

# Health Survey for England 2015

## Children's body mass index, overweight and obesity

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This report examines the prevalence of overweight and obesity among children in England in 2015. It describes differences between groups of children, by age, sex and income. Parents' and children's perceptions of their weight are compared with objective measures of body mass. Trends in childhood obesity over time are also discussed.

### Key findings

- Overall 28% of children aged 2 to 15 were either overweight (14%) or obese (14%). The proportion of boys who were overweight, including obese (30%) was higher than the proportion of girls who were overweight, including obese (26%).
- Children from lower income households were much more likely to be obese compared with those from higher income households. 18% of children from households in the lowest income quintile were obese, compared with 9% of children living in households in the highest income quintile.
- The majority of overweight and obese children were not aware that they were too heavy. Only 26% of overweight, including obese children aged 8 to 15 described themselves as too heavy, compared with 41% who said that they were about the right weight.
- Parents of overweight and obese children often thought that their child was the right weight. The majority of overweight children were described as being about the right weight by their mothers (91%) and fathers (80%). For obese children, 48% of mothers and 43% of fathers said their child was about the right weight. However, just over half of mothers (51%) and fathers (56%) of obese children described their child as too heavy.

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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 overweight and obesity among children in England.

## Introduction

### Contents

This report presents findings on children's BMI, and the prevalence of overweight and obesity. Estimates are based on objective measurements of a representative sample of children aged 2 to 15 who participated in the Health Survey for England 2015. The data are used to report overall prevalence of overweight and obesity, with comparisons by sex, age, and income. These are compared with perceptions of children's weight by themselves and their parents, using data collected in self-completion questionnaires. Finally, trends in childhood overweight and obesity between 1995 and 2015 are discussed.

Detailed tables accompanying this chapter can be accessed via <http://digital.nhs.uk/pubs/hse2015>.

### Background

Childhood obesity and the associated risks are serious public health concerns. The government's 2016 childhood obesity strategy aims to 'significantly reduce England's rate of childhood obesity within the next ten years'.<sup>1</sup> This aim is crucial in order to reduce physical and psychological illness during childhood as well as reducing the risk of chronic disease and premature mortality later in life.

The prevalence of childhood obesity in England increased between 1995 and 2005 and has subsequently remained relatively stable.<sup>2</sup>

Obesity in childhood is directly associated with various health conditions, including asthma<sup>3,4</sup>, early onset type-2 diabetes<sup>5,6</sup>, musculoskeletal problems<sup>7</sup> and cardiovascular risk-factors.<sup>8,9,10</sup> Children who are obese are also more likely to suffer from psychological problems, such as depression<sup>11,12</sup>, low-self-esteem<sup>13,14</sup> and dissatisfaction with their body.<sup>15,16,17</sup> An association between obesity and behavioural problems is also evident from a young age.<sup>18</sup>

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<sup>19</sup>, which in turn is a major risk factor for a large number of diseases such as diabetes<sup>20</sup>, cardiovascular disease<sup>21</sup> and a number of cancers.<sup>22,23</sup> Independent of adult obesity, evidence shows that being obese as a child is associated with chronic disease<sup>6,8</sup> and premature mortality.<sup>24</sup>

To address the issue of childhood obesity, a number of government policies and initiatives are in place aimed at individuals, the NHS, local authorities and food manufacturers and retailers. The 2016 Budget<sup>25</sup> announced that soft drinks companies will pay a levy on drinks with added sugar from April 2018.<sup>26</sup> Following this announcement, the 2016 childhood obesity strategy outlined an action plan that aims to reduce child obesity rates in England.<sup>1</sup> In addition to the soft drink industry levy, the strategy sets out a number of actions primarily focused on reducing sugar consumption and increasing physical activity among children.

The *Public Health Responsibility Deal*<sup>27</sup> was published in 2011 with voluntary pledges made by the food industry and local businesses to tackle obesity through means such as promoting healthy eating and physical activity. These commitments to tackle obesity were later reiterated in *Healthy Lives, Healthy People: A call to action on obesity in England*.<sup>28</sup>

The *Change4Life* public information campaign aims to improve the diet and activity levels of parents and children.<sup>29</sup> 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.<sup>30</sup> In particular, local authorities are being encouraged to use their powers to curb fast-food outlets<sup>31</sup> and to promote exercise and active travel.<sup>32</sup>

This report presents key findings, charts, and tables primarily from the 2015 survey. Further details of trends are given in the HSE 2015 Trend tables at <http://digital.nhs.uk/pubs/hse2015trend> and previous HSE reports<sup>33</sup>. Advice for individuals and families can be found at [Change4Life](#), for health professionals from the [National Institute for Clinical Excellence](#), and for policy makers at [Public Health England](#).

## Methods and definitions

### Methods

The 2015 Health Survey for England included a boosted sample of children, in order to increase the sample size for the analysis of children aged 2-15 improving the precision of the estimates, particularly among sub-groups. The 'core' sample included 2123 children aged between 0 and 15. The boost sample included an additional 3591 children.

Children aged 2 to 15 had their height and weight measured by trained interviewers; the body mass index (BMI) was calculated from the valid measurements.

Questions about children's desire to change their weight have been asked since 2006. Children aged 8 to 15 were asked as part of a self-completion questionnaire whether they thought they were about the right weight or too light or too heavy, and whether they were trying to change their weight. Parents were also asked for their assessment of their child's weight as part of a self-completion questionnaire. Because parents of children in the boost sample were not interviewed, the responses by parents refer only to children in the core sample.

### Definitions

Body mass index (BMI), calculated as weight in kilograms divided by height in metres squared ( $\text{kg/m}^2$ ), has been shown to correlate strongly with adiposity (excess body fat) in adults<sup>34,35</sup> and children.<sup>36,37</sup> It is the key measure of overweight and obesity used in this chapter. The decision to use BMI is supported by recommendations made by the International Obesity Task Force, which concluded that BMI is a reasonable measure of body adiposity in children.<sup>38</sup> As in previous HSE reports, information about children's overweight and obesity is based on the UK National BMI centiles classification.<sup>39,40</sup>

Different growth patterns among boys and girls at each age mean that, unlike for adults, a universal categorisation cannot be used to define childhood overweight and obesity. 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.<sup>41,42</sup> 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.<sup>43</sup>

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.

Trends from HSE years 1995 to 2015 show BMI, overweight and obesity prevalence calculated for children aged 2 to 15. Children were first included in the HSE in 1995 and since then weighting has been necessary to compensate for the fact that the number of children interviewed in a household was limited.<sup>44</sup> Non-response weighting was also introduced in 2003.<sup>45</sup> The child-selection weighted estimates are shown for 1995 to 2002 and the non-response weighted estimates (including adjustment for child selection) for 2003 to 2014. National trend data are presented separately for three age groups: all aged 2 to 15, and those aged 2 to 10 and 11 to 15.

## Prevalence of obesity and overweight among children

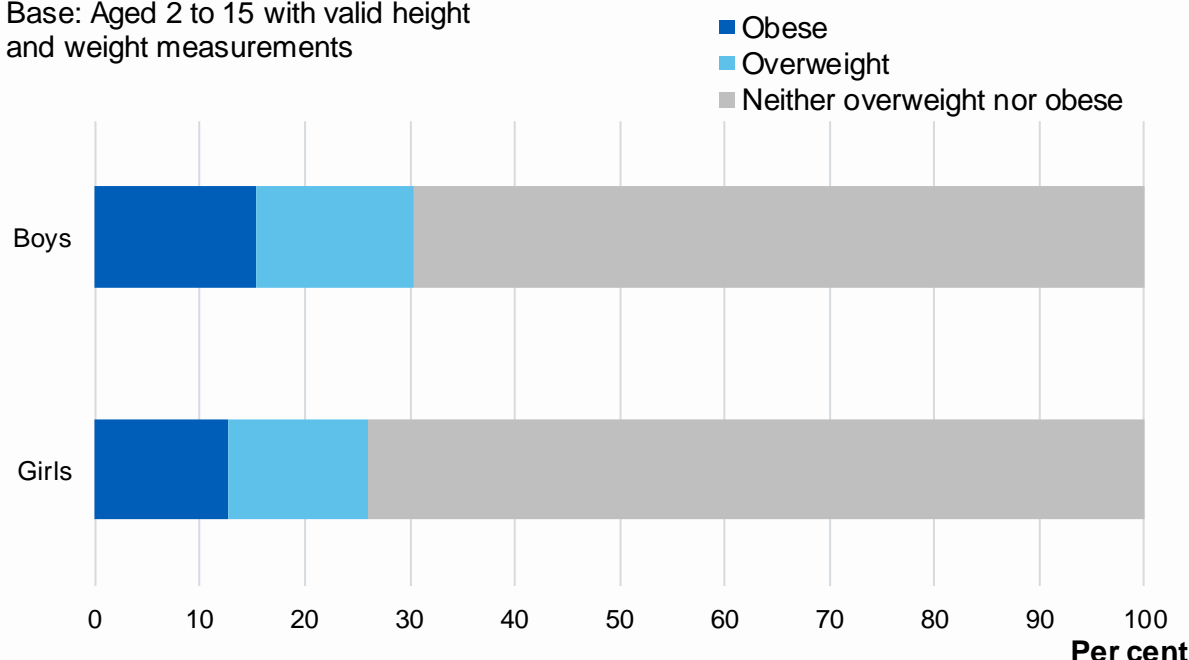
### Obesity and overweight by age and sex

Overall 14% of children aged 2 to 15 were classified as overweight and an additional 14% were classified as obese. The proportion of boys who were obese was higher than the proportion of girls who were obese (15% and 13% respectively). Similarly, more boys were overweight including obese than girls (30% and 26% respectively).

Figure 1, Table 2

#### Figure 1 BMI status by sex

Base: Aged 2 to 15 with valid height and weight measurements

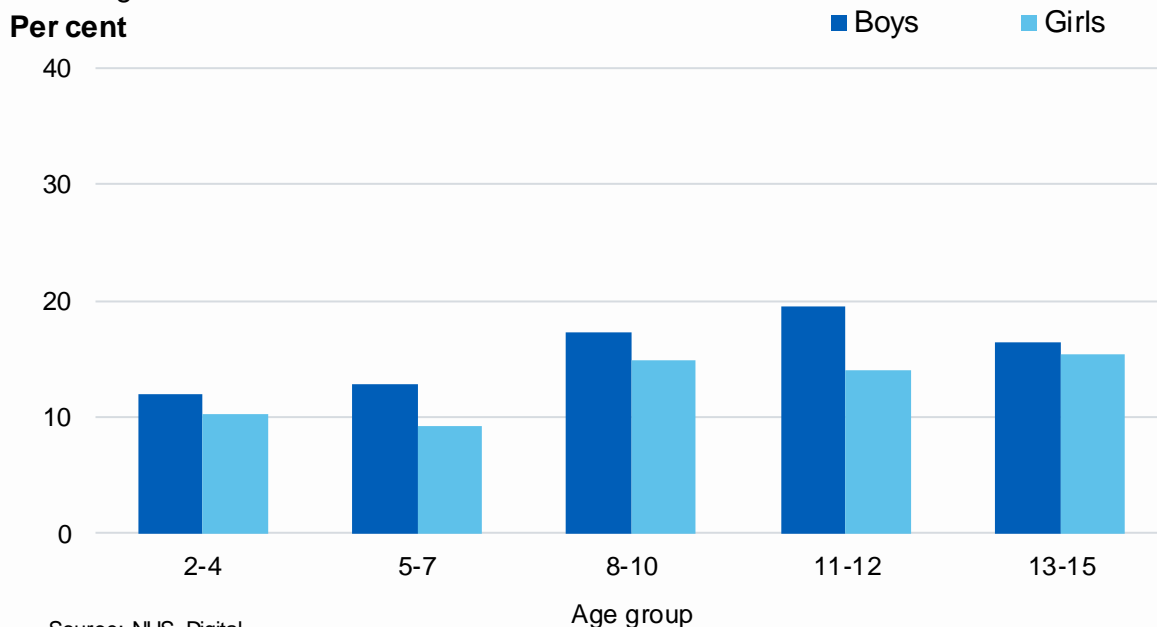


The prevalence of child obesity increased with age. 11% of those aged between 2 and 4 were obese compared with 16% of those aged 13 to 15.

Figure 2, Table 2

### Figure 2 Prevalence of obesity, by age and sex

Base: Aged 2 to 15 with valid height and weight measurements



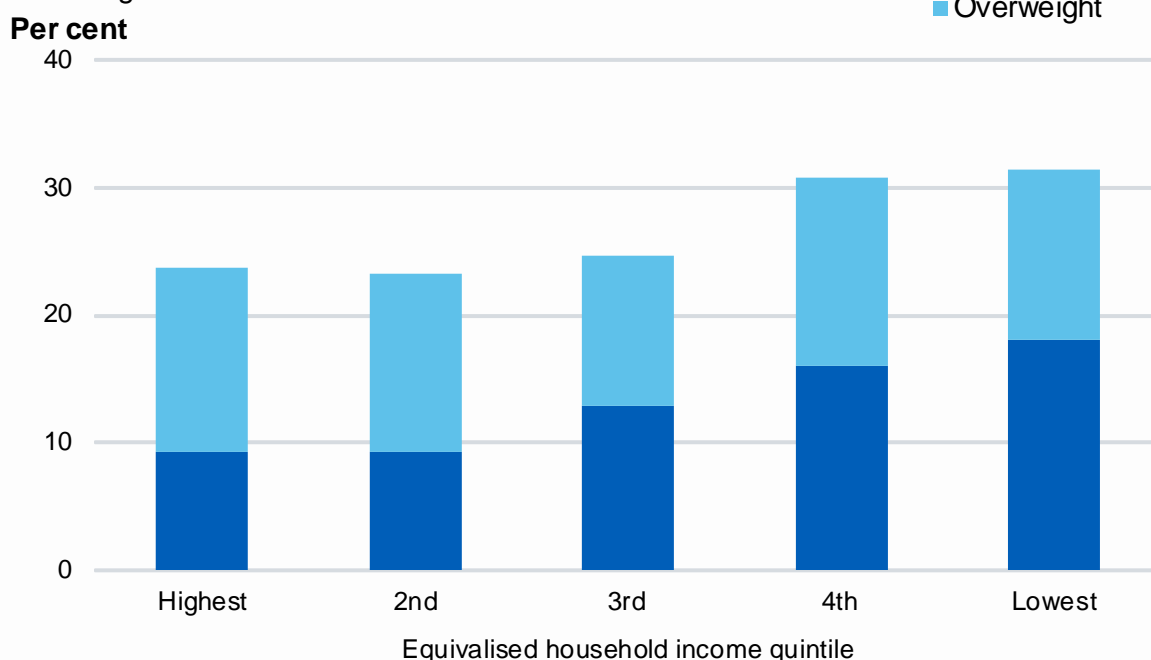
### Obesity and overweight by equivalised household income

As Figure 3 shows, the proportion of children classified as obese or overweight was higher in lower income households. Twice as many children living in the lowest income quintile were obese compared to those living in the highest income quintile (18% and 9% respectively).

Figure 3, Table 3

### Figure 3 Prevalence of obesity and overweight, by equivalised household income

Base: Aged 2 to 15 with valid height and weight measurements



Source: NHS Digital

## Perceptions of children's weight

### Children's perceptions of their own weight

Among children aged 8 to 15, 56% said that they were about the right weight, 11% said they were too heavy, 6% said they were too light and a further 27% of children aged 8 to 15 said that they were not sure. Girls were more likely than boys to think that they were too heavy; older children (aged 11 to 15) were more likely than younger ones (aged 8 to 10) to think the same thing.

Table 4

The majority of children aged 8 to 15 who were a healthy weight thought that they were about the right weight (63%), and a further 24% said they were not sure. Only 4% of healthy weight children thought that they were too heavy, although this was more common in girls than boys (6% and 1% respectively). 9% of children aged 8 to 15 who were neither overweight nor obese felt that they were too light; this was more common among boys than girls (12% and 6% respectively).

Table 5, Figure 4

A quarter (26%) of children aged 8 to 15 who were overweight, including obese felt they were too heavy, compared with 41% who said that they were about the right weight. Of the remainder, 33% were not sure and 1% felt they were too light.

Obese children were much more likely than children with lower BMI to think that they were too heavy (36%), and much less likely to think that their weight was about right



(26%). Obese children were also more likely to say that they were not sure whether they were the right weight or not.

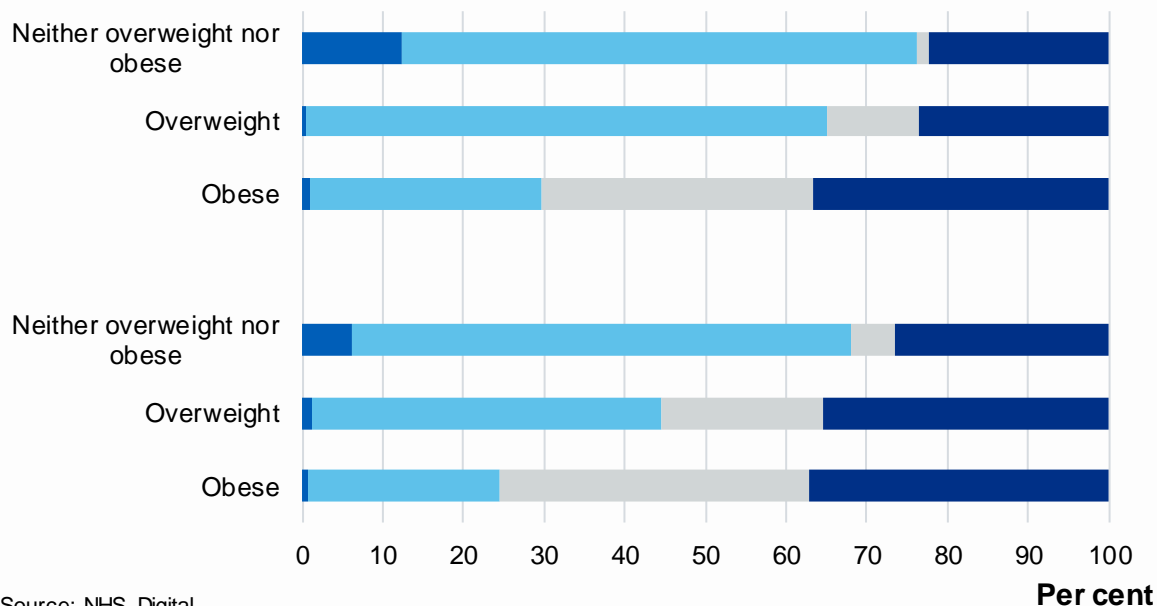
Table 5, Figure 4

### Figure 4 Perception of own weight, by BMI status

Base: Aged 8 to 15 with valid height and weight measurements

**BMI status**

- Too light
- About the right weight
- Too heavy
- Not sure



Source: NHS Digital

### Parents' perception of their children's weight

Parents were asked what they thought of the weight of each of their children. The parents of children selected for the child boost sample were not interviewed and so this section is based on children in the core sample only.

Most parents said that their child was about the right weight. 82% of children aged 4 to 15 were described by their mother as being about the right weight, 9% of children were described as too heavy and 8% were described as too light. Similarly, 81% of children aged 4 to 15 were described by their father as being about the right weight, 10% were reported as too heavy and 10% were felt to be too light. Mothers were more likely to say that daughters were about the right weight compared with sons (85% of girls, 79% of boys). The same was not true of fathers; 81% of boys and 80% of girls were described by their fathers as being about the right weight. Children in the older age group (11 to 15) were more likely to be seen as overweight by mothers and fathers than were children in the younger age group (4 to 10).

Table 6

88% of mothers and 86% of fathers of children who were neither overweight nor obese described them as being about the right weight.

The majority of overweight children were also described as being about the right weight by their mothers (91%) and fathers (80%). A small proportion of parents of overweight children described their child as being too heavy (8% of mothers and 19% of fathers).

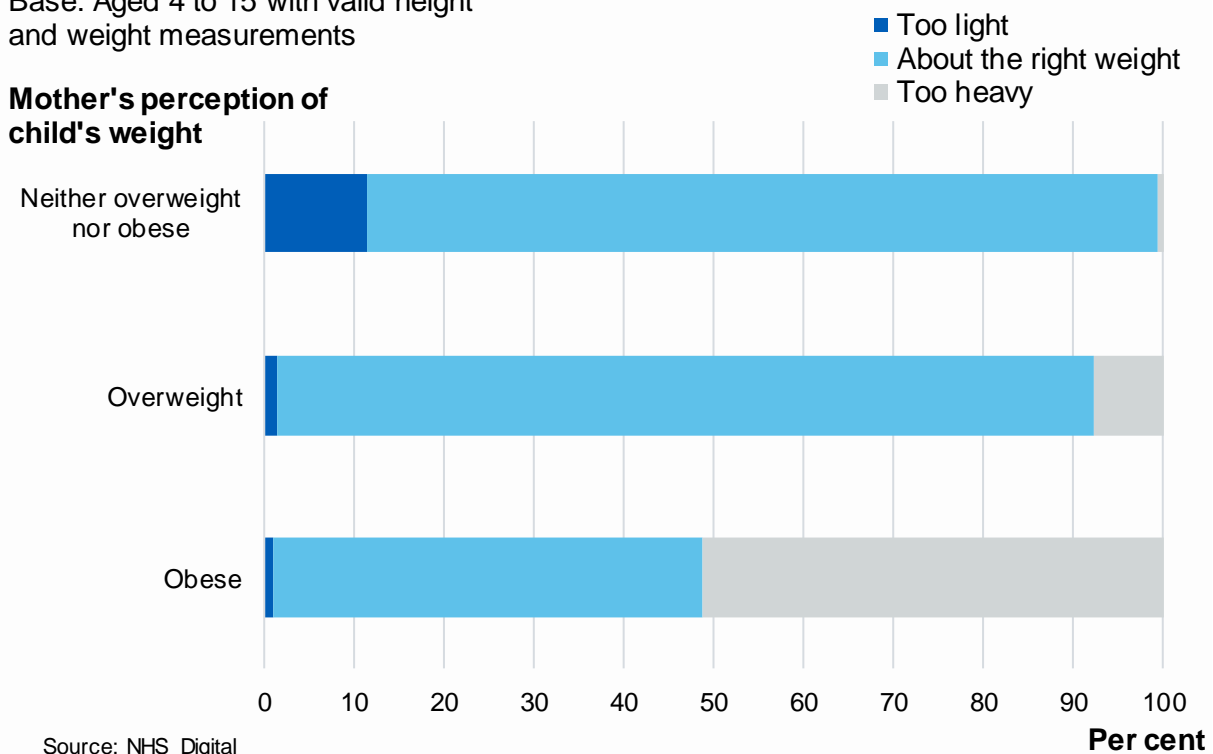
For obese children, 48% of mothers and 43% of fathers said their child was about the right weight. However, just over half of mothers (51%) and fathers (56%) of obese children described their child as too heavy.

Table 7, Figure 5, Figure 6

### Figure 5 Mother's perception of child's weight, by child's BMI status

Base: Aged 4 to 15 with valid height and weight measurements

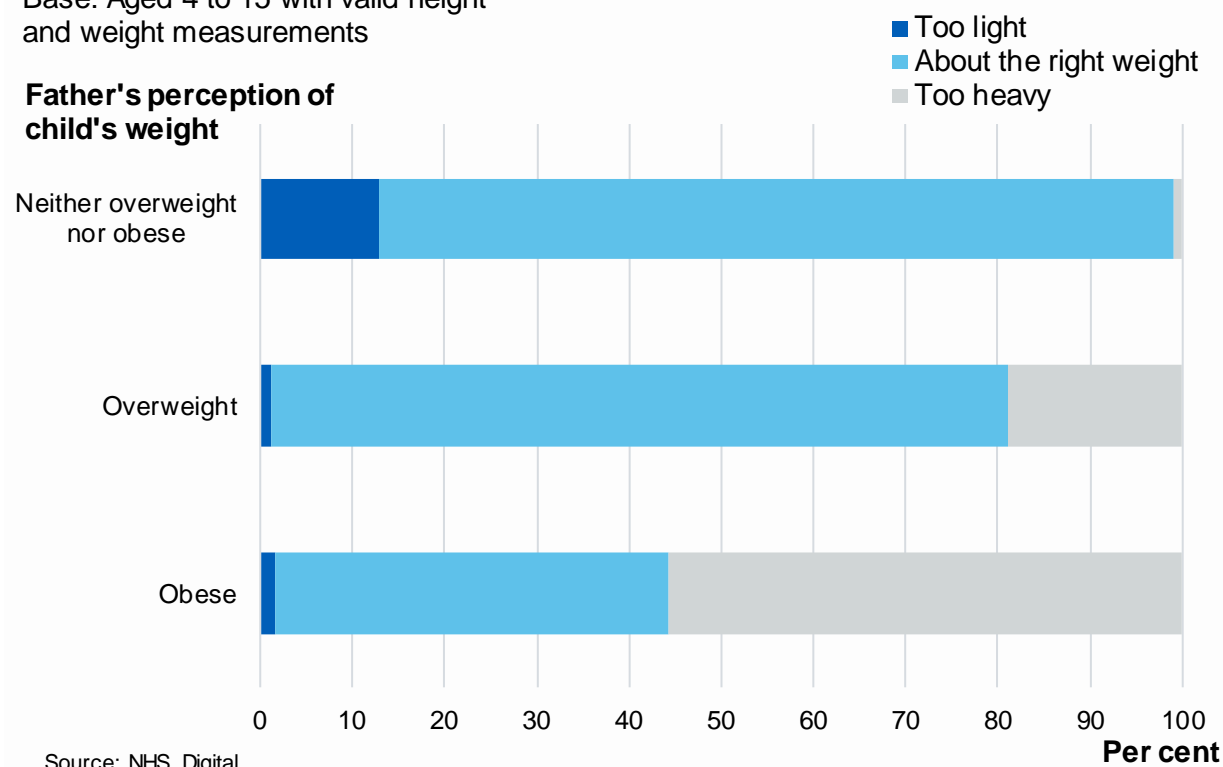
#### Mother's perception of child's weight



### Figure 6 Father's perception of child's weight, by child's BMI status

Base: Aged 4 to 15 with valid height and weight measurements

#### Father's perception of child's weight



### Children trying to change their weight

The majority of children aged 8 to 15 were not trying to change their weight (69%). Around a quarter (24%) of children aged 8 to 15 were trying to lose weight. This was more common for girls than boys (28% and 20% respectively) and it was more common for children aged 11 to 15 than those aged 8 to 10 (27% and 18% respectively). 7% of children reported that they were trying to gain weight; this was more common for boys than girls (10% and 4% respectively).

Table 8

Most children of a healthy weight were not trying to change their weight (79%). Half (49%) of overweight and obese children aged 8 to 15 also said they were not trying to change their weight, including 40% of obese children.

12% of children who were neither overweight nor obese said they were trying to lose weight.

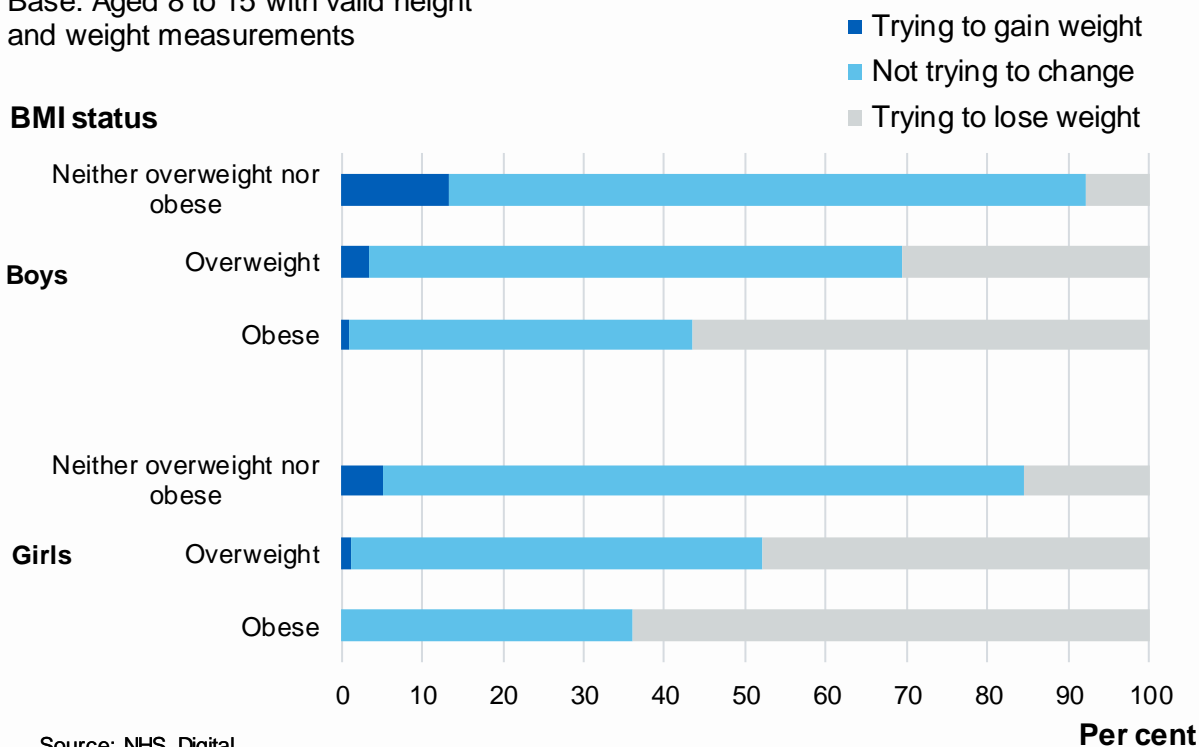
Among overweight children, 38% said they were trying to lose weight and 60% of obese children said they were trying to lose weight.

Overweight and obese girls were more likely than boys to be trying to lose weight (56% and 43% respectively). There was a similar difference between obese girls and boys (64% and 57% respectively).

Table 9, Figure 7

### Figure 7 Desire to change weight, by BMI status

Base: Aged 8 to 15 with valid height and weight measurements



### Trends in child obesity and overweight

The prevalence of obesity and overweight for children aged 2 to 15 between 1995 and 2015 is shown in Figure 8, presented as three-year moving averages in order to reduce the impact of random variation. The rate of childhood obesity in England increased during this period and then levelled out and was 14% in 2015. The percentage of children who were obese has fluctuated between 14% and 17% from 2008 to 2015. The estimates for individual years in this period vary slightly but differences are within survey sampling error.

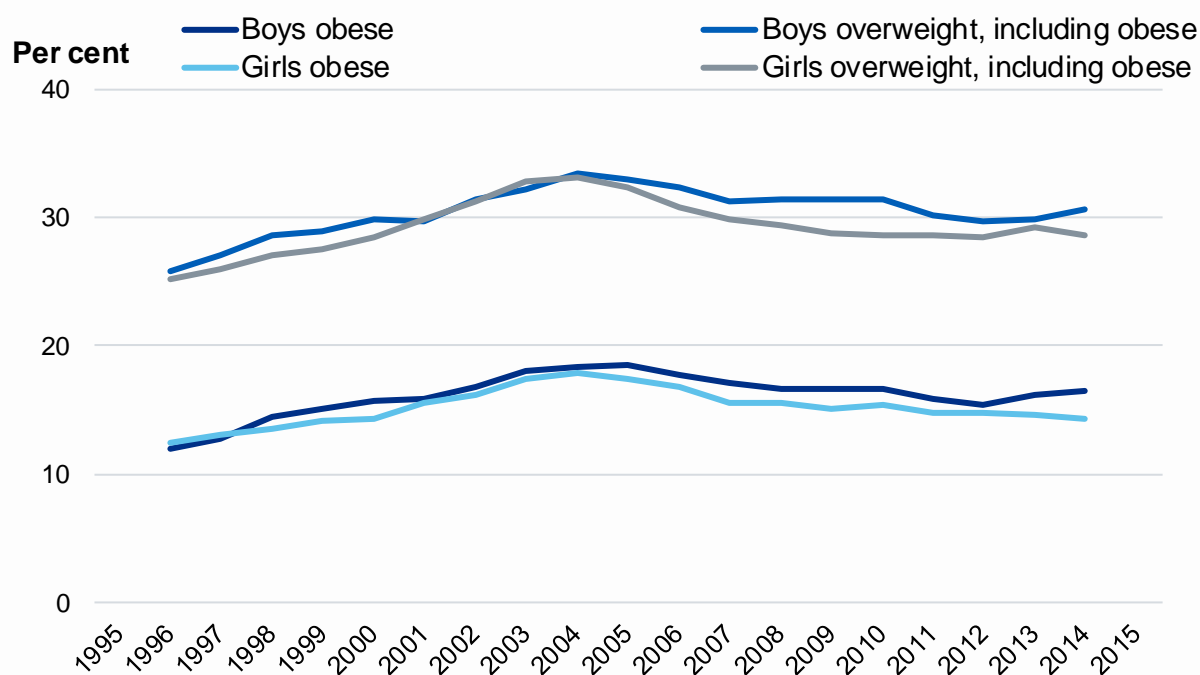
Figure 8

In 2015 the proportions of children aged 2 to 15 who were overweight (not including obese) were 13% of girls and 15% of boys. These proportions have stayed relatively stable over the past 20 years.

Table 10

### Figure 8 Trends in overweight and obesity for children aged 2-15, by sex (three-year moving average)

Base: Aged 2 to 15 with valid height and weight measurements



Source: NHS Digital

Among younger children, aged 2 to 10, the estimated prevalence of obesity has been between 13% and 15% between 2008 and 2015.

Table 11

Among older children, aged 11 to 15, the estimated prevalence of obesity has been between 16% and 20% between 2008 and 2015.

Table 12

## Discussion

Compared with the general increase in childhood obesity from 1995 to 2005, the obesity rate has subsequently levelled off. The prevalence of childhood obesity has varied little in recent years. This is consistent with international evidence that childhood obesity rates in developed countries are stabilising<sup>46,47,48,49</sup> and that they may be declining<sup>50,51,52</sup>.

Even so, the issue of childhood obesity remains a substantial health concern. The proportion of children in England who are overweight, including obese, remains high (28%) with serious consequences for physical and mental health both during childhood and as adults. Child obesity has an unequal impact across groups, being more prevalent among children from low-income backgrounds.

These findings confirm previous HSE reports<sup>53</sup> and other research<sup>54,55</sup> which found that parents are often unaware when their child is overweight or obese. Parents who

underestimate the weight status of their overweight or obese children may be less likely to provide them with the support they need to achieve a healthy weight. A research study<sup>56</sup> also found that parents from deprived backgrounds are more likely to underestimate their child's weight, which may be contributing to the problem of social inequalities in obesity.

It also appears that a small proportion of parents incorrectly believe that their child is underweight; mothers described 8% of children as too light as did 10% of fathers, whereas, according to the National Child Measurement Programme, just 1% of children are underweight.<sup>57</sup> Parents' underestimation of their child's weight is also apparent at the lower end of the weight spectrum.

Children themselves often hold misperceptions regarding their own weight. A substantial proportion of overweight and obese children believe that they are the right weight and are not trying to change their weight. Inaccurate perception of excess weight by children and their parents is a barrier to behaviour change among children and adolescents. Information and guidance for parents may improve understanding and lead to more accurate perceptions of their children's needs. Campaigns such as *Change4Life*<sup>29</sup> can play a role in this, providing parents with information about healthy eating and the importance of physical activity.

## Notes and references

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<sup>25</sup> HM Treasury. *Budget 2016*. London, 2016. <https://www.gov.uk/government/publications/budget-2016-documents>

<sup>26</sup> The 'sugar tax' will apply to drinks with total sugar content above 5 grams per 100 millilitres, with a higher rate for more than 8 grams per 100 millilitres. This won't need to be paid on milk-based drinks or fruit juices.

<sup>27</sup> Department of Health. *Public Health Responsibility Deal*. London, 2011. <https://responsibilitydeal.dh.gov.uk/>

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<sup>33</sup> Previous HSE reports are available at <http://content.digital.nhs.uk/article/1165/Search-catalogue>.

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<sup>40</sup> Scholes S, Heeks F. BMI, overweight and obesity. Chapter 2 in Craig R, Mindell J (eds). *Health Survey for England 2006. Volume 2: Obesity and other risk factors in children*. Health and Social Care Information Centre, Leeds, 2008. [www.hscic.gov.uk/catalogue/PUB01213/heal-surv-cvd-risk-obes-ad-ch-eng-2006-rep-v2.pdf](http://www.hscic.gov.uk/catalogue/PUB01213/heal-surv-cvd-risk-obes-ad-ch-eng-2006-rep-v2.pdf)

<sup>41</sup> There is no generally agreed definition of childhood obesity, but there are two widely used indicators: the International Classification, based on reference points derived from an international survey; and the UK National Body Mass Index centile classification, based on the UK 1990 reference curves, as used in this report. Although the figures produced by the two different definitions differ considerably (obesity estimates derived using the National Body Mass Index centile classification are much higher than those derived by the international classification), the overall trends are not affected by the definition used.

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- <sup>43</sup> 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.
- <sup>44</sup> Between 1995 and 2014 in households with more than two children, two were selected at random. In 2015 up to four children were selected at random: up to two aged between 0 and 12 and up to two aged between 13 and 15.
- <sup>45</sup> Health Survey for England 2015 Methods. NHS Digital, Leeds 2016. <http://digital.nhs.uk/catalogue/PUB22610/HSE2015-methods.pdf>.
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- <sup>56</sup> Black J, Park M, Gregson J et al. Child obesity cut-offs as derived from parental perceptions: cross-sectional questionnaire. *Br J Gen Pract*. 2015;65:e234-239
- <sup>57</sup> In 2014/15 NCMP found that 1% of 4-5 year olds and 1.4% of 10-11 year olds were underweight.

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