

Health Survey for England 2019

Overweight and obesity in adults and children

This report examines the prevalence of overweight and obesity among adults and children in England in 2019. It compares prevalence rates in different population groups by age, sex and indicators of economic deprivation. Associated health risks for adults and the links between parental and child overweight and obesity are also considered.

Key findings

- 27% of men and 29% of women were obese. Around two thirds of adults were overweight or obese, this was more prevalent among men (68%) than women (60%).
- Obesity increased with age from 13% of adults aged between 16 and 24, to 36% of those aged 65 to 74. It was lower among adults aged 75 and over (26%).
- 59% of men and 69% of women had a higher than desirable waist circumference (higher than 94cm for men or 80cm for women). This proportion increased broadly in line with age, from 29% of adults aged 16 to 24, to 83% of those aged 75 and over.
- Inequalities were seen for both obesity and raised waist circumference. Adults living in the most deprived areas were the most likely to be obese. This difference was particularly pronounced for women, where 39% of women in the most deprived areas were obese, compared with 22% in the least deprived areas.
- Most children aged between 2 and 15 were neither overweight nor obese: 69% of boys and 73% of girls were normal weight. However, 18% of boys and 13% of girls were obese. Children's obesity was closely associated with their parent's BMI status. While 7% of children with mothers who were neither overweight nor obese were obese themselves, 27% of children with an obese mother were obese, and there was a similar pattern in relation to fathers' BMI status.

Contents

Key findings	1
This is a National Statistics publication	4
Introduction	5
Contents	5
Background	5
Methods and definitions	7
Methods	7
Definitions	7
Body mass index (BMI)	7
Waist circumference	8
Age standardisation	9
About the survey estimates	9
Adults' height and weight	11
Prevalence of adults' overweight and obesity	12
Trends in adults' overweight and obesity	12
Adults' overweight and obesity, by age and sex	13
Adults' overweight and obesity, by region and sex	14
Adults' overweight and obesity, by Index of Multiple Deprivation (IMD) and sex	15
Prevalence of very high waist circumference	17
Trends in waist circumference	17
Waist circumference, by age and sex	17
Waist circumference, by region and sex	18
Waist circumference, by Index of Multiple Deprivation (IMD) and sex	18
Overweight, obesity and risks to health	19
Combined assessment of health risk from BMI and high waist circumference, by sex	19
Diabetes status by BMI and sex	20
Diabetes status by waist circumference and sex	21
Children's height and weight	23
Prevalence of children's overweight and obesity	24
Trends in children's overweight and obesity	24

Children's overweight and obesity, by age and sex	25
Child overweight and obesity, by household income, and sex	26
Child overweight and obesity, by parental BMI status, and sex	27

Appendix: measurement methods **28**

Height	28
Weight	28
Waist circumference	28
Response to measurements	29

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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 obesity and overweight 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 2019.¹

The report compares the prevalence of overweight and obesity among adults by sex, age, region and area deprivation, as well as abdominal obesity, the risks to health, and diabetes prevalence associated with obesity. Overweight and obesity in children is presented in the context of household income and their parents' BMI status.

Detailed tables accompanying this report can be accessed via <https://digital.nhs.uk/data-and-information/publications/statistical/health-survey-for-england/2019/data-tables>

Other HSE 2019 reports can be found at <https://digital.nhs.uk/pubs/hse2019>

Background

Obesity is a major public health problem in England and globally.² In adults, overweight and obesity are associated with life-limiting conditions, such as type 2 diabetes, cardiovascular disease, and some cancers as well as osteoarthritis.³ Childhood obesity is predictive of adult obesity, but also separately increases the risks of asthma,^{4,5} early onset type-2 diabetes,^{6,7} and cardiovascular risk factors.^{8,9,10}

¹ Some analyses include data from earlier survey years.

² World Health Organisation *Factsheet on Obesity and Overweight* 2020 <https://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight>

³ Jensen MD, Ryan DH, Apovian CM, et al. *American College of Cardiology/American Heart Association Task Force on Practice Guidelines; Obesity Society. 2013 AHA/ACC/TOS guideline for the management of overweight and obesity in adults: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines and The Obesity Society.* J Am Coll Cardiol. 2014;**63**:2985-3023.

⁴ 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.

⁵ 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.

⁶ 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.

⁷ 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.

⁸ Cote AT, Harris KC, Panagiotopoulos C et al. *Childhood obesity and cardiovascular dysfunction.* Journal of the American College of Cardiology. 2013;**62**:1309-1319.

⁹ 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.

¹⁰ 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.

Previous surveys have shown that a majority of adults in England are overweight or obese.¹¹ The National Child Measurement programme records children's height and weight at the first and last years of primary schools. This has shown an upward trend in obesity and overweight at Year 6 between 2006-07 and 2018-19, while at Reception, a downward trend in obesity and overweight was seen for boys and a small upward trend seen in girls, as well as an increase in inequalities.¹²

The burden on the NHS due to obesity and related illnesses are well recognised, and in 2006-7 were estimated to cost more than £5 billion.¹³ Uplifted for inflation, in 2019 this as estimated at £6.1 billion.¹⁴ A 2011 analysis estimated that if current trends continue, over 20 years, 2 million quality adjusted life years (QALYS) will be lost, whereas if a 1% reduction in BMI was achieved by every adult, 3 million QALYS would be gained.¹⁵

In response to the obesity prevalence and associated costs, a number of policies and programmes have been put into place to change both the obesogenic environment, and the response of individuals and health professionals to it. The *Public Health Responsibility Deal* aiming to cut 20% of sugar in the most popular products between 2015 and 2020¹⁶ resulted in an overall reduction between 2015 and 2018 of 2.8% by 2019.¹⁷ The Soft Drinks Industry Levy, was implemented in 2018; the proportion of available intervention soft drinks exceeding the 5g/DI sugar threshold decreased by around half following the announcement in March 2016 of the levy.¹⁸

The *Living Well for Longer* policy¹⁹ is aimed at local authorities and clinical commissioning groups to act on obesity, supplemented by the *Whole Systems*

¹¹ Connolly A, Craig S. *Health Survey for England 2018: Overweight and obesity in adults and children*. Health and Social Care Information Centre, Leeds, 2019. <https://files.digital.nhs.uk/52/FD7E18/HSE18-Adult-Child-Obesity-rep.pdf>

¹² Public Health England *Patterns and trends in child obesity: national and regional data*. Public Health England, London, 2020. <https://www.gov.uk/government/publications/child-obesity-patterns-and-trends/patterns-and-trends-in-child-obesity-national-and-regional-data>

¹³ Scarborough P, Bhatnager P, Wickramasinghe K, et al. *The economic burden of ill health due to diet, physical inactivity, smoking, alcohol and obesity in the UK: an update to 2006–07 NHS costs*, Journal of Public Health. 2011;**33**:527-535.

¹⁴ Department for Health and Social Care policy paper *Tackling obesity: empowering adults and children to live healthier lives*. DHSC, London, 2020. <https://www.gov.uk/government/publications/tackling-obesity-government-strategy/tackling-obesity-empowering-adults-and-children-to-live-healthier-lives#fn:16>

¹⁵ Wang Y, McPherson K, Marsh T, et al. *Health and economic burden of the projected obesity trends in the USA and the UK*. The Lancet. 2011;**378**:815-825.

¹⁶ 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-2011.pdf>

¹⁷ Public Health England *Sugar reduction: report on progress between 2015 and 2018*. London, PHE, 2019. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/832618/Sugar_reduction_summary_of_progress_2015-2018.pdf

¹⁸ Scarborough P, Adhikari V, Harrington RA, et al. *Impact of the announcement and implementation of the UK Soft Drinks Industry Levy on sugar content, price, product size and number of available soft drinks in the UK, 2015-19: A controlled interrupted time series analysis*. PLoS Med2020;17:e1003025.

¹⁹ Department of Health and Social Care, Public Health England. *Living Well for Longer: National Support for Local Action to Reduce Premature Avoidable Mortality*. DHSC, London, 2014 <https://www.gov.uk/government/publications/helping-people-live-well-for-longer>

Approach to obesity focusing on the obesogenic environment.²⁰ *Adult Obesity, applying All Our Health*²¹ is a resource for health and social care professionals to help patients to work towards a healthy weight. Public health campaigns have included the *Change4life* programme, aimed at parents.²²

The 2019 Health Survey for England was conducted before the Covid-19 outbreak in England. The pandemic has had a disproportionate effect on obese people, who are at increased risk of being hospitalised, admitted to intensive care, and of dying from Covid-19.²³ This has prompted an increased focus on obesity reduction,²⁴ and future surveys may capture the impact of these policies.

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 2019 Methods report and are summarised in the Appendix to this report.

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).²⁵ 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.

²⁰ Public Health England. *Whole systems approach to obesity*. PHE, London, 2019.

<https://www.gov.uk/government/publications/whole-systems-approach-to-obesity>

²¹ Public Health England. *Adult Obesity. Applying all our health*. PHE, London 2019

<https://www.gov.uk/government/publications/adult-obesity-applying-all-our-health/adult-obesity-applying-all-our-health>

²² NHS. *Change4Life campaign*. <https://www.nhs.uk/change4life-beta/about-change4life>

²³ Public Health England *Excess Weight and COVID-19: Insights from new evidence*. 2020. PHE, London, 2019. <https://www.gov.uk/government/publications/excess-weight-and-covid-19-insights-from-new-evidence>

²⁴ Department of Health and Social Care policy paper. *Tackling obesity: empowering adults and children to live healthier lives*. DHSC, London, 2020.

<https://www.gov.uk/government/publications/tackling-obesity-government-strategy/tackling-obesity-empowering-adults-and-children-to-live-healthier-lives#fn:16>

²⁵ Keys A, Fidanza F, Karvonen MJ, et al. *Indices of relative weight and obesity*. International Journal of Epidemiology, 2014;**43**:655–65.

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/m² or more), who are at highest risk of morbidity and mortality.²⁶

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.^{27,28} 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 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.²⁹

²⁶ NHS Consensus Development Conference. *Gastrointestinal surgery for severe obesity*. Nutrition 1996;**12**:397-402.

²⁷ 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.

²⁸ 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.

²⁹ World Health Organization. *Obesity: preventing and managing the global epidemic (No. 894)*. World Health Organization, Geneva, 2000.

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.^{30,31} NICE guidance specifies that waist circumference should be considered as a second measurement, after BMI.³²

Table B: Classification of waist circumference groups

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

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 regarding 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 2019 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 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.

³⁰ Lean M, Han T, Morrison C. *Waist circumference as a measure for indicating need for weight management*. *BMJ* 1995;**311**:158-61.

³¹ 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.

³² National Institute of Health and Care Excellence. *Obesity: Identification, assessment and management of overweight and obesity in children, young people and adults*. NICE, London, 2014. www.nice.org.uk/guidance/cg189

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.³³

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.

Population estimates

This report includes estimates of the numbers of adults and children in different BMI categories. These are based on the Office for National Statistics mid-year population estimates for England in 2019. A full description of how these estimates are calculated is given in Section 8.9 and Appendix C of the HSE 2019 Methods report.

Rounding of estimates

Estimates presented in the text are rounded to the nearest whole number. Where categories are combined the sum of two estimates may sometimes appear to be greater or less than expected. This reflects the effect of rounding; for example, estimates of 10.6% and 12.7% would round respectively to 11% and 13%, but the sum (23.3%) will round to 23% rather than 24%.

The charts are based on unrounded estimates. Consequently values given in the text may appear different in the corresponding chart. For example, an estimate of 10% in the text may represent a value between 9.5% and 10.4%, and it is the latter that would be reflected in the chart data points.

³³ Statistical significance does not imply substantive importance; differences that are statistically significant are not necessarily meaningful or relevant.

Adults' height and weight

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

In 2019 the mean height of men was 175.5cm, and of women was 161.7cm. Between 1993 and 2019, mean height increased by slightly more than 1cm among men, and by half that much among women.

Table 1

Between 1993 and 2019, mean weight increased from 78.9kg to 85.4kg among men, and from 66.6kg to 72.1kg among women. Among men, mean weight increased least among those aged 16 to 24 (an increase of 4.4kg within this age group from 73.1kg to 77.5kg between 1993 and 2019), and most among those aged 65 to 74 (an increase of 9.7kg within this age group from 77.7kg to 87.4kg between 1993 and 2019). 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 2019), and the greatest increase was seen among women aged 25 to 34 (an increase of 7.1kg, from 65.5kg to 72.6kg).

Table 2

Prevalence of adults' overweight and obesity

Trends in adults' overweight and obesity

In 2019, 28% of adults were obese, and a further 36% were overweight but not obese. Obesity levels were not significantly different between men and women: 27% and 29% respectively. As explained in the introduction to this report, survey estimates are subject to a margin of error. It is likely that the prevalence of obesity is likely to be between 25% and 29% for men, and between 27% and 31% for women.

In 2019, an estimated 12.6 million adults were obese, including 6 million men and 6.6 million women. A further 16.3 adults were overweight but not obese, including 9.2 million men and 7.2 million women.³⁴

Tables 3, A1 and B1

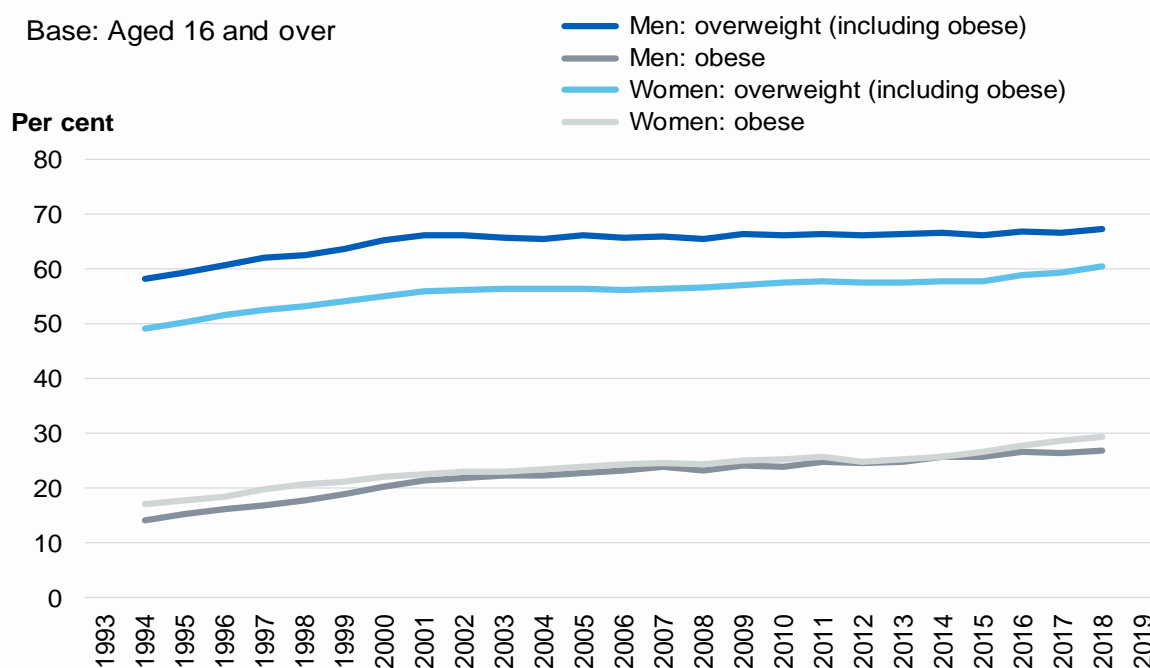
Obesity has increased from 13% of men and 16% of women in 1993, to 27% of men and 29% of women in 2019. The majority of this increase occurred between 1993 and 2001, when 21% of men and 23% of women were obese. Increases since that time have been more gradual.

Overall, obesity including overweight has increased from 58% of men and 49% of women in 1993 to 68% of men and 60% of women in 2019. As with obesity, recent changes have been more gradual.

Figure 1, Table 3

Figure 1: Prevalence of overweight and obesity in adults, by sex: 1993-2019 (three year rolling averages)

Base: Aged 16 and over



Source: NHS Digital

³⁴ Table B1 shows estimates for the number of adults in England who were overweight and obese between 2003 and 2019, including the confidence intervals around these. A full description of how the estimates and confidence intervals have been calculated is given in Section 8.9 and Appendix C of the HSE 2019 Methods report.

Adults' overweight and obesity, by age and sex

Mean BMI in 2019 was 27.6kg/m² for both men and women. As explained in the introduction to this report, survey estimates are subject to a margin of error. It is likely that the mean BMI for adults was between 27.4kg/m² and 27.8kg/m².³⁵

BMI differed by age and followed a different pattern for men and women. BMI was highest among men aged between 65 and 74 and women aged between 45 and 54. Among men, mean BMI increased from 24.7kg/m² in those aged 16 to 24, to 29.3kg/m² in those aged 65 to 74. Among women, mean BMI increased from 24.5kg/m² aged 16 to 24 to 28.6kg/m² aged 45 to 54.

Obesity levels were not significantly different between men and women: 27% and 29% respectively. As above, the margin of error means that obesity was likely to have been between 25% and 29% for men, and between 27% and 31% for women.

Obesity increased with age from 13% of adults age 16 to 24, to 36% of those aged 65 to 74, before decreasing in those age 75 and over to 26%.

A greater proportion of men than women were overweight but not obese (41% compared with 31%), and overall a greater proportion of men were overweight or obese (68% compared with 60%).

The proportion of adults who were either overweight or obese increased with age from 37% of men age 16 to 24 to 81% of men aged 65 to 74, and 74% of men aged 75 and over. Among women, the proportion was highest in middle-aged and older women, affecting between 66% and 69% of women aged 45 and over, compared with 37% of women aged 16 to 24.

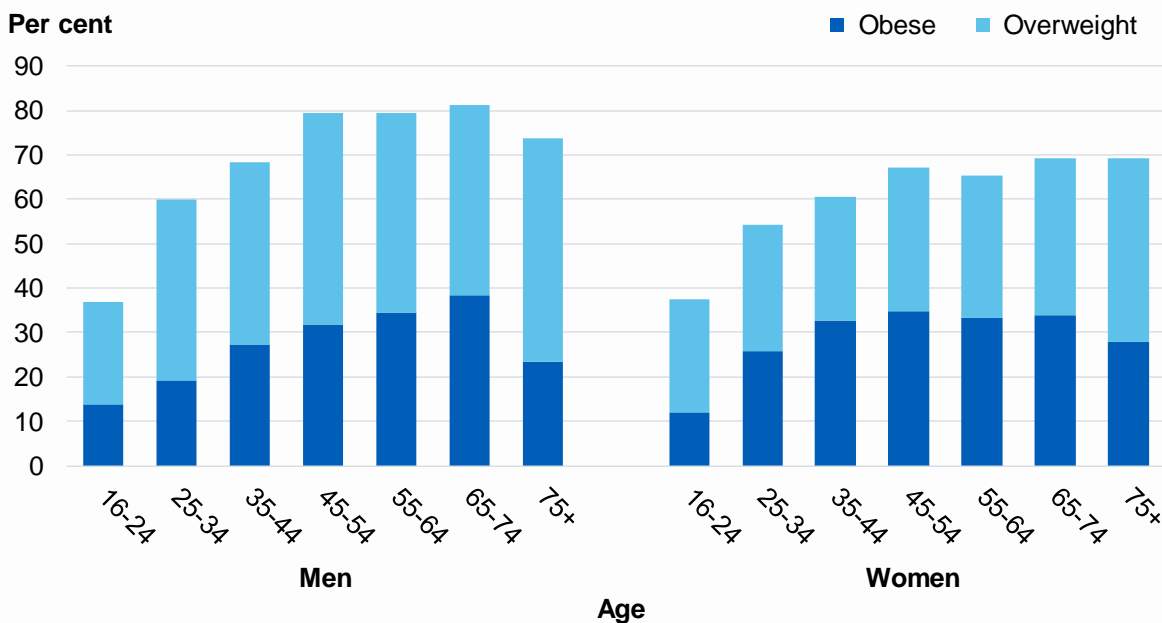
In all age groups except the youngest (those aged 16 to 24), the majority of adults were overweight or obese.

Figure 2, Table 4

³⁵ Further details are provided in Table A1.

Figure 2: Prevalence of overweight and obesity, by age and sex

Base: Aged 16 and over



Source: NHS Digital

Adults' overweight and obesity, by region and sex

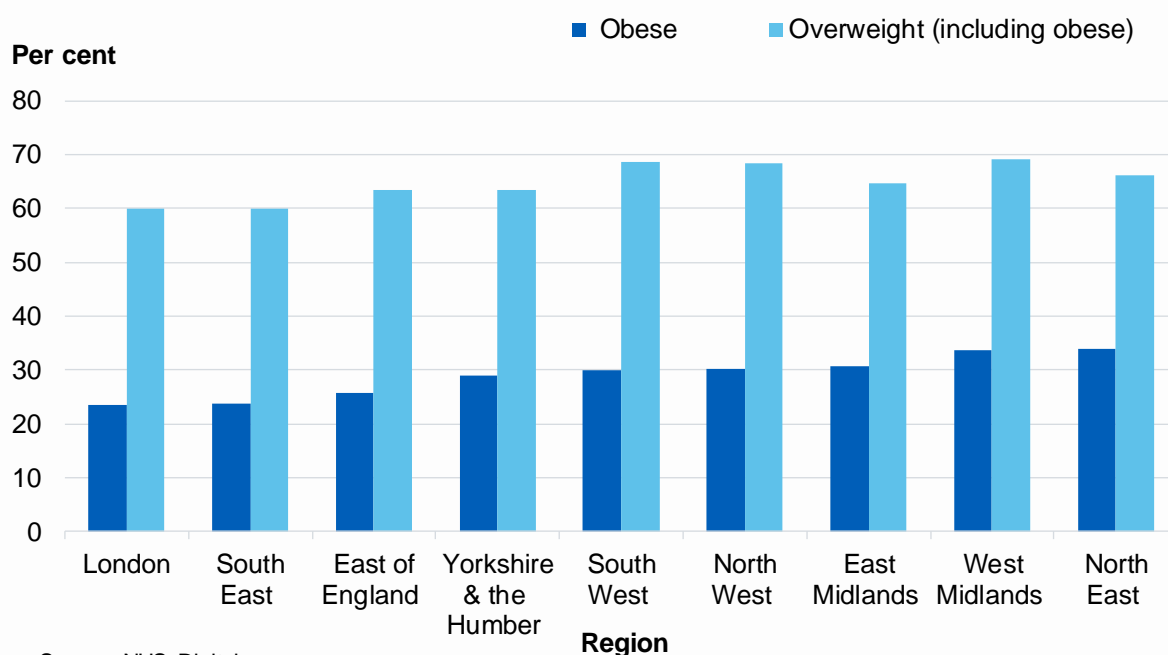
Estimates by region are shown in the tables as both observed and age-standardised. Observed estimates show the actual levels of overweight, obesity, and high waist circumference in each region. Comparisons between regions should be based on the age-standardised data, which take into account the different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

Among all adults, the prevalence of obesity was highest in the North East and West Midlands (34% of adults), and was lowest in the South East (24%) and London (23%). Taking overweight and obesity together, the highest prevalence was in the West Midlands and South West (both 69%) and North West (68%). It was lowest in London and the South East (both 60%).

Figure 3, Table 5

Figure 3: Prevalence of overweight and obesity, by region

Base: Aged 16 and over



Adults' overweight and obesity, by Index of Multiple Deprivation (IMD) and sex

The Index of Multiple Deprivation (IMD) is a measure of area deprivation, based on 37 indicators, across seven domains of deprivation.³⁶ 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).³⁷ The age profile of the IMD quintiles have been age-standardised to account for different area age profiles.

Mean BMI varied by IMD quintile, with a different pattern for men and women. Among men it increased from 27.1 kg/m² among the least deprived, to 28.1 kg/m² for the most deprived. Among women, the increase was greater, from 26.6 kg/m² in the least deprived to 29.1 kg/m² in the most deprived.

Obesity for men was much lower in the least deprived quintile (22%) than the other quintiles; it was highest in the most deprived quintile (30%). Obesity for women was lowest in the least deprived (22%) and highest in the most deprived (39%), again a bigger difference for women than men.

³⁶ 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.

³⁷ For more information on the Index of Multiple Deprivation, see Section 8.7 and Appendix A: Glossary in the HSE 2019 Methods report.

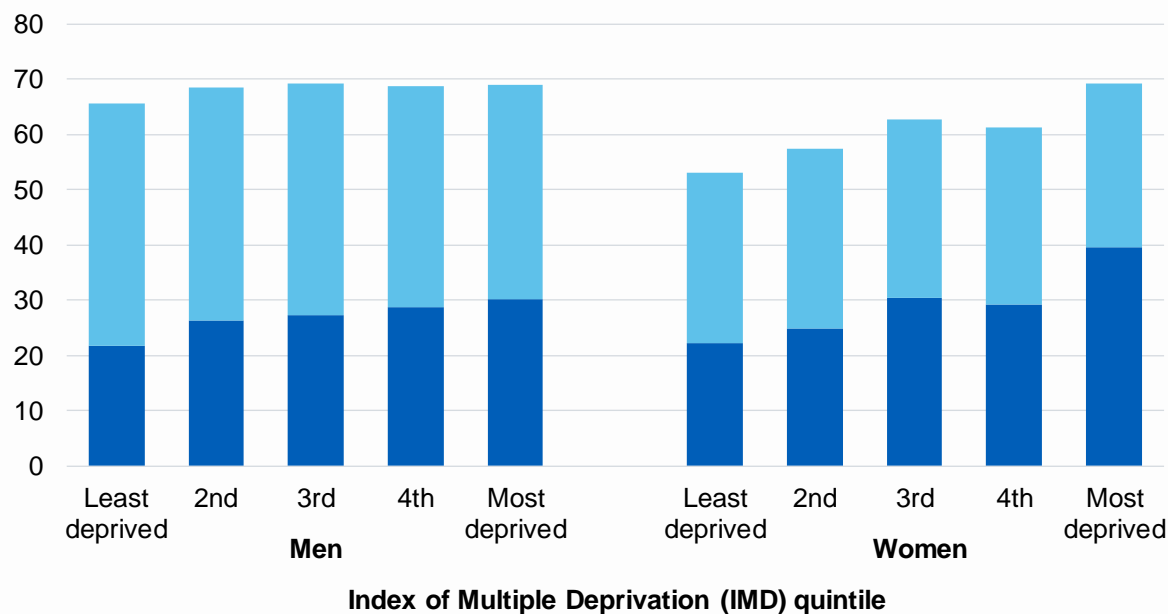
The proportion of men who were overweight or obese was lower in the least deprived group (66%), than in the other four quintiles (69%). For women, the proportion who were overweight or obese was lowest in the least deprived (53%) and highest in the most deprived (69%). A much greater difference was seen for women than for men.

Figure 4, Table 6

Figure 4: Prevalence of obesity and overweight, by IMD and sex

Base: Aged 16 and over

Per cent



Source: NHS Digital

Prevalence of very high waist circumference

Trends in waist circumference

The proportion of men and women with a very high waist circumference increased between 1993 and 2019, from 20% of men and 26% of women to 36% of men and 48% of women. As with overall obesity, the increasing prevalence of high waist circumference occurred more quickly between 1993 and 2001, when 31% of men and 38% of women had a very high waist circumference.

Table 7

Waist circumference, by age and sex

Mean waist circumference was higher in men (97.7cm) than women (88.8cm). The thresholds of risk are different for men and women, and a greater proportion of women than men were classified as having a very high waist circumference: 48% of women (over 88cm) compared with 36% of men (over 102cm).

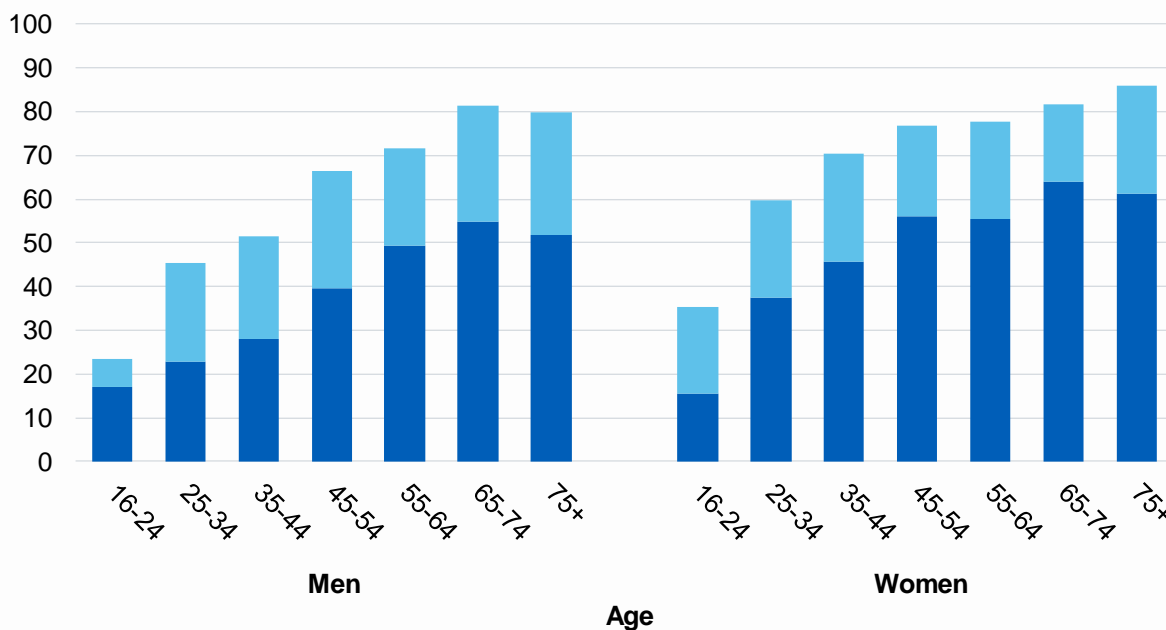
Mean waist circumference and the proportions of adults who exceeded the high or very high thresholds increased with age up to the 65 to 74 years age group. Among women, the prevalence of very high waist circumference increased from 16% of 16 to 24 year olds, to 64% of those aged 65 to 74. Among men, the equivalent increase was from 17% to 55%.

Figure 5, Table 8

Figure 5: Prevalence of raised waist circumference, by age and sex

Base: Aged 16 and over
Per cent

■ Very high waist circumference
■ High waist circumference



Source: NHS Digital

Waist circumference, by region and sex

The prevalence of very high waist circumference varied by region, but after accounting for age, the variation was not statistically significant.

Table 9

Waist circumference, by Index of Multiple Deprivation (IMD) and sex

Waist circumference varied by quintile with area deprivation, particularly so for women: 39% of women in the least deprived quintile had a very high waist circumference, and this proportion increased with the level of deprivation to 58% of those in the most deprived quintile. The pattern for men was more complex: prevalence was lowest in the least deprived quintile (33%) and was highest in the second most deprived quintile (39%).

Table 10

Overweight, obesity and risks to health

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/m²’. 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. This is because some people, despite having a BMI of less than 35 kg/m², 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.³⁸

For those with a BMI of 35 kg/m² or more, waist circumference has little added predictive power of disease risk, and these individuals are also unlikely to have a low waist circumference.³⁹

Table C: Health risk from BMI and waist circumference

BMI classification	Waist circumference		
	Low	High	Very high
Normal weight (18.5 to less than 25kg/m ²)	No increased risk	No increased risk	Increased risk
Overweight (25 to less than 30kg/m ²)	No increased risk	Increased risk	High risk
Obesity I (30 to less than 35kg/m ²)	Increased risk	High risk	Very high risk
Obesity II (35 to less than 40kg/m ²)	Very high risk	Very high risk	Very high risk
Obesity III (40kg/m ² or more)	Very high risk	Very high risk	Very high risk

Combined assessment of health risk from BMI and high waist circumference, by sex

44% of men and 39% of women had an overall health group of ‘no increased risk’, a similar proportion to recent years. The majority of this group were individuals with a normal BMI and a desirable waist circumference (27% of men, 26% of women). A further 17% of men, and 14% of women had ‘increased’ overall health risk.

³⁸ 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

³⁹ 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.

14% of men and 18% of women had ‘high risk’. Finally, 23% of men and 27% of women had a ‘very high risk’. An overall high or very high health risk was less common among men (37%) than women (45%).

Table 11

Table D: Men’s health risk from BMI and waist circumference, % in each group

BMI group	Desirable Waist	High Waist	Very High Waist
Underweight	1	-	-
Normal	27	3	0
Overweight	13	17	12
Obese I	0	2	15
Obese II	-	0	6
Obese III	-	-	2

Table E: Women’s health risk from BMI and waist circumference, % in each group

BMI group	Desirable Waist	High Waist	Very High Waist
Underweight	2	-	-
Normal	26	10	2
Overweight	3	11	17
Obese I	0	1	15
Obese II	-	-	7
Obese III	-	-	4

Underweight	No increased risk	Increased risk	High risk	Very high risk
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Diabetes status by BMI and sex

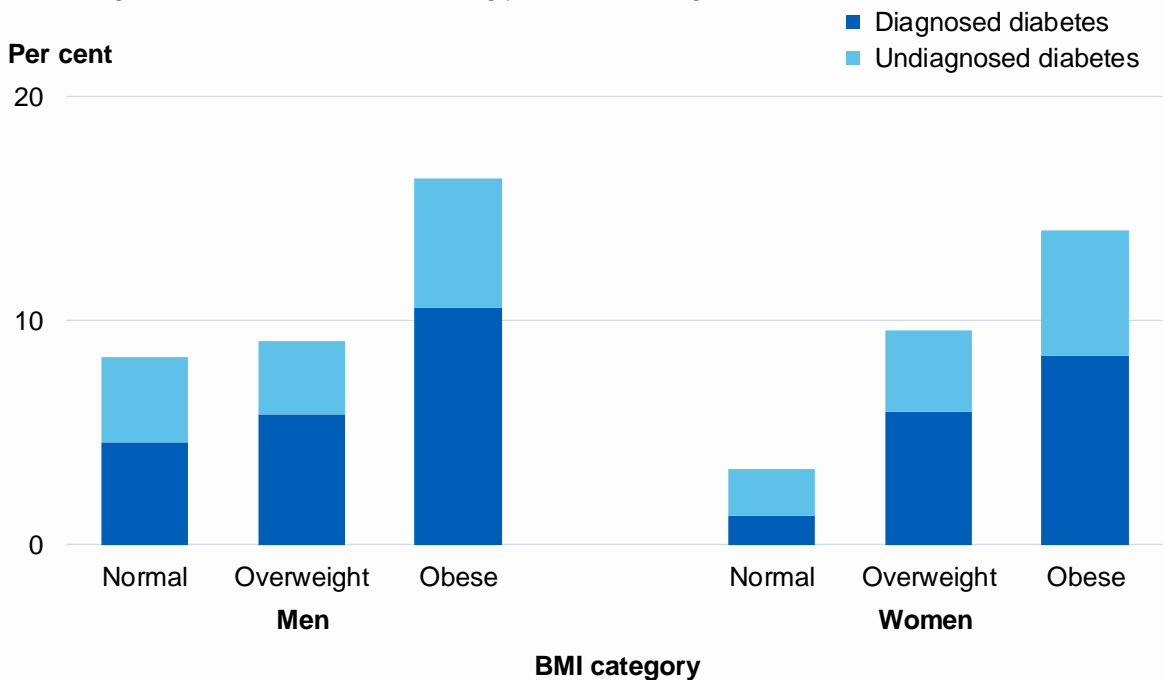
After age standardisation, the prevalence of diagnosed diabetes increased with BMI group, from 3% of those of normal weight, to 6% of overweight and 9% of obese adults. Including those with undiagnosed diabetes,⁴⁰ the total diabetes prevalence was 5% of adults of normal weight, 9% of overweight and 15% of obese adults. The association between BMI group and diabetes prevalence was similar for men and women.

Figure 6, Table 12

⁴⁰ Undiagnosed diabetes was defined as a blood glycosylated haemoglobin (HbA_{1c}) level of 48mmol/mol or above in someone without doctor-diagnosed diabetes. See the HSE 2019 Adult health report for more information on the measurement of diabetes with in the HSE.

Figure 6: Prevalence of diabetes, by BMI category and sex

Base: Aged 16 and over with a valid glycated haemoglobin measure



Source: NHS Digital

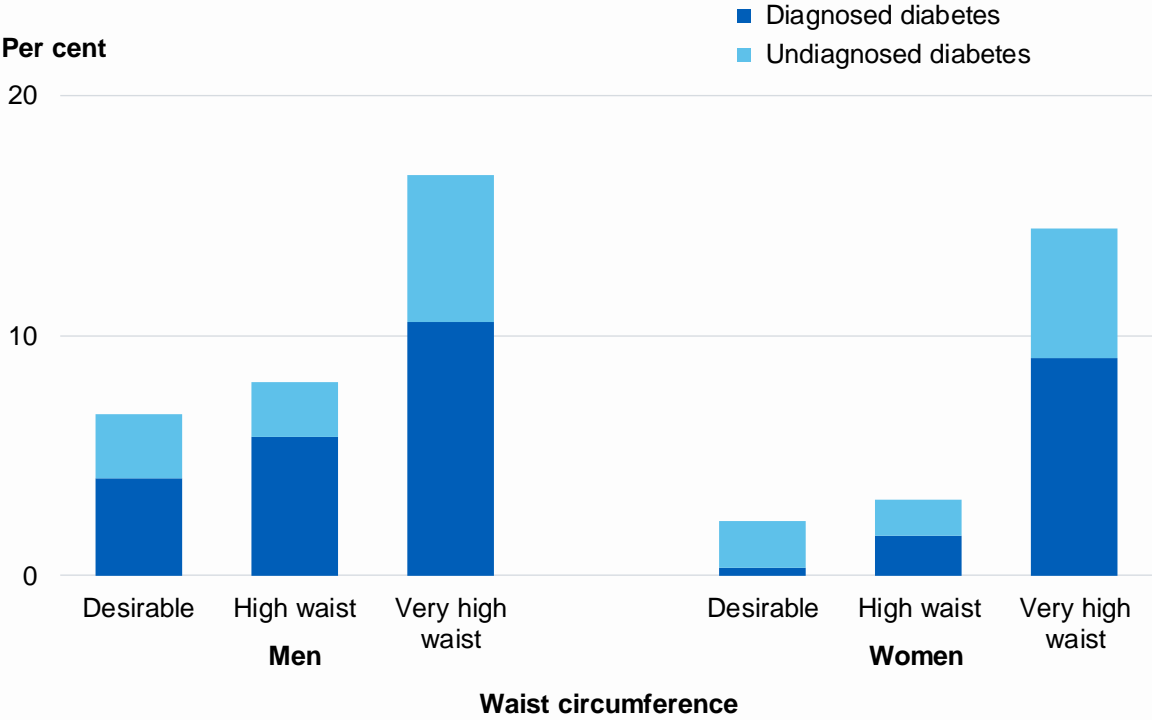
Diabetes status by waist circumference and sex

Diagnosed and total diabetes prevalence also increased with increasing waist circumference, though with a different pattern for men than for women. For men, the prevalence of diagnosed diabetes increased sharply from 4% of those with a desirable waist circumference, to 6% of those with a high waist circumference, to 11% of those with a very high waist circumference. However, among women, the increased risk appeared to be mainly in the very high waist circumference group. For women, fewer than 1% of those with a desirable waist circumference and 2% of those with a high waist had diagnosed diabetes, compared with 9% of those with a very high waist circumference. A similar pattern was shown for total diabetes.

Figure 7, Table 13

Figure 7: Prevalence of diabetes, by waist category and sex

Base: Aged 16 and over with a valid glycated haemoglobin measure



Source: NHS Digital

Children's 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 in age 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 15.⁴¹ 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 average heights of boys and girls are similar in the younger age groups but diverge in their teenage years. In 2019, boys' mean height was 99.8cm for those aged 2 to 4, 119.9cm for ages 5 to 7, 136.8cm for ages 8 to 10, 152.6cm for ages 11 to 12 and 167.2cm for boys aged 14 to 15. For girls, mean heights were 99.2cm for those aged 2 to 4, 118.0cm for ages 5 to 7, 137.9cm for ages 8 to 10, 152.8cm for ages 11 to 12 and 160.9cm for ages 13 to 15.

Average weight for boys and girls does not differ in the same way. Children's weight in 2019 was 9.5kg for infants aged under 2, 16.2kg for children aged 2 to 4, 22.8kg for those aged 5 to 7, 34.1kg for ages 8 to 10, 47.0kg for ages 11 to 12, and 59.7kg for ages 13 to 15.

Tables 14 and 15

⁴¹ 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 children’s overweight and obesity

Trends in children’s overweight and obesity

In 2019, 12% of boys and 15% of girls were overweight but not obese. 20% of boys and 13% of girls were obese. As explained in the Introduction to this report, survey estimates are subject to a margin of error. It is likely that the proportion of children in the population in 2019 who were obese was between 17% and 23% of boys and 10% and 16% of girls.⁴²

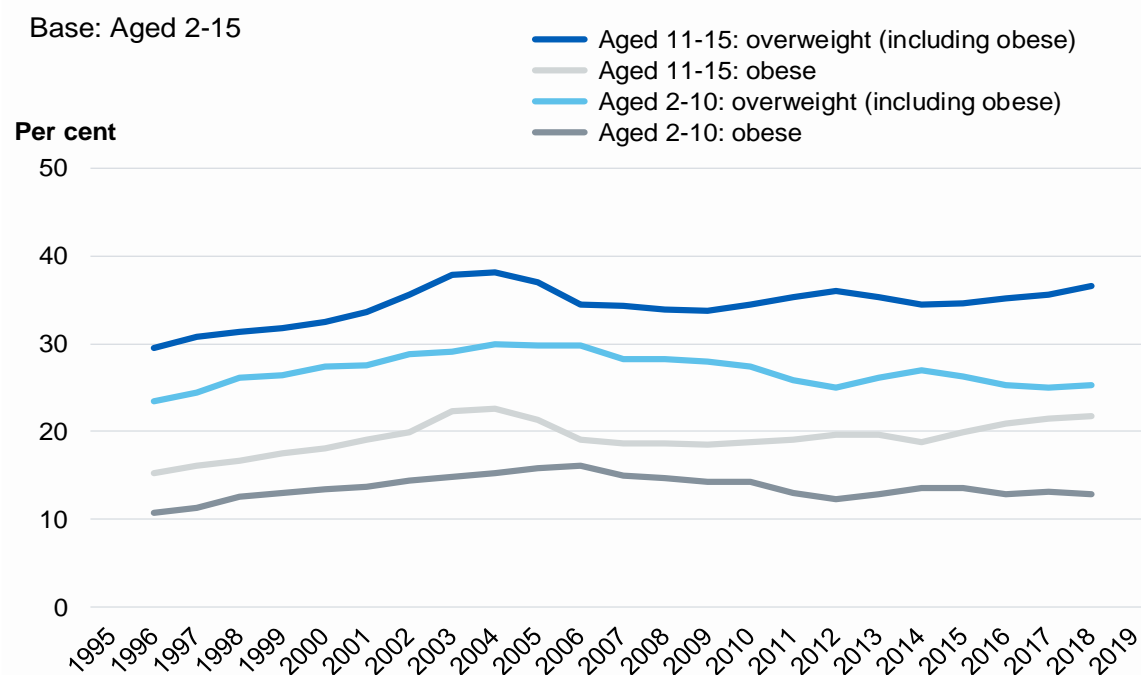
In 2019, an estimated 1.6 million children aged between 2 and 15 were obese, including 970,000 boys and 590,000 girls.⁴³

Tables 16, A2 and B2

Obesity in children aged 2 to 15 increased from 12% in 1995 to 19% in 2004/05, before declining to 16% in 2008 and remaining at a similar level since that time. Throughout the period, obesity and overweight were higher among children aged 11 to 15. Since 2008, the proportions in this age group who were obese have varied between 16% and 24%; since 2016 the proportions have generally been at the higher end of this range.

Figure 8, Table 16

Figure 8: Prevalence of overweight and obesity in children, by age: 1995-2019 (three year rolling averages)



Source: NHS Digital

⁴² More details are provided in Table A2.

⁴³ Table B2 shows estimates for the number of children in England who were overweight and obese between 2003 and 2019, including the confidence intervals around these. A full description of how the estimates and confidence intervals have been calculated is given in Section 8.9 and Appendix C of the HSE 2019 Methods report.

Children's overweight and obesity, by age and sex

The remaining analyses in this report are based on combined data from 2018 and 2019, unless otherwise stated.⁴⁴

In 2018/19, the majority (71%) of children aged between 2 and 15 years were classified as of normal weight.⁴⁵ This included 69% of boys and 73% of girls. 13% of children were overweight but not obese and 16% were obese. Boys were more likely to be obese than were girls (18%, compared with 13%).

The proportions who were obese increased with age. 8% of boys aged 2 to 4 were obese, and this increased to 25% of boys aged between 8 and 10. It was at similar levels among boys aged from 11 to 15. Among girls, the proportions who were obese increased from 8% of those aged 2 to 4 to 19% of those aged 11 to 13, and 18% of those aged 13 to 15.

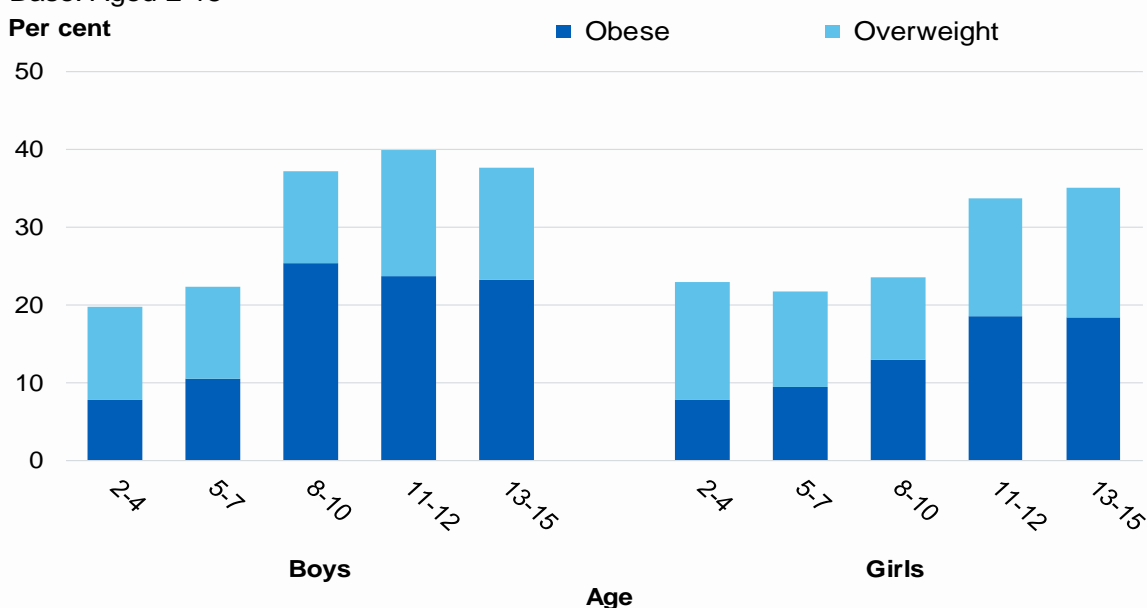
The proportions of children who were overweight or obese also increased with age in a different pattern for boys and girls. Among boys, overweight including obesity was between 20% and 22% in the age groups between 2 and 7 and increased thereafter to between 37% and 40% for boys aged between 8 and 15. For girls, the increase came later. Between 22% and 24% of girls aged 2 to 10 were overweight including obese; this rose to between 34% and 35% of girls aged between 11 and 15.

Figure 9, Table 17

Figure 9: Prevalence of overweight and obesity in children, by age and sex

Base: Aged 2-15

Per cent



Source: NHS Digital

⁴⁴ 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 data from two survey years improves the precision of estimates.

⁴⁵ This includes a small proportion of children who would have been classified as underweight. This category was not separately coded in the analysis because of the sample size.

Child overweight and obesity, by household income, and sex

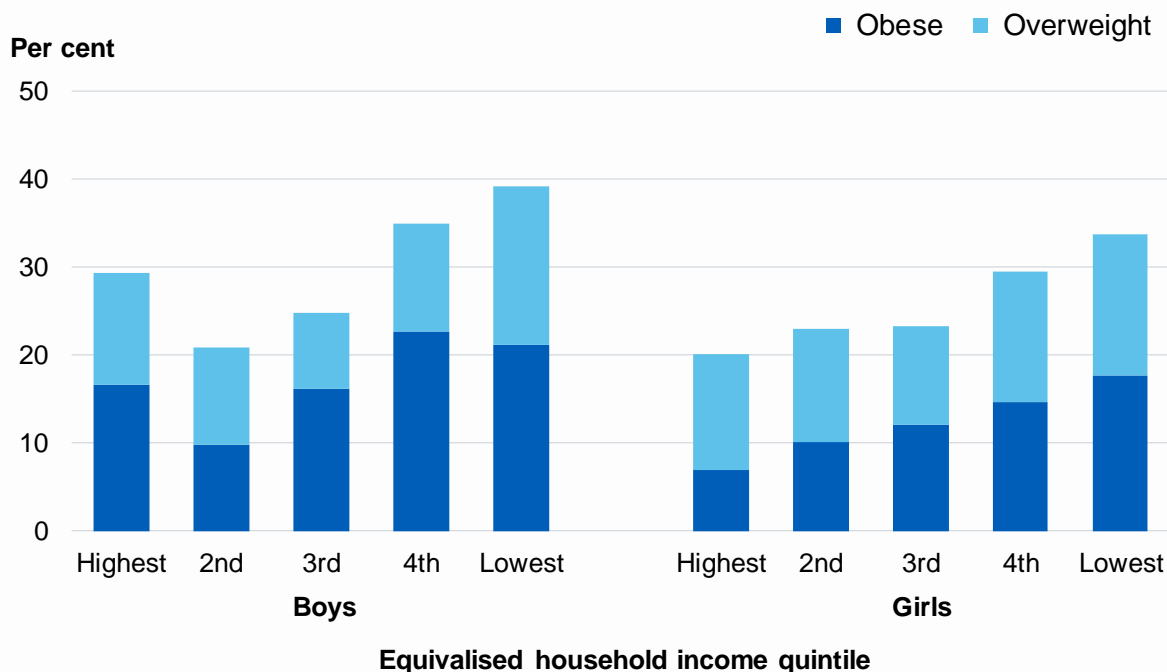
The HSE uses the measure of equivalised household income, which takes into account the number of adults and dependent children in the household as well as overall household income. Households are divided into quintiles (fifths) based on this measure.⁴⁶

Obesity was lower among children in higher income households, and higher in households with lower incomes. 10% and 12% of children respectively in the two highest income quintiles were obese, compared with 19% in the two lowest income quintiles. The proportions who were overweight including obese were between 22% and 25% in the highest three quintiles, compared with 32% in the second lowest and 37% of those in the lowest income quintile.

Figure 9, Table 18

Figure 10: Prevalence of overweight and obesity in children, by household income and sex

Base: Aged 2-15



Source: NHS Digital

⁴⁶ For further information on equivalised household income, see the HSE 2019 Methods report.

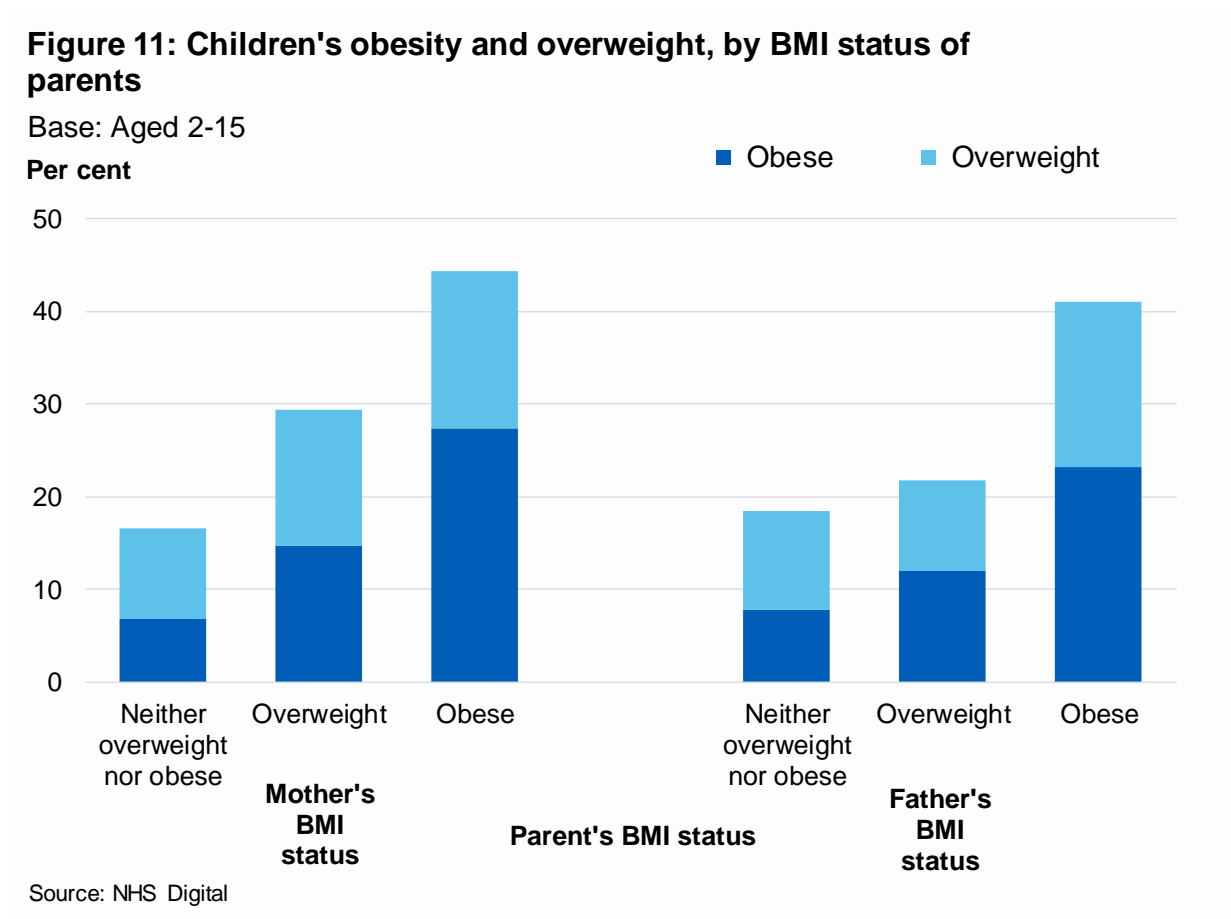
Child overweight and obesity, by parental BMI status, and sex

Children’s BMI status was strongly related to that of their parents. 7% of children whose mothers were neither overweight nor obese were obese themselves, compared with 15% of children whose mothers were overweight but not obese, and 27% of those with obese mothers.

Children were also more likely to be either overweight or obese if their mothers were. 17% of children whose mothers were neither overweight nor obese were overweight or obese, compared with 29% of children whose mothers were overweight but not obese and 44% of those with obese mothers were either overweight or obese themselves.

The association with fathers’ BMI was also marked: obesity increased from 8% of children with fathers who were neither overweight nor obese to 23% of those with obese fathers. Similarly, the proportion of children who were overweight or obese increased from 19% of children with fathers who were neither overweight nor obese to 41% of those with obese fathers.

Figure 11, Tables 19 and 20



Appendix: measurement methods

Full details of the protocols for carrying out all the measurements are contained in Appendix B of the HSE 2019 Methods report.⁴⁷

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.⁴⁸ 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.

⁴⁷ Health Survey for England 2019: Methods, available via the report website <https://digital.nhs.uk/pubs/hse2019>.

⁴⁸ 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 (45% of men, 52% of women).

Within co-operating households, 68% of children (aged 2 and over) had their height measured and 67% of children (all ages) had their weight measured.

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

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