Han A, Sanders R, Wiltshire, HD, Baker. *Psychological consequences of childhood obesity: psychiatric comorbidity and prevention.* Adolescent Health, Medicine and Therapeutics. 2016 Nov; 7 125–146

[17] Wadden TA, Foster GD, Stunkard AJ, Linowitz JR. *Dissatisfaction with weight and figure in obese girls: discontent but not depression*. International Journal of Obesity. 1989; 13(1):89-97.

[18] Hill AJ, Draper E, Stack J. *A weight on children's minds: body shape dissatisfactions at 9-years old.* International Journal of Obesity and Related Metabolic Disorders. 1994;18:383-389.

[19] Gustafson-Larson AM, Terry RD. *Weight-related behaviours and concerns of fourth-grade children*. Journal of the American Dietetic Association. 1992;92:818-822.

[20] Griffiths LJ, Dezateux C, Hill A. *Is obesity associated with emotional and behavioural problems in children? Findings from the Millennium Cohort Study*. International Journal of Pediatric Obesity. 2011;6:e423-432.

[21] M.K. Serdula, D. Ivery, R.J. Coates, D.S. Freedman, D.F. Williamson, T. Byers. *Do obese children become obese adults? A review of the literature.* Preventive Medicine. 1993; 22:167-177.

[22] Department of Health and Social Care. *UK physical activity guidelines.* 2019. https://www.gov.uk/government/publications/physical-activity-guidelines-uk-chief-medical-officers-report

[23] Public Health England. *Eatwell guide.* London, 2016, updated 2018. https://www.gov.uk/government/publications/the-eatwell-guide

[24] NHS. Change4Life campaign. https://www.nhs.uk/change4life-beta/about-change4life

[25] Department of Health. *Public Health Responsibility Deal*. London, 2011. https://webarchive.nationalarchives.gov.uk/20180201175731/https://responsibilitydeal.dh.gov.uk/wp-content/uploads/2012/03/The-Public-Health-Responsibility-Deal-March-20111.pdf

encouraged to use their powers to curb fast-food outlets and to promote exercise and active travel.[26,27]

The 2016 childhood obesity strategy outlined an action plan that set out a number of actions primarily focused on reducing sugar consumption and increasing physical activity among children.[28] In April 2018 the soft drinks industry levy (SDIL) was launched, which has seen some soft drinks producers reduce the sugar in their products and raise funds for sport in schools. In June 2018 an update to the action plan was published[29] setting a national ambition to "halve childhood obesity and significantly reduce the gap in obesity between children from the most and least deprived areas by 2030". The updated plan sets out actions focusing on sugar and calorie reduction, the advertising and promotion of unhealthy foods and working with local authorities and schools to deliver change.

In July 2019, Public Health England published the *Whole systems approach to obesity*, which offers further guidance to local authorities in how to tackle 'obesogenic' environments. The guide recommends a long-term, system-wide approach that is tailored to local needs and works across the life course and suggests that actions are agreed according to local context.[30]

This report presents key findings, charts, and tables primarily from the 2018 survey. Most tables referring to children combine data from 2017 and 2018, although headline 2018 figures for children's overweight and obesity are included in the trend tables. Adult trend tables include data from 1993 and child trend tables include data from 1995 when children were first included in the survey.

# Methods and definitions

## Methods

Height and weight were measured during the interviewer visit while waist and hip circumferences were measured during the nurse visit, for both adults and children.

Full details of the protocols for carrying out all the measurements are contained in the HSE 2018 Methods report and are summarised in the Appendix to this report.

[26] Public Health England. *Obesity and the environment briefing – regulating the growth of fast-food outlets.* London, 2013, updated 2014. https://www.gov.uk/government/publications/obesity-and-the-environment-briefing-regulating-the-growth-of-fast-food-outlets

[27] Public Health England. *Obesity and the environment briefing – increasing physical activity and active travel.* London, 2013. https://www.gov.uk/government/publications/obesity-and-the-environment-briefing-increasing-physical-activity-and-active-travel

[28] HM Government. *Childhood obesity: a plan for action*. London, 2016. https://www.gov.uk/government/publications/childhood-obesity-a-plan-for-action

[29] HM Government: *Childhood obesity: a plan for action, chapter 2*. London 2018. https://www.gov.uk/government/publications/childhood-obesity-a-plan-for-action-chapter-2

[30] Public Health England. *Whole systems approach to obesity.* London 2019. https://www.gov.uk/government/publications/whole-systems-approach-to-obesity

# Definitions

## Body mass index (BMI)

In order to define overweight or obesity, a measurement is required that allows for differences in weight due to height. A widely accepted measure of weight for height is the body mass index (BMI), defined as weight in kilograms divided by the height in metres squared (kg/m$^2$).[31] This has been used as a measure of obesity in the HSE series.

Adult participants were classified into the following BMI groups according to the World Health Organization (WHO) BMI classification, shown in Table A below.

**Table A: Classification of Body Mass Index (BMI) groups**

| BMI (kg/m$^2$) | Description |
|---|---|
| Less than 18.5 | Underweight |
| 18.5 to less than 25 | Normal |
| 25 to less than 30 | Overweight, not obese |
| 30 or more | Obese, including morbidly obese |
| 40 or more | Morbidly obese |

Within this report, BMI categories of overweight and obese have frequently been combined to show the proportion whose BMI is above the normal range. As in previous years' reports, a subset of the obese category has also been defined, namely those with morbid obesity (BMI 40kg/m$^2$ or more), who are at highest risk of morbidity and mortality.[32]

A universal categorisation cannot be used to define childhood overweight and obesity because boys and girls have different growth patterns at each age. Overweight and obesity prevalence for children aged 2 to 15 is therefore estimated using age, categorised in six-month bands, and the sex-specific UK National BMI centiles classification.[33,34] This classification gives the BMI threshold separately for boys and girls for each age above which a child is considered overweight or obese. The classification estimates were produced by calculating the proportion of boys and girls who were at or above the 85th (overweight) or 95th (obese) BMI centiles of the 1990 reference population.[34]

Assessment of a child's weight status compares the actual BMI with BMI centiles on published growth charts, using sex and age in six-month bands (extracted from the

[31] Keys A, Fidanza F, Karvonen MJ, et al *Indices of relative weight and obe*sity. International Journal of Epidemiology, 2014;43:655–65..

[32] NHS Consensus Development Conference. *Gastrointestinal surgery for severe obesity*. Nutrition 1996;12:397-402.

[33] Stamatakis E. *Anthropometric measures, overweight, and obesity*. Chapter 9 in Sproston K, Primatesta P (eds). Health Survey for England 2002. The Stationery Office, London, 2003.

[34] Centiles are values of a distribution that divide it into 100 equal parts. For example, the 10th centile is the value of a distribution where 10% of the cases have values at or below the 10th centile.

date of interview minus the date of birth). Presentation of the results is based on the age at last birthday, which is the HSE standard. Also, in line with the HSE standard for children, none of the results in this chapter have been age-standardised.

### Waist circumference

In order to measure abdominal obesity in adults, waist circumference is measured, and categorised into desirable, high and very high, by sex-specific thresholds.[35]

BMI does not distinguish between mass due to body fat and mass due to muscular physique. It also does not take account of the distribution of fat. It has therefore been suggested that waist circumference, waist to hip ratio or waist to height ratio may be useful supplements to BMI to identify central (abdominal) obesity, which increases the health risk from being overweight.[36,37] More recently, waist circumference has been identified as the most useful of these three measures of central obesity in determining health risk.

**Table B: Classification of waist circumference groups**

| Description | Men's waist circumference | Women's waist circumference |
|---|---|---|
| Desirable | Less than 94 cm | Less than 80 cm |
| High | 94-102 cm | 80-88 cm |
| Very high | More than 102 cm | More than 88 cm |

Currently no such categorisation is applicable to children.

### Age standardisation

Adult data within this report have been age-standardised to allow comparisons between groups after adjusting for the effects of any differences in their age distributions. When different sub-groups are compared in respect of a variable on which age has an important influence, any differences in age distributions between these sub-groups are likely to affect the observed differences in the proportions of interest. For information about the method used, see Section 8.6 of the HSE 2018 Methods report.

## About the survey estimates

The HSE, in common with other surveys, collects information from a sample of the population. The sample is designed to represent the whole population as accurately as possible within practical constraints, such as time and cost. Consequently, statistics based on the survey are estimates, rather than precise figures, and are

[35] World Health Organization, 2000. *Obesity: preventing and managing the global epidemic (No. 894)*. World Health Organization

[36] Lean M, Han T, Morrison C. *Waist circumference as a measure for indicating need for weight management*. BMJ 1995;311:158-61.

[37] Schneider HJ, Friedrich N, Klotsche J et al. *The predictive value of different measures of obesity for incident cardiovascular events and mortality.* Journal of Clinical Endocrinology and Metabolism. 2010;95:1777-1785.

subject to a margin of error, also known as a 95% confidence interval. For example the survey estimate might be 24% with a 95% confidence interval of 22% to 26%. A different sample might have given a different estimate, but we expect that the true value of the statistic in the population would be within the range given by the 95% confidence interval in 95 cases out of 100.

Where differences are commented on in this report, these reflect the same degree of certainty that these differences are real, and not just within the margins of sampling error. These differences can be described as statistically significant.[38]

Confidence intervals are quoted for key statistics within this report and are also shown in more detail in the Excel tables accompanying this report. Confidence intervals are affected by the size of the sample on which the estimate is based. Generally, the larger the sample, the smaller the confidence interval, and hence the more precise the estimate.

[38] Statistical significance does not imply substantive importance; differences that are statistically significant are not necessarily meaningful or relevant.

# Adult height and weight

The tables accompanying this report present trends in mean height and mean weight by age and sex from 1993 onwards.

In 2018 the mean height of men was 175.6cm, and of women was 162.1cm. Between 1993 and 2018, mean height increased by about 1cm among both men and women.

Table 1

Between 1993 and 2018, mean weight increased from 78.9kg to 84.8kg among men, and from 66.6kg to 72.4kg among women.

Among men, mean weight increased least among those aged 16 to 24 (an increase of 3.7kg within this age group from 73.1kg to 76.8kg between 1993 and 2018), and most among those aged 65 to 74 (an increase of 8.4kg within this age group from 77.7kg to 86.1kg between 1993 and 2018).

Among women, those aged 16 to 24 were the age group with the smallest increase in mean weight (an increase of 3.2kg, from 62.6kg to 65.8kg between 1993 and 2018), and the greatest increase was seen among women aged 25 to 34 (an increase of 7.2kg, from 65.5kg to 72.7kg).

Table 2

# Prevalence of adult overweight, obesity and high waist circumference

## Adult overweight and obesity, by age and sex

Mean BMI among adults was 27.5 kg/m$^2$. As explained in the introduction to this report, survey estimates are subject to a margin of error. It is likely that the mean BMI among adults within the population was between 27.3 kg/m$^2$ and 27.7 kg/m$^2$. Mean BMI was the same for men and women. It increased with age and was highest among adults between the ages of 45 and 74.[39]

63% of adults were classified as overweight or obese. As noted above, this is an estimate and subject to a margin of error: the proportion in the population is likely to be somewhere between 62% and 65%. Overall, 67% of men and 60% of women were classed as overweight or obese. Being overweight but not obese was more common among men (41%) than women (30%).

28% of adults were obese. This is an estimate and subject to a margin of error: the proportion in the population is likely to be somewhere between 26% and 29%. Obesity, including morbid obesity, was more common in women than men (29% and 26% respectively). A higher proportion of women were morbidly obese than men (4% and 2% respectively).

The proportion of adults who were overweight or obese increased with age for both men and women and was highest amongst men aged between 55 and 64 (82%) and women aged between 65 and 74 (70%). The proportion of obese men and women

[39] Confidence intervals around estimates of mean BMI and the prevalence of overweight and obesity among adults are shown in more detail in Table A1.

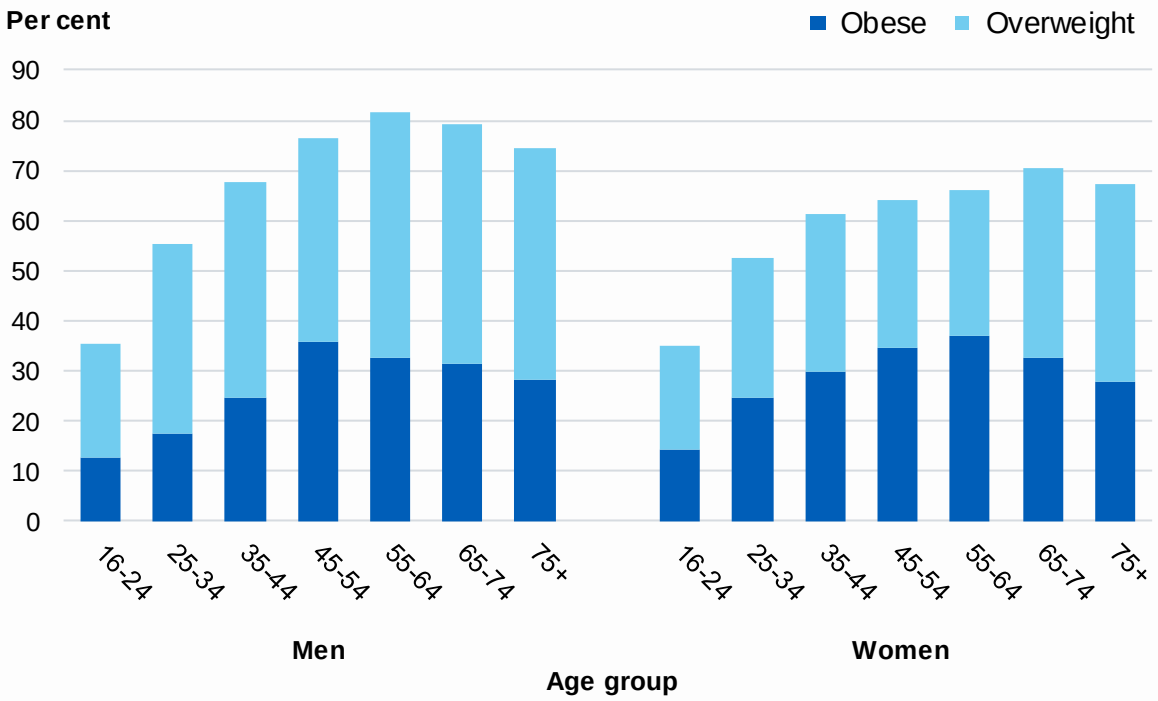
 

also increased with age and was highest amongst men aged between 45 and 54 (36%) and amongst women aged between 55 and 64 (37%).

Figure 1, Table 3

**Figure 1: Adult overweight and obesity prevalence, by age and sex**

Base: Aged 16 and over




Source: NHS Digital

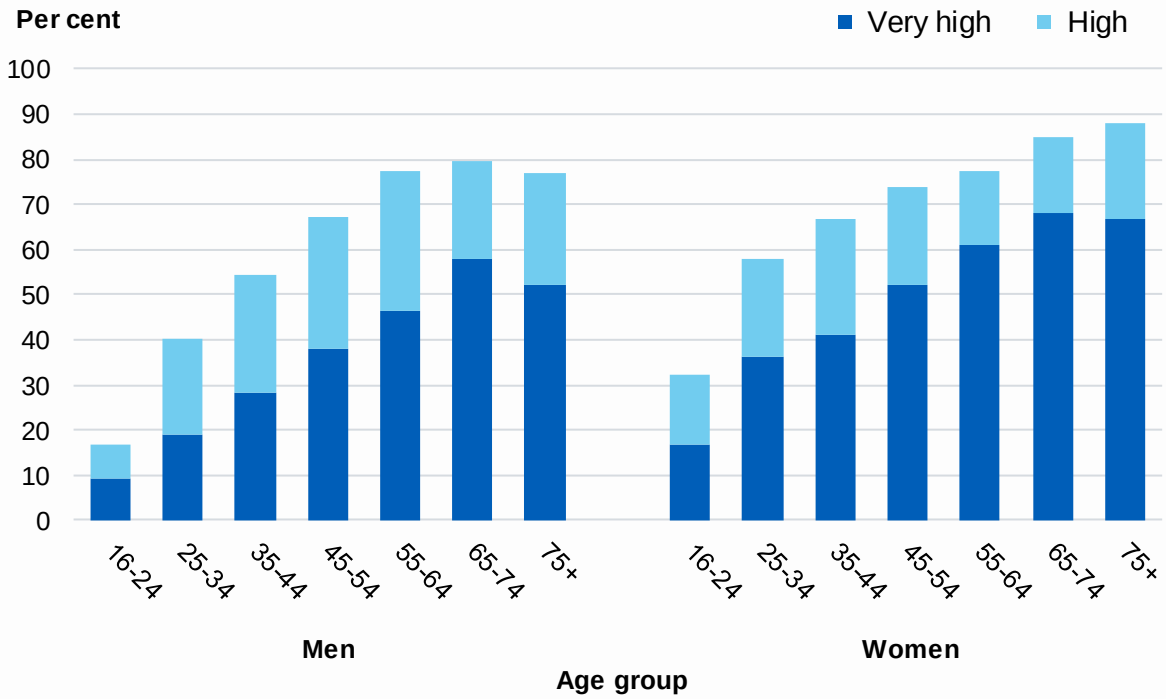
## Adult waist circumference, by age and sex

The mean waist circumference was 97.1 cm for men and 88.8 cm for women. Overall, 34% of men and 48% of women had very high waist measurements and a further 23% of men and 20% of women had high waist measurements. The probability of having a very high waist circumference increased with age and was most common among adults aged between 65 and 74; 58% of men and 68% of women of this age had very high waist measurements.[40]

Figure 2, Table 7

**Figure 2: High and very high waist circumference in adults, by age and sex**

Base: Aged 16 and over




Source: NHS Digital

[40] Confidence intervals around estimates of mean waist circumference and the prevalence of very high waist circumference are shown in more detail in Table A2.

## Adult obesity, overweight and waist circumference, by region and sex

Estimates by region are shown in the tables as both observed and age-standardised. Observed estimates show the actual levels of overweight, obesity, and high waist circumference in each region. Comparisons between regions should be based on the age-standardised data, which take into account the different regional age profiles.

The proportion of adults who were overweight (including obese) according to their BMI varied by region. After controlling for age, the lowest levels were in London and the highest levels in the North East, the West Midlands and Yorkshire and the Humber.

The proportion of adults who were obese according to their BMI also varied by region. After taking age into account, the lowest levels of obesity were in the South East and London and the highest levels were in the West Midlands, the North East and Yorkshire and the Humber.

Table 4

The proportion of men and women with a very high waist circumference varied by region. After taking age into account, it was lowest in London and highest in the North East.

Table 8

## Adult obesity, overweight and waist circumference, by IMD and sex

The English Index of Multiple Deprivation (IMD) is a measure of area deprivation, based on 37 indicators, across seven domains of deprivation.[41] IMD is a measure of the overall deprivation experienced by people living in a neighbourhood, although not everyone who lives in a deprived neighbourhood will be deprived themselves. To enable comparisons, areas are classified into quintiles (fifths). The age profile of the IMD quintiles have been age-standardised to account for different area age profiles. For further information about the IMD, see Chapter 8 and Appendix B: Glossary in the HSE 2018 Methods report.

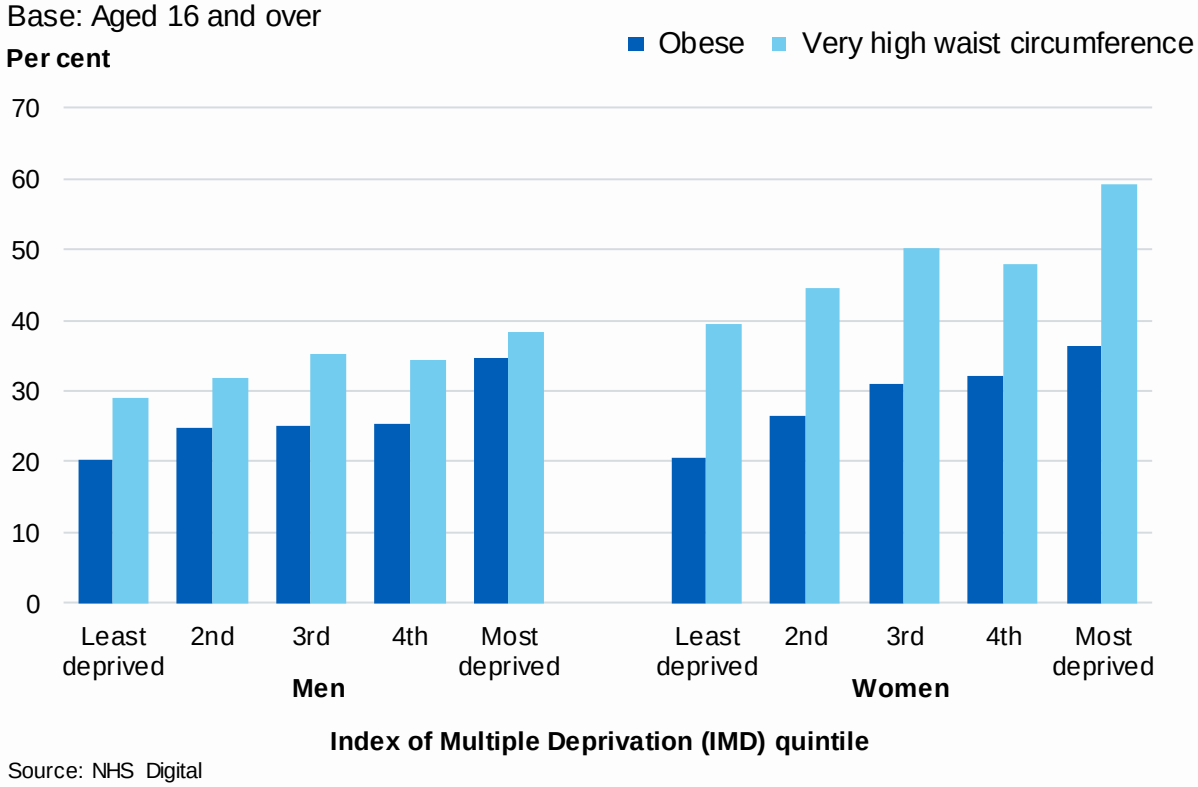
Obesity varied by area deprivation, with those in the most deprived areas having the highest mean BMI and highest prevalence of obesity. 35% of men and 37% of women living in the most deprived areas were obese compared with 20% of men and 21% of women in the least deprived areas.

Waist circumference was also associated with area deprivation, with the highest likelihood of very high waist circumference in the most deprived areas; 38% of men and 59% of women, compared with 29% of men and 40% of women in the least deprived areas. Figure 3 shows both measures of obesity, by area deprivation and sex.

Figure 3, Tables 5 and 9

**Figure 3: Prevalence of BMI-defined obesity and very high waist circumference, by Index of Multiple Deprivation and sex**

Base: Aged 16 and over




Source: NHS Digital

[41] The seven domains used to calculate IMD are: income deprivation; employment deprivation; health deprivation and disability; education; skills and training deprivation; crime; barriers to housing and services; and living environment deprivation.

## Trends in adult obesity, overweight and waist circumference

Figure 4 shows trends in obesity and in overweight including obesity from 1993 to 2018, using three-year moving averages to smooth out any unusually high or low values in individual years.

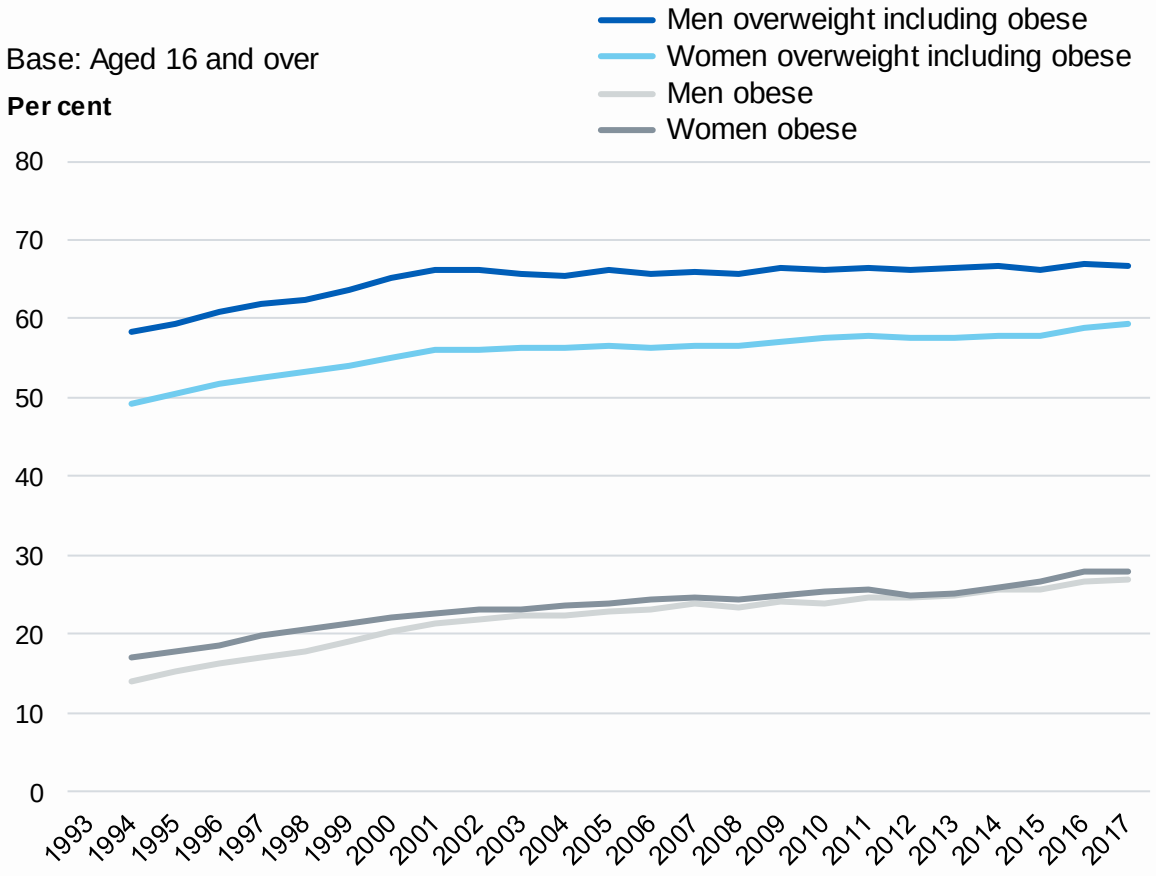
Rates of obesity and overweight have been stable in recent years. Between 1993 and 2001, the prevalence of overweight including obesity increased from 53% to 62% of adults in England. Since around 2001, the proportion of adults who were overweight or obese has varied between 60% and 64%, and was 63% in 2018.

Obesity prevalence also increased steeply between 1993 and around 2000, and there was a slower rate of increase after that. The prevalence of obesity has varied between 23% and 29% from 2003 to 2017, with a gradual upward trend. In 2018, it was 28%.

Morbid obesity has also increased since 1993, with 2% of men and 4% of women morbidly obese in 2018, compared with fewer than 0.5% of men and just over 1% of women in 1993.

Figure 4, Table 6

**Figure 4: Adult overweight and obesity prevalence, 1993-2018, by sex (three year moving average)**




Source: NHS Digital

There were also noticeable increases between 1993 and 2018 in the proportion of both men and women with a very high waist circumference. The proportion of men with a very high waist circumference (more than 102 cm) rose from 20% in 1993 to 34% in 2018. The proportion of women with a very high waist circumference (more than 88 cm) rose from 26% to 48% over the same period.

Table 10

# Obesity, overweight and risks to health

## Combined assessment of health risk from BMI and waist circumference

In 2014, NICE published guidance on the identification, assessment and management of overweight and obesity in children, young people and adults, which partially updated its 2006 guidance. The guidance included a recommendation for health professionals to "think about using waist circumference, in addition to BMI, in people with a BMI less than 35 kg/m$^2$". The recommendation is to base the assessment of health risks associated with being overweight or obese on BMI and waist circumference, as in Table C below.[42] This is because some people, despite having a BMI of less than 35 kg/m$^2$, may have a higher risk of disease due to having a more 'central' fat distribution as identified by a high or very high waist circumference.[42,43]

For those with a BMI of 35 kg/m$^2$ or more, waist circumference has little added predictive power of disease risk, and these individuals are also unlikely to have a low waist circumference.[42]

**Table C: Health risk from BMI and waist circumference**

| **BMI classification** | **Waist circumference** | | |
|---|---|---|---|
| | Low | High | Very high |
| Normal weight (18.5 to less than 25) | No increased risk | No increased risk | Increased risk |
| Overweight (25 to less than 30) | No increased risk | Increased risk | High risk |
| Obesity I (30 to less than 35) | Increased risk | High risk | Very high risk |
| Obesity II (35 to less than 40) | Very high risk | Very high risk | Very high risk |
| Obesity III (40 or more) | Very high risk | Very high risk | Very high risk |

[42] World Health Organization. *Waist circumference and waist-hip ratio. Report of a WHO expert consultation.* Geneva, 2008. http://apps.who.int/iris/bitstream/10665/44583/1/9789241501491_eng.pdf?ua=1

[43] Schneider HJ, Friedrich N, Klotsche J et al. *The predictive value of different measures of obesity for incident cardiovascular events and mortality.* Journal of Clinical Endocrinology and Metabolism. 2010;95:1777-1785.

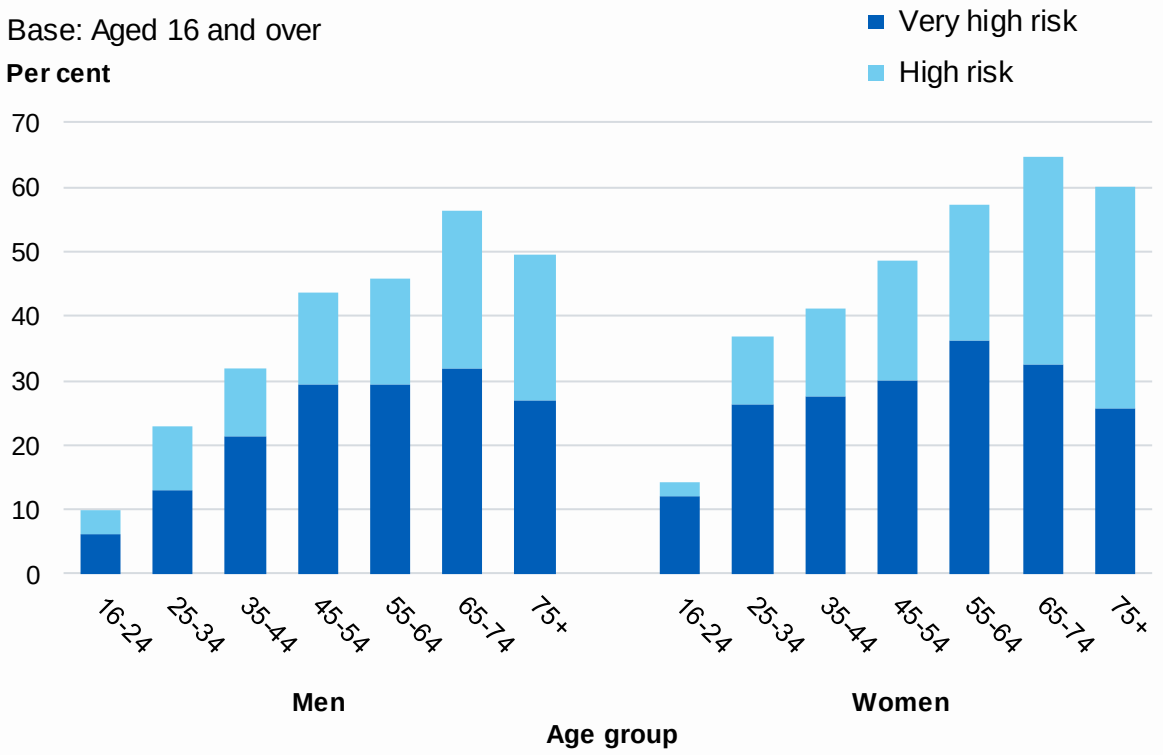
## Weight-related health risk by age and sex

Participants with both BMI and waist measurements were assigned a health risk category, taking these two measures into account. More than half of adults (54% of men and 58% of women) were at increased, high or very high risk of chronic disease. Women were more likely than men to be in the high or very high risk categories (46% and 35% respectively). This includes 11% of women and 7% of men who were in the Obese II and Obese III categories, with a BMI of 35 kg/m$^2$ or more, and were therefore at very high risk. The proportion of people in these risk categories generally increased with age and was highest among men and women aged between 65 and 74 (56% and 65% respectively at high or very high risk of chronic disease).

Figure 5, Table 11

**Figure 5: High or very high weight-related health risk, by age and sex**

Base: Aged 16 and over




Source: NHS Digital

Very small proportions of men (less than 0.5%) and women (2%) who had a normal BMI had a very high waist circumference that put them at increased risk.

However, among adults who were overweight (BMI of 25 to less than 30 kg/m$^2$, the most common weight category for men) the majority had either a high or very high waist circumference, putting them into the increased or high risk groups.

Overall 28% of women were in one of the obese categories (I to III).[44] Almost all women in category I had a very high waist circumference, putting them at very high risk of chronic disease. (Adults in categories II and III were all deemed to be at very high risk). Although men were less likely than women to be obese, most obese men were also in the very high risk category because of their very high waist circumference.

Table 11

## Trends in weight-related health risk

Following overall trends in BMI and waist circumference, there have been noticeable increases in the proportion of individuals at very high risk of chronic disease due to these measures of obesity between 1993 and 2018. The proportion of men at very high risk rose from 11% in 1993 to 20% in 2005, and has varied between 20% and 24% since. The proportion of women at very high risk rose from 14% to 23% between 1993 and 2005 and has fluctuated since then, with an increase to 29% in 2017. In 2018, 22% of men and 28% of women were at very high risk of chronic disease due to their BMI and waist circumference.

Table 12

## Adult weight and diabetes risk category

The definition of diagnosed diabetes was based on a positive response to both of the questions asked at the interview: 'Do you now have, or have you ever had diabetes?' and 'Were you told by a doctor that you had diabetes?'.[45] Women who had diabetes only during pregnancy were excluded. No attempt was made to validate this self-reported data. There is therefore the possibility that some misclassification may have occurred, because some participants may not have remembered (or not remembered correctly) the diagnosis made by their doctor.

The definition of undiagnosed diabetes was based on those with blood glycated haemoglobin (HbA1c) level of 48 mmol/mol or above without doctor-diagnosed diabetes. Glycated haemoglobin (HbA1c), measured in the blood sample, is a validated tool for monitoring longer-term hyperglycaemia (raised levels of blood glucose).[46] HbA1c shows the proportion of haemoglobin in the circulation to which glucose is bound. It reflects the average level of blood glucose during approximately three months preceding the measurement and has been suggested as a diagnostic or screening tool for diabetes. It can be measured reliably in non-fasting blood samples,

[44] The combined measures discussed here are based on adults with valid measurements of height, weight and waist circumference. Estimates for BMI categories may therefore vary slightly from those presented earlier in this report, which are based on the larger number of adult participants with valid height and weight measurements, and which are definitive.

[45] The interview makes no distinction between Type 1 and Type 2 diabetes.

[46] World Health Organisation. *Use of glycated haemoglobin (HbA1c) in the diagnosis of diabetes mellitus: abbreviated report of a WHO consultation*. Geneva, 2011. www.who.int/diabetes/publications/diagnosis_diabetes2011/en

as collected in the HSE, whereas measurement of glucose requires fasting blood samples.

For further information about the measurement of diabetes within the HSE, see the 2018 HSE report on Adult health.[47]

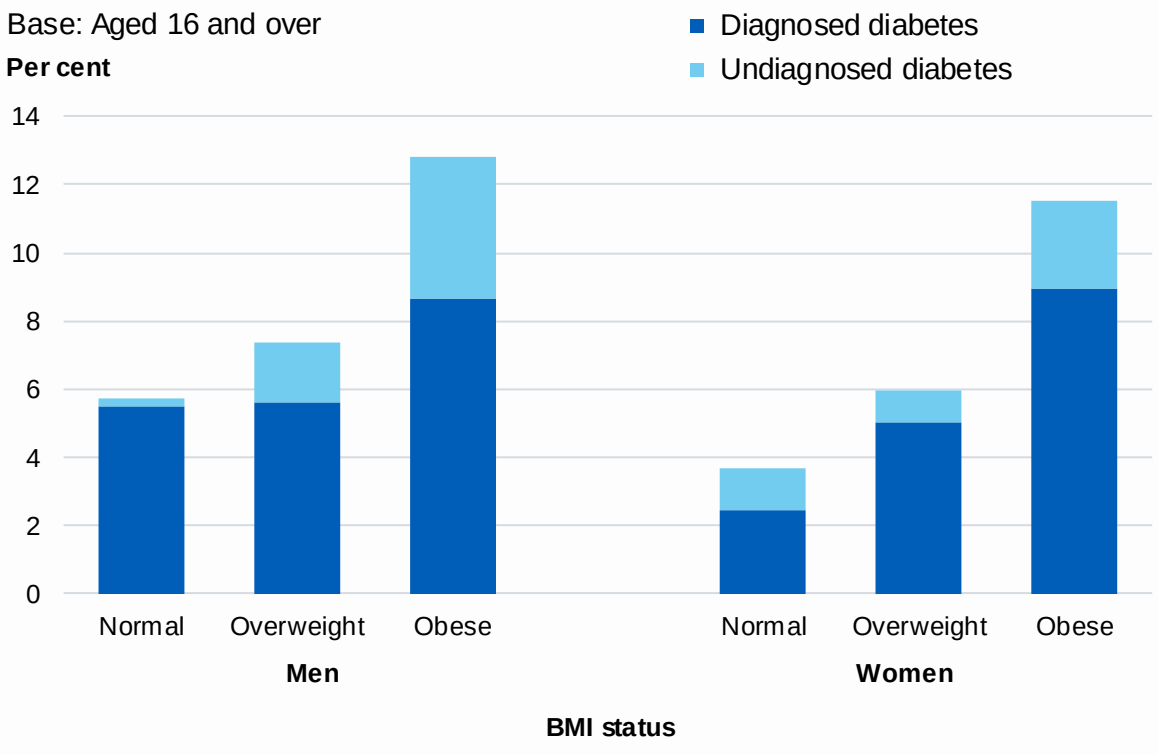
## Diabetes status by BMI and sex

Total diabetes, including diagnosed and undiagnosed diabetes, was at similar levels among men and women (9% and 7% respectively). Among men, 7% had diagnosed diabetes and a further 2% had undiagnosed diabetes. For women, the figures were 5% and 2% respectively.

Diagnosed, undiagnosed and total diabetes were all associated with BMI status. Prevalence of total diabetes was greatest among those who were obese (12%) compared to those who were overweight but not obese (7%) or those who were not overweight (5%).

Figure 6, Table 13

**Figure 6: Prevalence of diabetes, by BMI status and sex**




Source: NHS Digital

[47] https://digital.nhs.uk/pubs/hse2018

## Diabetes status by waist circumference and sex

Total diabetes was also associated with central obesity, measured by waist circumference. 14% of men and 10% of women with a very high waist circumference had either diagnosed or undiagnosed diabetes. This compared to 6% of men and 3% of women with high waist circumferences and 5% of men and 4% of women with a desirable waist circumference.

Table 14

# Child height and weight

This section presents trends in children's mean height and mean weight by age and sex from 1995 onwards. Height and weight were measured during the interviewer visit. Infants (aged 0 to 1) were first included in the survey in 2001. The weight of infants over six weeks has been measured every year since 2001.

Trends in children's height are shown for the period 1995 to 2018, based on children aged 2 to 15. [48] Trends in children's weight are shown for the period 1995 to 2000, based on children aged 2 to 15, and from 2001 to 2018, based on children aged 0 to 15.

The mean heights of children measured in 2018 were 100.0cm for children aged 2 to 4, 119.3cm for ages 5 to 7, 136.5cm for ages 8 to 10, 152.7cm for ages 11 to 12, and 163.8cm for ages 13 to 15.

Table 15

The mean weights of children measured in 2018 were 9.7kg for ages 0 to 1, 16.1kg for ages 2 to 4, 23.4kg for ages 5 to 7, 33.5kg for ages 8 to 10, 46.1kg for ages 11 to 12 and 56.8kg for ages 13 to 15.

Table 16

[48] Estimates of infant length based on the measurements of children aged under 2 between 2001 and 2008 can be found in the trend tables published in 2015, as can data on BMI for this age group. https://webarchive.nationalarchives.gov.uk/20180328130330/http://digital.nhs.uk/catalogue/PUB22616

# Prevalence of child overweight and obesity

## Child overweight and obesity by age and sex

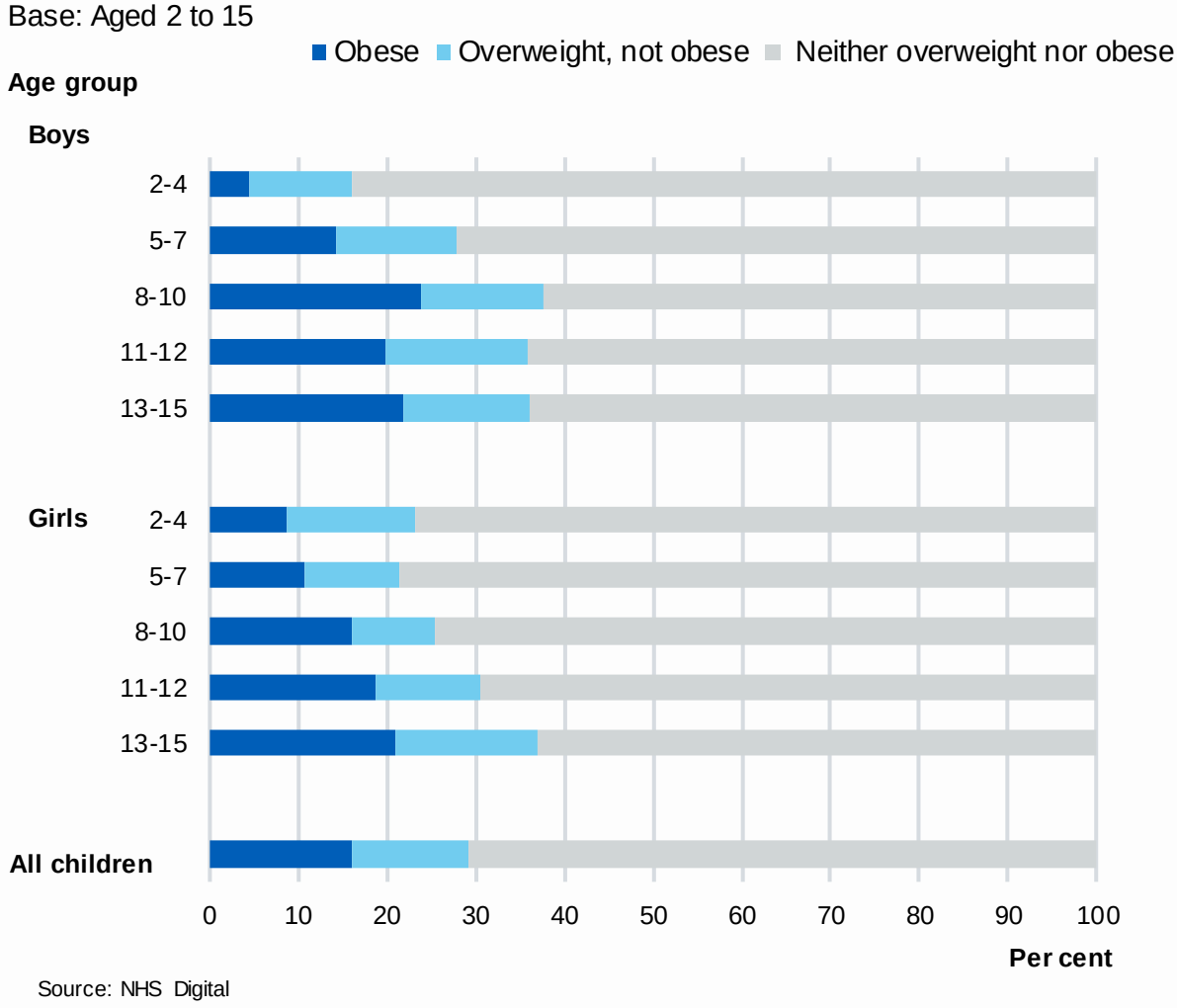
Estimates of child overweight and obesity in this report are based on data from 2017 and 2018, unless otherwise stated.[49] Estimates for 2018 only are shown in Table 19 which also shows changes over time.

Similar proportions of boys (31%) and girls (27%) were either overweight or obese including 17% of boys and 15% of girls who were obese.

The prevalence of child overweight and obesity increased with age. 16% of boys and 23% of girls aged 2 to 4 were overweight including obese compared with 36% of boys and 37% of girls aged 13 to 15. The proportion of obese children also increased with age. 4% of boys and 9% of girls aged 2 to 4 were obese compared with 22% of boys and 21% of girls aged 13 to 15.

Figure 7, Table 17

**Figure 7: Child overweight and obesity by age and sex (2017 and 2018)**




Source: NHS Digital

[49] In years where there is no child boost (the last child boost was in 2015) around 1,300 children each year have valid height and weight measurements. Combining 2017 and 2018 data improves the precision of estimates.

## Child obesity and overweight by Index of Multiple Deprivation and sex

The English Index of Multiple Deprivation (IMD) is a measure of area deprivation, based on 37 indicators, across seven domains of deprivation.[50] IMD is a measure of the overall deprivation experienced by people living in a neighbourhood, although not everyone who lives in a deprived neighbourhood will be deprived themselves. To enable comparisons, areas are classified into quintiles (fifths). The age profile of the IMD quintiles have been age-standardised to account for different area age profiles.

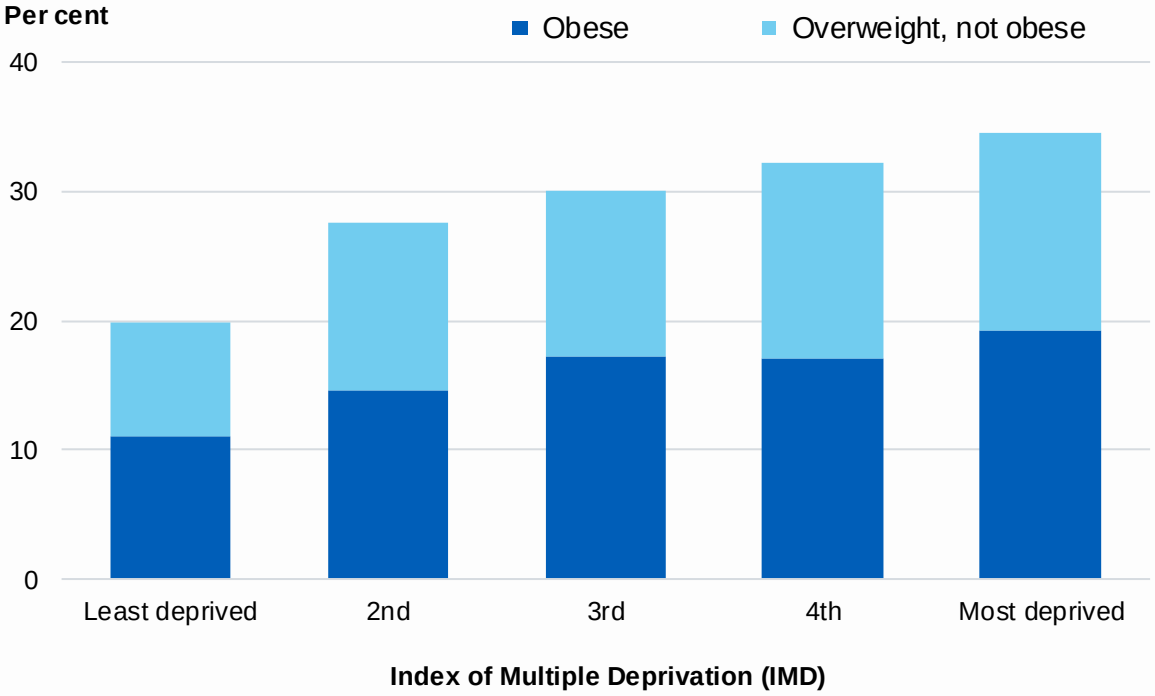
For further information about the IMD, see Chapter 8 and Appendix B: Glossary in the HSE 2018 Methods report.

The proportion of children who were obese was higher in the most deprived areas. 19% of children in the most deprived quintile were obese compared to 11% of children in the least deprived quintile. This relationship between area deprivation and obesity was different for boys and girls. The proportion of obese boys did not vary significantly by the level of area deprivation, whereas girls in the most deprived areas were more likely to be obese (19%) then those living in the least deprived areas (6%).

Figures 8 and 9, Table 18

**Figure 8: Child overweight and obesity, by Index of Multiple Deprivation (2017 and 2018)**

Base: Aged 2 to 15



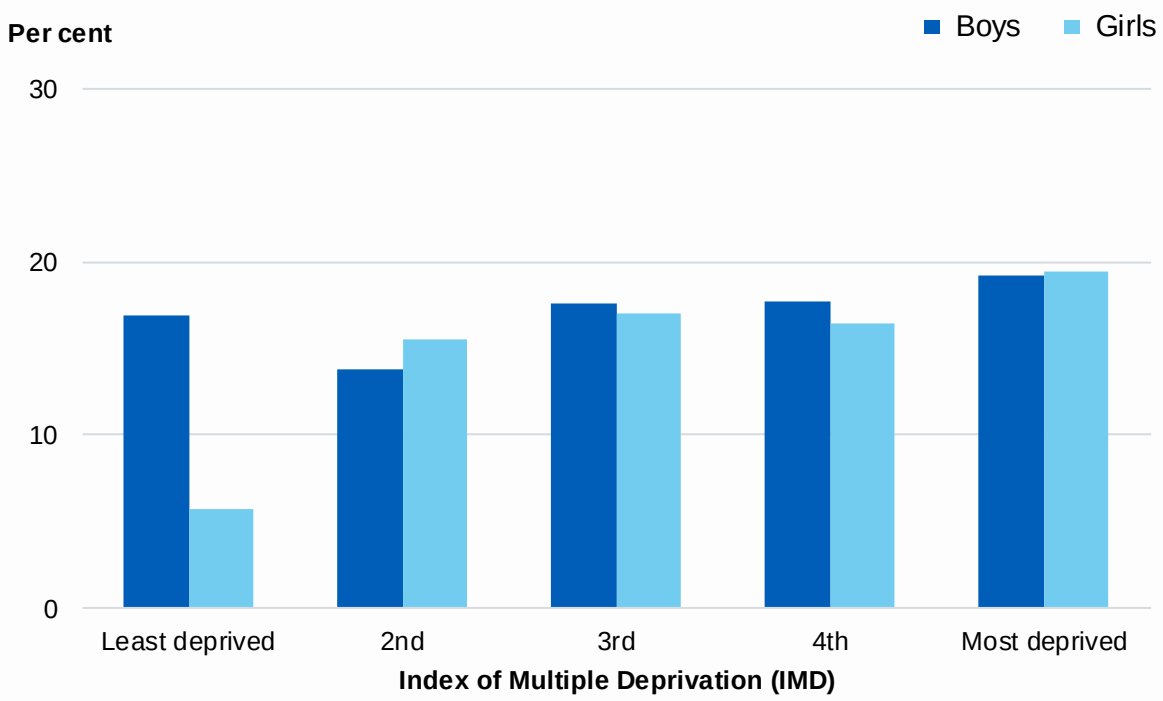

Source: NHS Digital

[50] The seven domains used to calculate IMD are: income deprivation; employment deprivation; health deprivation and disability; education; skills and training deprivation; crime; barriers to housing and services; and living environment deprivation.

**Figure 9: Child obesity, by Index of Multiple Deprivation and sex (2017 and 2018)**

Base: Aged 2 to 15




Source: NHS Digital

## Trends in child obesity and overweight

The prevalence of obesity and overweight for children aged 2 to 15 between 1995 and 2018 is shown in Figure 10, presented as three-year moving averages in order to reduce the impact of random variation.

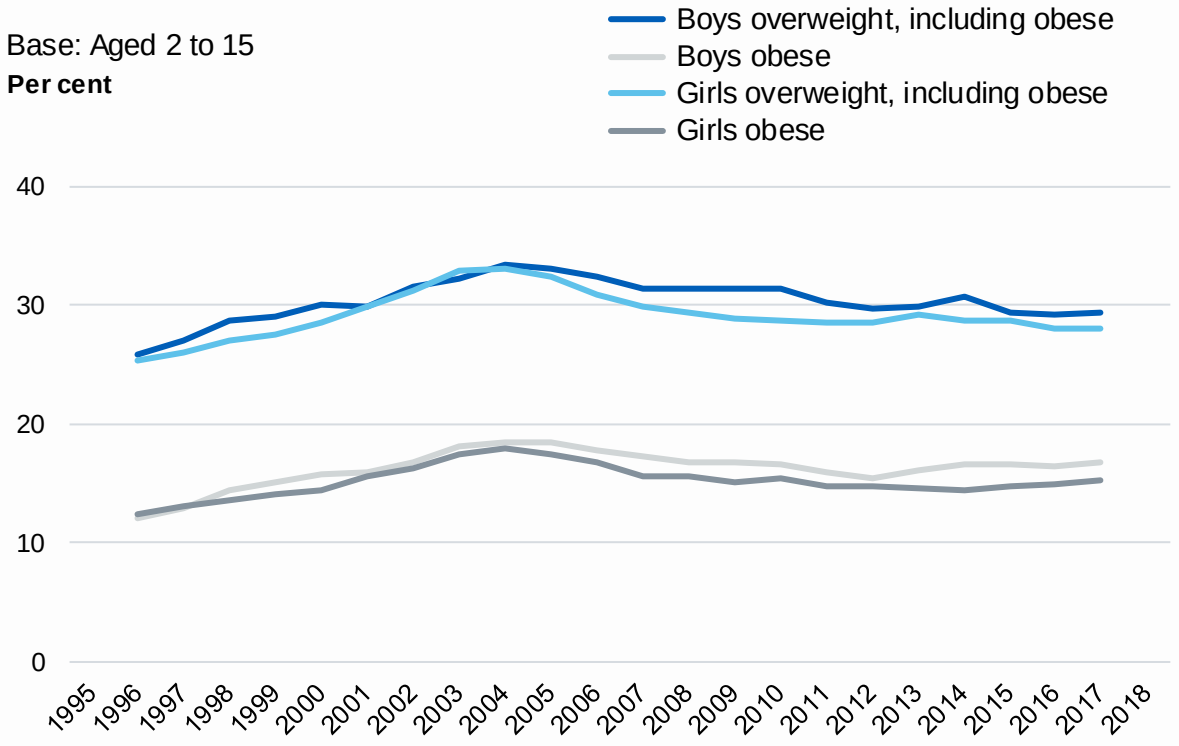
In 2018, 28% of children aged 2 to 15 were overweight or obese including 15% who were obese. These are estimates and subject to a margin of error: the proportion of children in the population who are overweight or obese is likely to be somewhere between 26% and 31%. Similarly, the proportion of obese children in the population is likely to be somewhere between 13% and 17%.[51]

Between 1995 and 2005 the prevalence of childhood obesity in England increased, then levelled out around 2005. Between 2006 and 2018 the percentage of children who were obese has fluctuated between 14% and 17%. The estimates for individual years in this period vary slightly but differences are within survey sampling error.

In 2018, the proportion of children aged 2 to 15 who were overweight but not obese was 13%. This proportion has stayed relatively stable in recent years.

Figure 10, Table 19

**Figure 10: Child overweight and obesity prevalence, 1995-2018, by sex (three year moving average)**




Source: NHS Digital

[51] Confidence intervals around estimates of the prevalence of overweight and obesity among children are shown in more detail in Table A3.

# Child overweight and obesity by parental weight

This section looks at the relationship between the weight of children and the weight of their parents, measured by BMI. The analysis is restricted to participating households where valid height and weight measurements were obtained from children and their resident parents or guardians, and is based on data from 2017 and 2018 combined. The focus of this analysis is on overweight and obesity; the group classified as of 'healthy weight' includes a small proportion of children whose BMI indicates that they are underweight.

## Children's BMI status by mother's BMI status and sex

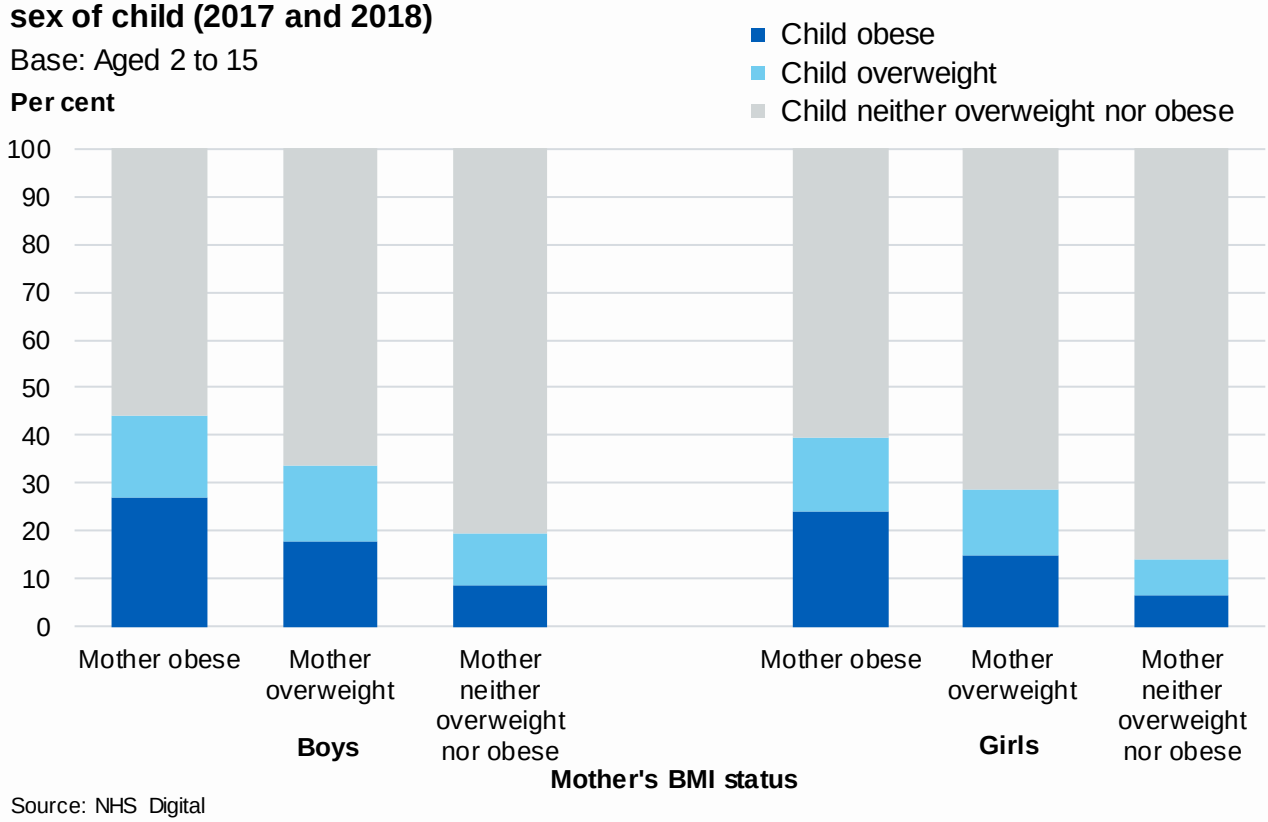
Children's BMI status was associated with their mother's BMI status.[52] This was true for both boys and girls. Obesity was most common in children with obese mothers (26%), less common in children whose mothers were overweight but not obese (16%) and was least common in children whose mothers were neither overweight nor obese (7%).

Children of obese mothers were less likely to be a healthy weight (58%) than children whose mothers were overweight but not obese (69%) or those whose mothers were neither overweight nor obese (83%).[53]

Figure 11, Table 20

**Figure 11: Child overweight and obesity by mother's BMI status and sex of child (2017 and 2018)**

Base: Aged 2 to 15




Source: NHS Digital

[52] For the purpose of this analysis, 'mother' is defined as the child's resident female parent or guardian.

[53] As noted above, the healthy weight category includes a small number of children who were classified as underweight.

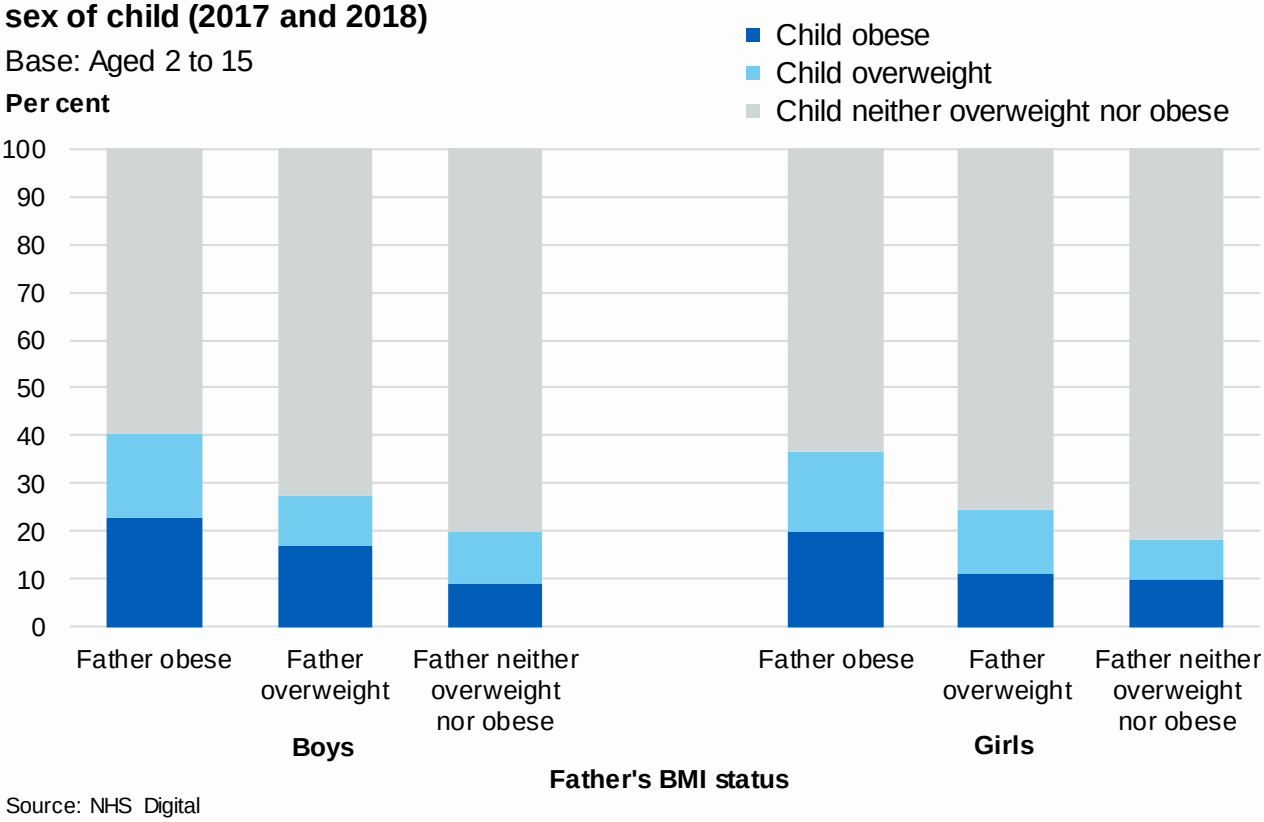
## Children's BMI status by father's BMI status and sex

Children's BMI status was also associated with their father's BMI status[54], and as with children and their mothers, this was true for both boys and girls. Over a fifth (22%) of children with obese fathers were obese, compared to 14% of children whose fathers were overweight but not obese, and 9% of children whose fathers were neither overweight nor obese. Similarly, 61% of children of obese fathers were a healthy weight, compared to 74% of children whose fathers were overweight but not obese, and 81% of children whose fathers were neither overweight nor obese.

Figure 12, Table 21

**Figure 12: Child overweight and obesity by father's BMI status and sex of child (2017 and 2018)**

Base: Aged 2 to 15




Source: NHS Digital

[54] For the purpose of this analysis, 'father' is defined as the child's resident male parent or guardian.

# Appendix: measurement methods

Full details of the protocols for carrying out all the measurements are contained in the HSE 2018 Methods report.[55]

## Height

Height was measured using a portable stadiometer with a sliding head plate, a base plate and connecting rods marked with a measuring scale. One measurement was taken with the head positioned in the Frankfort plane.[56] Adult participants stretched to their maximum height and for child participants interviewers administered a child stretch. The reading was recorded to the nearest even millimetre. Participants who were unable to stand or were unsteady on their feet were not measured.

## Weight

Class III Seca scales were introduced for HSE 2011, and have been used since then. These measure up to a maximum of 200kg.

For the weight measurement, participants were asked to remove their shoes and any bulky clothing or heavy items in pockets etc. A single measurement was recorded to the nearest 100g. Adult participants who were pregnant, unable to stand, or unsteady on their feet were not weighed. Participants who weighed more than 200kg were asked for their estimated weight because the scales are inaccurate above this level. These estimates have been included in the analyses. Very young children who found it difficult to or could not stand were weighed while being held by a parent; the parent's weight was measured separately and then subtracted from the joint weight measurement.

In the analysis of height and weight, data were excluded for those who were considered by the interviewer to have unreliable measurements, for example those who were too stooped or wearing excessive clothing.

## Waist circumference

The waist was defined as the midpoint between the lower rib and the upper margin of the iliac crest (hip bone). The measurement was taken twice, using the same tape (waist and hip measurements were alternated), and was recorded to the nearest even millimetre. Where the two waist measurements differed by more than 3cm, a third measurement was taken. The mean of the two valid measurements (the two out of the three measurements that were the closest to each other, if there were three measurements) was used in the analysis.

Participants were excluded from waist measurements if they reported that they were pregnant, had a colostomy or ileostomy, or were unable to stand. All those with measurements considered unreliable by the nurse, for example due to excessive clothing or movement, were also excluded from the analysis.

[55] Health Survey for England 2018: Methods, available via the report website https://digital.nhs.uk/pubs/hse2018.

[56] The Frankfort Plane is an imaginary line passing through the external ear canal and across the top of the lower bone of the eye socket, immediately under the eye. A participant's head is positioned so that the Frankfort Plane is horizontal. In this position the head plate of the stadiometer will rest on the crown of the head.

## Response to measurements

Within co-operating households, 72% of adults had their height measured and 70% had their weight measured. Women were more likely than men to take part in the interview and consequently were more likely to have their height and weight measured. Around half of men and women had their waist and hip measurements taken during the nurse visit (49% of men, 56% of women).

Within co-operating households, 68% of children (aged 2 and over) had their height measured and 68% of children (all ages) had their weight measured.

Full details of response to the measurements are given in Section 6 of the Methods report.[57]

[57] Health Survey for England 2018: Methods, available via the report website https://digital.nhs.uk/pubs/hse2018.

# Information and technology
## for better health and care

**www.digital.nhs.uk**

**0300 303 5678**

**enquiries@nhsdigital.nhs.uk**

**@nhsdigital**

This publication may be requested
in large print or other formats.

**Published by NHS Digital,**
**part of the Government Statistical Service**