

# Children's body mass index, overweight and obesity

11

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## Summary

- There is considerable evidence linking childhood overweight and obesity with a number of long-term and immediate physiological and psychological health risks. This chapter examines the patterns of overweight and obesity among children aged 2-15 in 2013, and the relationship between these measures and a number of demographic variables. Children's own perceptions of their weight and their parents' perceptions are also examined.
- In both boys and girls aged 2-15, mean body mass index (BMI) increased with age, from 16.8kg/m<sup>2</sup> for boys and 16.4kg/m<sup>2</sup> for girls aged 2-4 to 20.8kg/m<sup>2</sup> for boys and 22.2kg/m<sup>2</sup> for girls aged 13-15.
- Among children aged 2-15, 16% of boys and 15% of girls were classed as obese, and 14% of both boys and girls were classed as overweight. Overall 30% of boys and 29% of girls were classed as either overweight or obese.
- Levels of obesity varied according to socio-economic status. Among children aged 2-15, levels of obesity were highest in the lowest quintile of equivalised household income (22% of boys and 21% of girls) compared with those in the highest quintile (7% and 6% respectively). Likewise, the prevalence of obesity was higher among those living in the two most deprived quintiles of the Index of Multiple Deprivation, from 17% to 22% for boys and 16% to 21% for girls.
- The prevalence of obesity has increased since 1995, when 11% of boys and 12% of girls aged 2-15 were obese. There was a steady increase up to around 2004 and 2005, where obesity peaked at 18% to 19% among both boys and girls. Levels have been slightly lower than this peak since then. The levels in 2013, at 16% for boys and 15% for girls, were not statistically significantly different from those over the last three or four years.
- There were differences in trends according to age. Among children aged 11-15, the proportion who were obese has remained at a broadly similar level (with some fluctuation) since the peak in 2004/2005. Among those aged 2-10 the proportion who were obese has decreased significantly from 17% of both boys and girls in 2005 to 13% of boys and 12% of girls in 2013.
- When children aged 8-15 were asked about their perception of their weight, 58% of boys and 52% of girls felt that they were about the right weight, while 11% of boys and 15% of girls felt that they were too heavy, and 10% of boys and 4% of girls thought they were too light (21% of boys and 28% of girls were not sure). Just under a quarter of children who thought that they were about the right weight were overweight (15%) or obese (8%).
- The majority of both mothers and fathers of children aged 4-15 thought that their child was about the right weight (80% of mothers, 85% of fathers for boys, and 80% and 78% respectively for girls).
- Most parents who thought their child was about the right weight were correct;

however, just under a quarter had a child who was overweight or obese (24% among both mothers and 22% among fathers who thought their child's weight was 'about right').

- The majority of children were not trying to change their weight (71% of boys and 66% of girls). Fewer boys than girls said they were trying to lose weight (20% and 29% respectively), and trying to lose weight was more common among older children for both sexes.

## 11.1 Introduction

### 11.1.1 Background

Childhood obesity and its associated risks have been outlined by the government as one of the biggest threats to public health in England.<sup>1</sup> It continues to provoke national and international concern. Estimates from the Foresight report in 2007, based on HSE data from 1993-2004, suggested that by 2050, 55% of boys and 70% of girls aged under 20 could be overweight or obese.<sup>2</sup> However, a more recent update on these trends based on HSE data from 2000 to 2007, although not directly comparable, indicated a healthier picture; these suggested that by 2020 13% of boys and 10% of girls aged 2-11 might be obese.<sup>3</sup>

According to the most recent report on the National Child Measurement Programme (NCMP), based on the 2012/13 school year, over a fifth (22.2%) of children in Reception (aged 4-5 years) were either overweight or obese. This proportion increased to a third (33.3%) for children in Year 6 (aged 10-11 years). The percentage of Year 6 children who were classed as obese was more than double that of Reception year children (18.9% and 9.3%). The proportions of overweight and obese children combined in both Reception and Year 6 were lower than in 2011/12. This is the first time since the NCMP began in 2006/07 that overweight and obesity prevalence has reduced for Year 6 children. Data from further years will be required to see if this is the start of a declining trend.<sup>4</sup>

### 11.1.2 Government initiatives to tackle obesity

In response to childhood obesity prevalence the National Institute for Health and Care Excellence (NICE) are producing a quality standard covering public health strategies to prevent overweight and obesity as well as interventions for lifestyle management in children and young people aged under 18 years. Several other policies and strategies aimed at tackling obesity have also been introduced over the past few years. These include the White Paper *Choosing Health: Making Healthier Choices Easier*, which aimed to prevent any further rises in obesity among children under 11.<sup>5</sup> In November 2010 the government announced an ongoing strategy to improve public health in its White Paper *Healthy Lives, Healthy People: Our Strategy for Public Health in England*.<sup>1</sup> The paper set out key areas to focus on in its aim to improve the lives of people in England. Included in these was the continued support for school-aged children through the Healthy Child Programme,<sup>6</sup> and assistance with local services to tackle overweight and obesity through the National Child Measurement Programme.<sup>7</sup> Following this 2010 white paper, The Public Health Responsibility Deal<sup>8</sup> was announced in 2011, with a view to encouraging local businesses and the voluntary sector to support people to live healthier lives by informing their lifestyle choices in areas such as healthy eating and physical activity. Preventative measures were also outlined in the 2009 *Change4Life* campaign<sup>9</sup> which focussed on encouraging families to eat healthily and improve levels of physical activity.

In October 2011, these commitments were reinforced by a further pledge to tackle overweight and obesity in the context of the new structure of the NHS and Public Health England. *Healthy Lives, Healthy People: a call to action on obesity in England*<sup>10</sup> set out rigorous plans to engage people in healthier lifestyles across all life stages. The degree to which obesity and overweight have become a problem was acknowledged in the paper and recommendations were centred around local and national level partnerships, with a view to reducing excess weight by 2020.

### 11.1.3 The impact of overweight and obesity

Overweight and obesity are terms that refer to an excess of body fat. Body mass index (BMI) relates to increased weight-for-height and is a frequently used measure of obesity and overweight. The two terms denote different degrees of excess adiposity (body fat), and overweight can be thought of as a stage where an individual is at risk of developing obesity.<sup>11</sup> The adverse health consequences associated with obesity are mostly related to an increased adiposity rather than increased weight per se<sup>12</sup> and it is therefore important that any indicator of obesity reflects this increased adiposity.

There is considerable evidence linking obesity with numerous long-term and immediate physiological health risks which highlights the importance of studying early overweight and obesity. Childhood and adolescent obesity can persist into adulthood, where the direct health risks of obesity are severe and well-established. It has been estimated that up to 50% of obese adolescents remain obese in adulthood.<sup>13,14</sup> Other studies have linked childhood and adolescent overweight and obesity directly to middle-age mortality and a range of chronic diseases in adult life.<sup>15,16,17,18,19</sup> In addition to the increased risk for health problems in later life, children face immediate health consequences of obesity, including increased risks for an abnormal lipids (fats in blood) profile and elevated blood pressure.<sup>20</sup> Associations between childhood obesity and increased asthma prevalence<sup>21</sup> and the incidence of Type 2 diabetes mellitus<sup>22</sup> have also been reported.

As well as the physiological health risks that arise as a result of obesity, the psychological effects of obesity are also being increasingly recognised; many of which can continue into adulthood. Studies have shown high levels of dissatisfaction with body size and shape amongst adolescents as well as a desire to be thinner, which increases in line with body mass and is more prevalent among girls.<sup>23,24,25</sup> Other links to the psychological effects of obesity have been found to include low self esteem or self image,<sup>26</sup> and depression.<sup>27</sup> Symptoms of depression in adolescents have also been linked to higher BMI and low levels of physical activity,<sup>24</sup> particularly among young women.<sup>28</sup>

The influence of family is vital to the prevention and treatment of childhood obesity.<sup>29</sup> Adults play a large role in influencing the content and availability of food, as well as the food choices that children make.<sup>30</sup> Moreover, studies have highlighted the pattern between the weight status of children and their parents, showing a clear link between the BMI of children and their mother's BMI.<sup>27</sup> The need to understand the health consequences of excess weight and to recognise the need for weight management is a pre-requisite for preventing and tackling obesity. Yet evidence suggests that 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.<sup>31</sup> Studies have shown that, among parents of pre-school children, as many as 90% do not correctly identify their child as overweight when this is the case.<sup>32</sup>

This chapter examines patterns of obesity and overweight among children aged 2-15, and the relationship between these and demographic and attitude variables. Trend data on key HSE measures, including child obesity, are available in *Health Survey for England 2013 trend tables* on the Health and Social Care Information Centre website.<sup>33</sup>

## 11.2 Methods and definitions

### 11.2.1 Methods

Children aged 2-15 had their height and weight measured and BMI was calculated from the valid readings. The calculation uses sex and exact age in six month bands (extracted from the date of interview minus the date of birth). Presentation of the results is based, however, 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 2013 show BMI, overweight and obesity prevalence calculated for children aged 2-15. 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 is limited to two (in households with more, two are selected at random). This weighting is used to ensure that the age/sex distribution of selected children matches that of all children in co-operating households. Non-response weighting was also introduced in 2003. The child-selection weighted estimates are shown for 1995-2002 and the non-response weighted estimates (including adjustment for child selection) for 2003-2013. National trend data are presented separately for three age groups: 2-10, 11-15 and 2-15.

Questions about children's perceptions of their own weight and their desire to change their weight have been asked since 2006. Children aged 8-15 were asked as part of a self-completion questionnaire whether or not they thought they were about the right weight and whether they were trying to change their weight. In 2012 and 2013 parents (including legal guardians) of children aged under 16 were asked about their perceptions of their child's weight. These questions were included in the self-completion booklet for adults, and both mothers and fathers were asked to give their views. This was slightly different from 2011, when (in two parent families) only one parent, usually the mother, was asked about their perception of their child's weight in a separate booklet relating specifically to the child. Analyses of parents' perceptions are presented in Tables 11.7-11.9, and it should be noted that there are relatively small numbers of children for whom parent information is also available. Therefore in some cases data for boys and girls have been combined, and margins of error for some of the estimates are wide.

### 11.2.2 Definitions

Body mass index (BMI), calculated as weight (kg) divided by height squared ( $m^2$ ), has been shown to correlate strongly with adiposity in adults<sup>34,35</sup> and children.<sup>5,36,37</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, children's overweight and obesity prevalence and trends have been produced using the UK National BMI centiles classification.<sup>39,40</sup> This classification was used to produce obesity trend estimates in the Chief Medical Officer's 2002 Annual Report.<sup>41</sup>

Different growth patterns among boys and girls at each age means that a universal categorisation cannot be used to define childhood overweight and obesity. Overweight and obesity prevalence for children aged 2-15 is therefore estimated using the exact age (categorised in six month bands) and the sex-specific UK National BMI centiles classification.<sup>42,43</sup> This classification gives the BMI threshold 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.

## 11.3 BMI and prevalence of obesity and overweight

### 11.3.1 BMI, obesity and overweight, by age and sex

Mean body mass index (BMI) was similar for boys and girls aged 2-15, at  $18.2 \text{ kg/m}^2$  and  $18.5 \text{ kg/m}^2$  respectively. As Figure 11A shows, mean BMI increased with age.

16% of boys and 15% of girls aged 2-15 were classed as obese, and 14% of both sexes were overweight. Overall, 30% of boys and 29% of girls were classed as either overweight or obese; the differences between the sexes were not statistically significant. As shown in Figure 11B, the proportion who were obese generally increased with age, though there was less variation by age in the proportion who were overweight. **Tables 11.1, 11.2, Figures 11A, 11B**

### 11.3.2 BMI, obesity and overweight prevalence, by equivalised household income

Among children aged 2-15, there was significant variation in the proportion who were obese according to equivalised household income, as shown in Figure 11C. Boys and girls in the lowest quintile were around three times as likely to be obese as those in the highest income quintile. **Table 11.3, Figure 11C**

Figure 11A

**Mean body mass index, by age and sex**

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

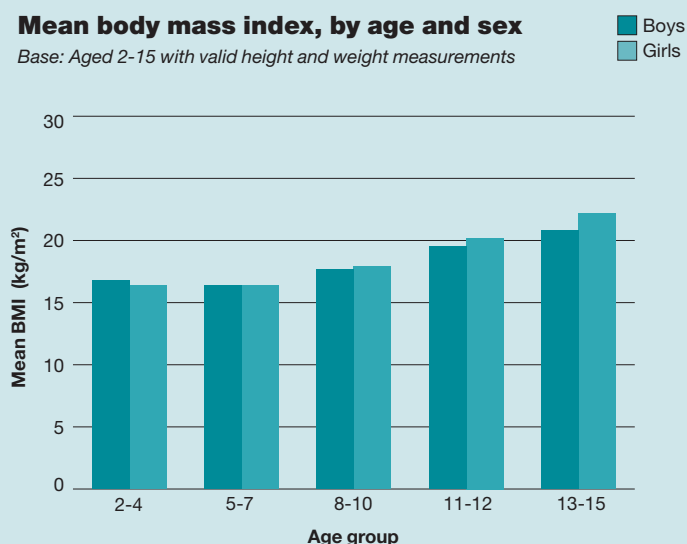


Figure 11B

**Prevalence of overweight and obesity, by age and sex**

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

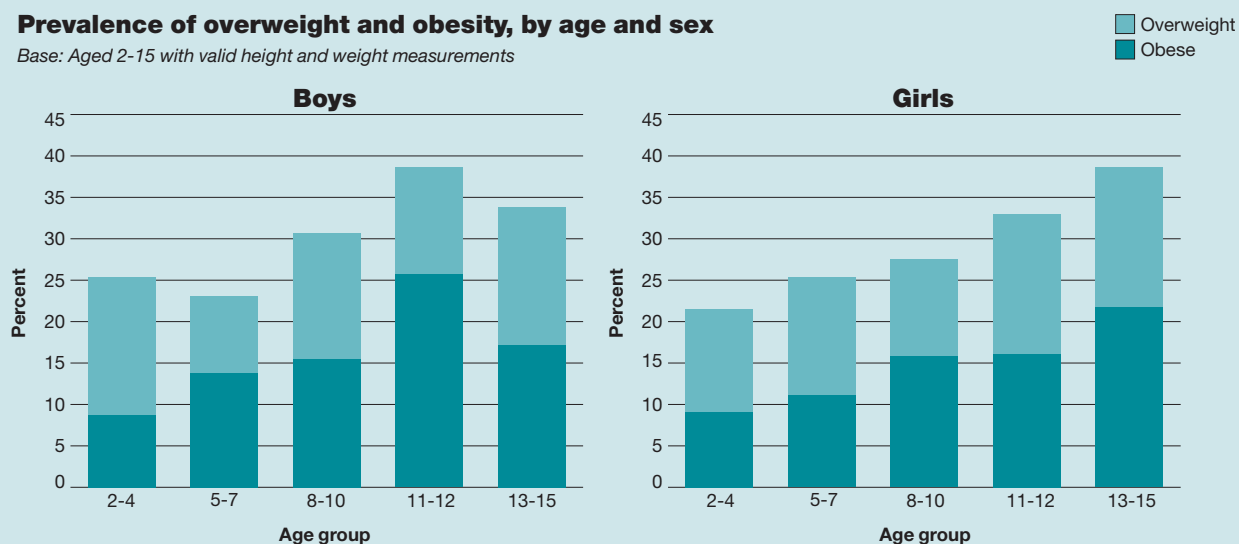
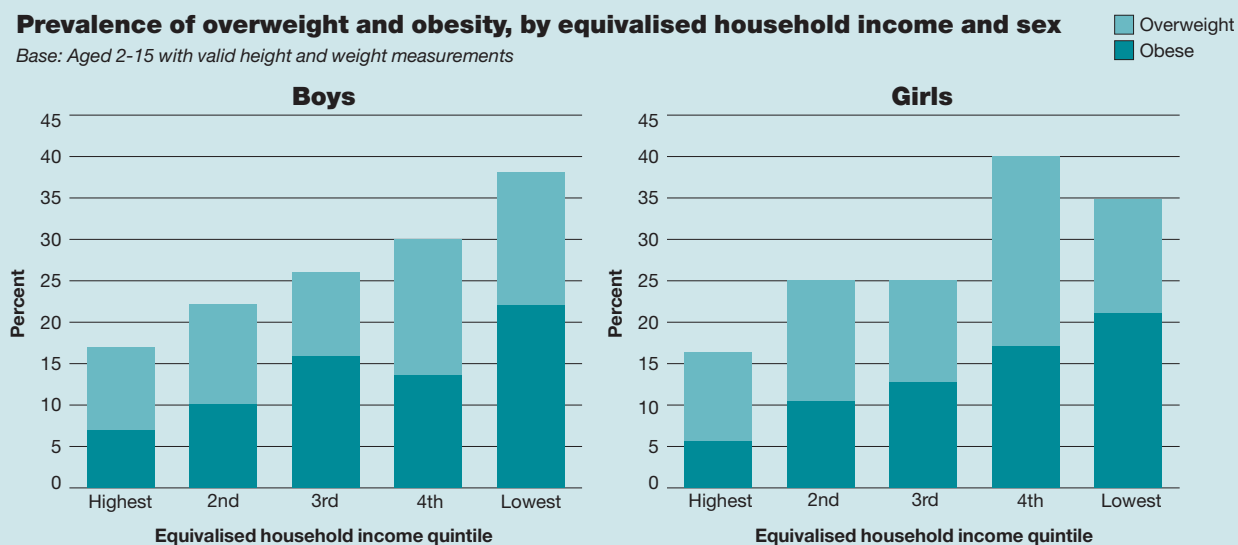


Figure 11C

**Prevalence of overweight and obesity, by equivalised household income and sex**

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

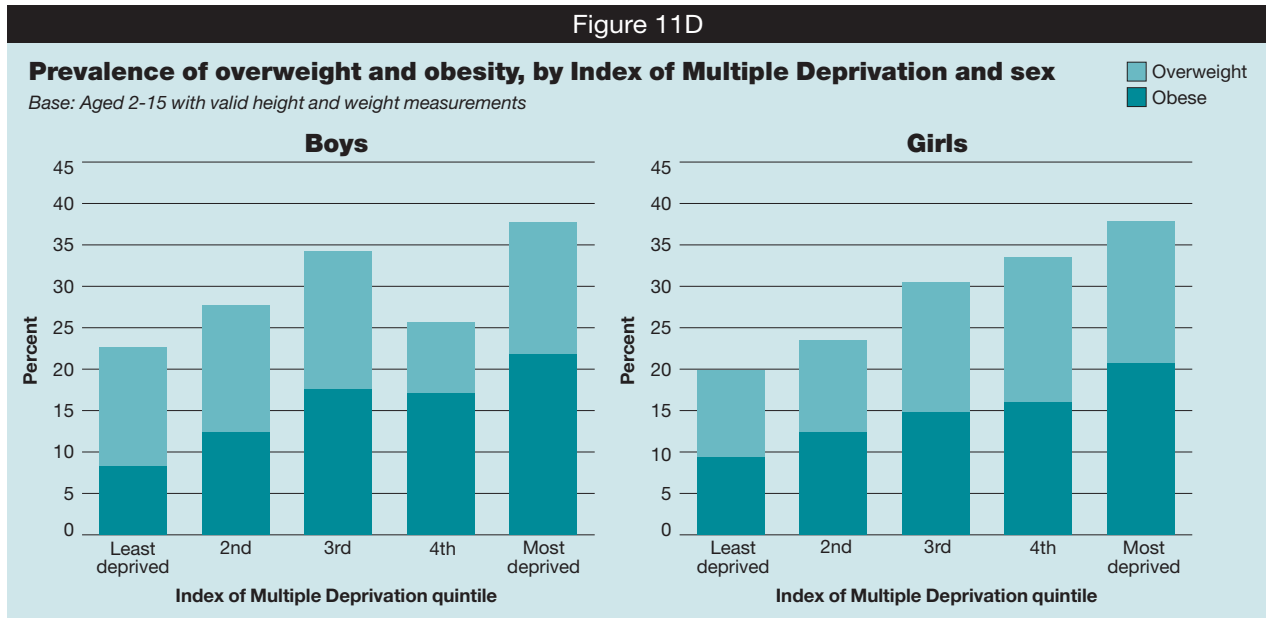


### 11.3.3 BMI, obesity and overweight prevalence, by Index of Multiple Deprivation (IMD)

The impact of area deprivation was examined by looking at mean BMI and obesity prevalence by quintiles of the Index of Multiple Deprivation (IMD). Following a similar pattern to household income, levels of obesity were considerably higher for both boys and girls in the two most deprived quintiles compared with those in less deprived quintiles (see Figure 11D).

There was a similar pattern of significant variation by IMD quintiles in mean BMI, with higher mean BMI in more deprived areas.

Table 11.4, Figure 11D



## 11.4 Child and parent perceptions of weight

### 11.4.1 Child perceptions of their own weight

In the self completion booklet, children aged 8-15 were asked about their perception of their own weight. Parents of children aged under 16 were also asked about their perceptions of their child's weight in a self-completion booklet.

More than half of boys and girls aged 8-15 thought that they were about the right weight (58% and 52% respectively). 11% of boys and 15% of girls thought they were too heavy, while 10% of boys and 4% of girls thought they were too light. A substantial proportion of children were not sure whether they were about the right weight (21% of boys and 28% of girls). Figure 11E shows the results among younger and older children. While the pattern was broadly similar across the age groups, a higher proportion of those aged 11-15 than 8-10 thought that they were too heavy.

The mean BMI of children aged 8-15 who thought they were about the right weight was 18.8kg/m<sup>2</sup>, compared with 26.2kg/m<sup>2</sup> for those who thought they were too heavy. The majority of children who thought they were too heavy were obese or overweight. Just under a quarter of children who thought that they were about the right weight were overweight or obese (see Figure 11F).

Tables 11.5, 11.6, Figures 11E, 11F

### 11.4.2 Parent perceptions of their child's weight

The majority of both mothers and fathers of children aged 4-15 thought that their child was about the right weight (80% of mothers, 85% of fathers for boys, and 80% and 78% respectively for girls). Few parents of children in this age group thought that their child was too heavy (8% of mothers and 5% of fathers for boys, and 12% and 15% respectively for

Figure 11E

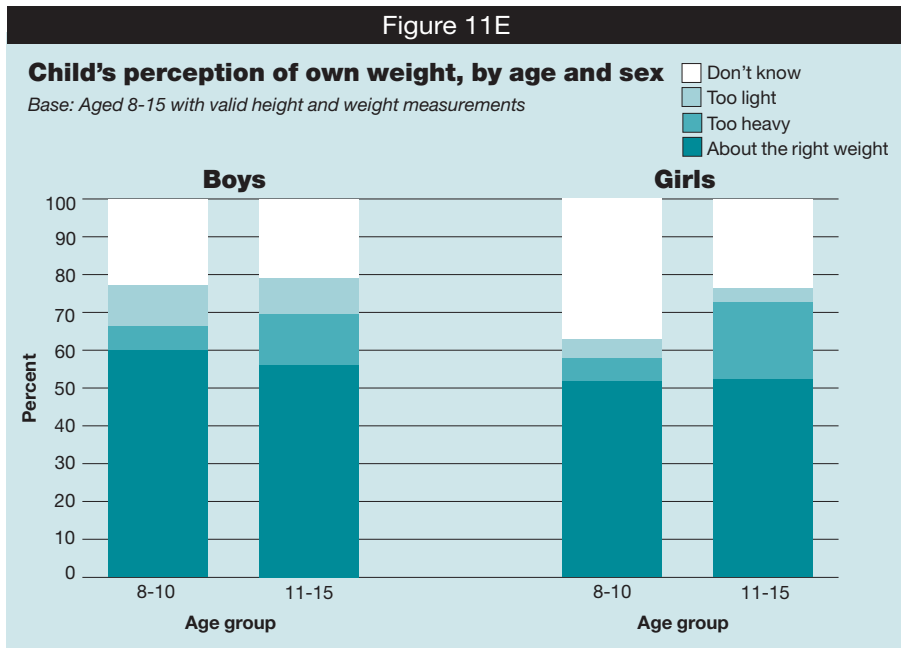
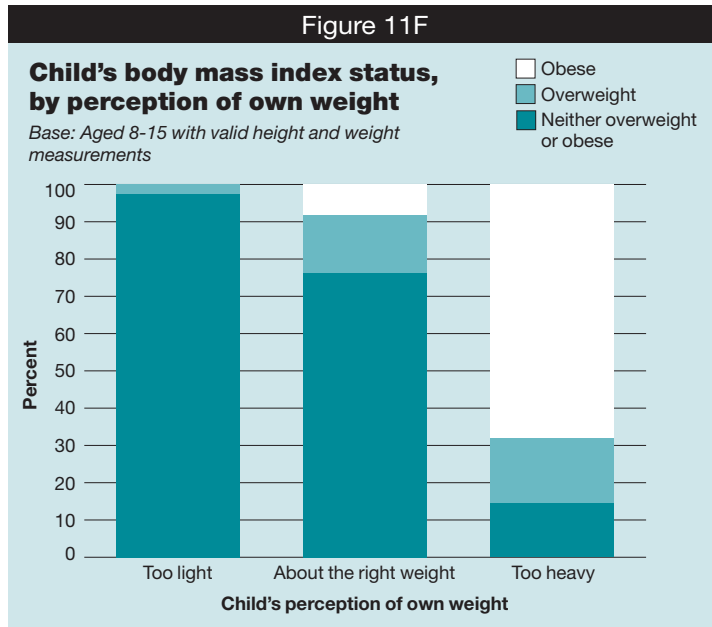


Figure 11F



girls). Perceptions varied between older and younger children, with a higher proportion of both parents likely to think children aged 11-15 were too heavy than children aged 4-10, as shown in Figures 11G and 11H.

In cases where parents thought that their child was about the right weight, the mean BMI of the children was 18.0/m<sup>2</sup> (mothers) and 17.80/m<sup>2</sup> (fathers). In the majority of cases where parents thought their child was too heavy, the child was in fact overweight or obese, as shown in Figure 11I. Most parents who thought their child was about the right weight were correct; however, just under a quarter in this group had a child who was overweight or obese.

Parent perceptions so far have been presented for children aged 4-15. An additional table is provided which shows parental perceptions for the 8-15 age group (Table 11.9), with results therefore for the same age group as for children's own perceptions in Table 11.6. The patterns in mothers' and fathers' perceptions of their child's weight were very similar for the 4-15 and 8-15 age groups.

Tables 11.7-11.9, Figures 11G – 11I



Figure 11G

**Mother's perception of child's weight, by child's age and sex**

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

- Too light
- Too heavy
- About the right weight

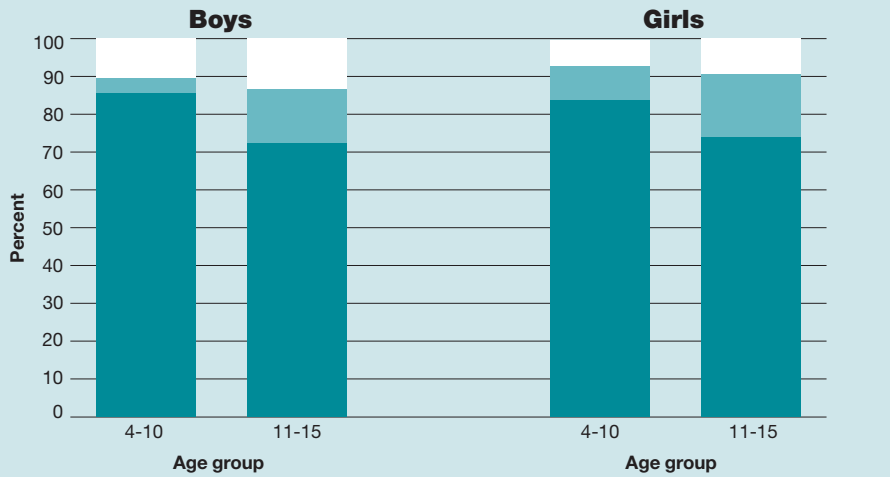


Figure 11H

**Father's perception of child's weight, by child's age and sex**

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

- Too light
- Too heavy
- About the right weight

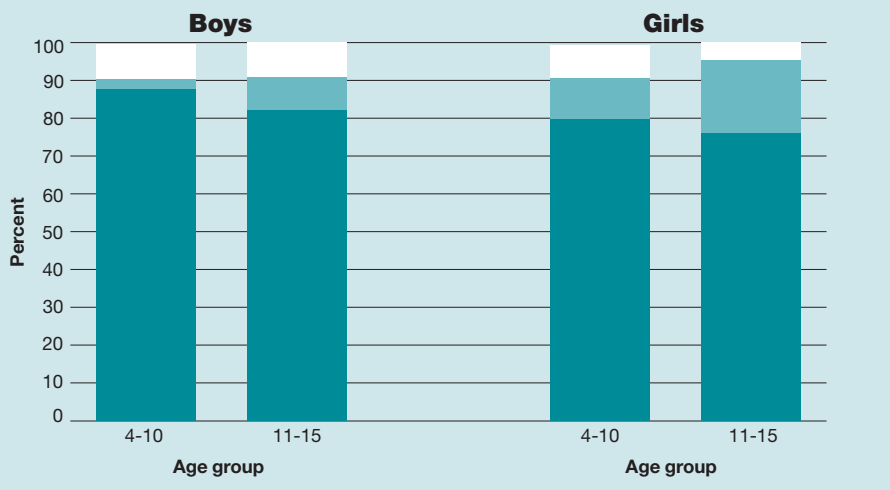
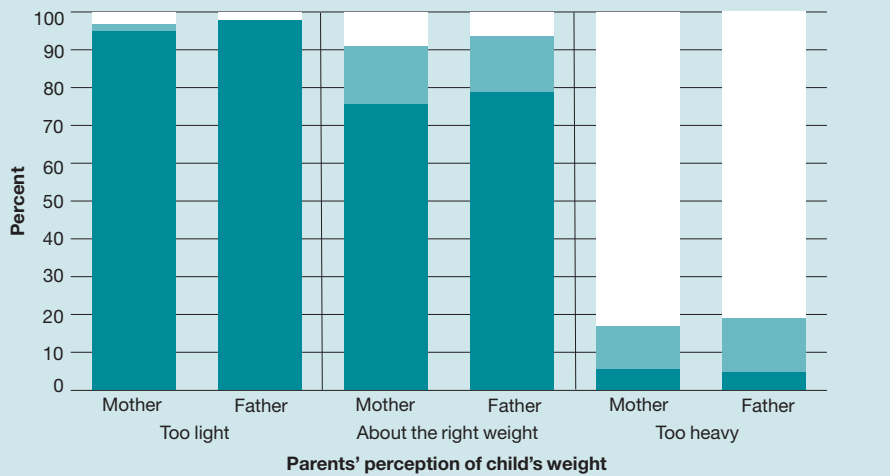


Figure 11I

**Child's body mass index status, by parents' perception of child's weight**

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

- Obese
- Overweight
- Neither overweight or obese

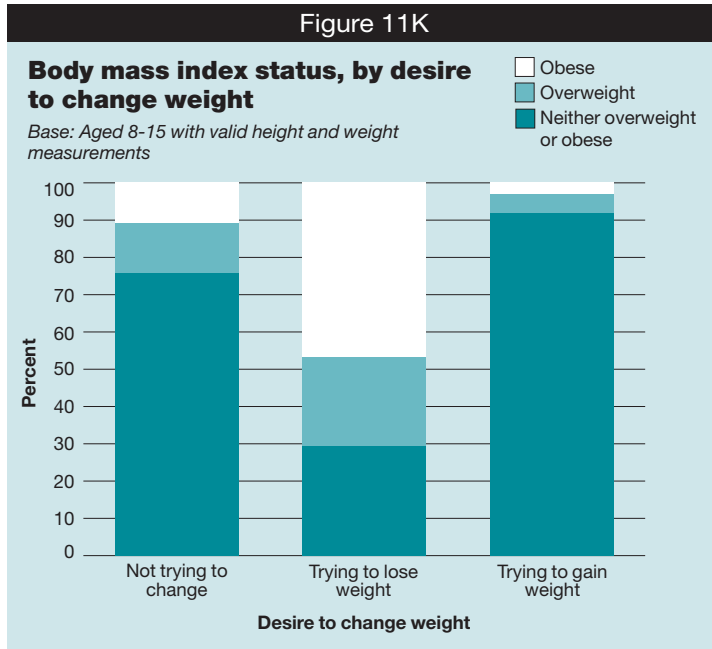
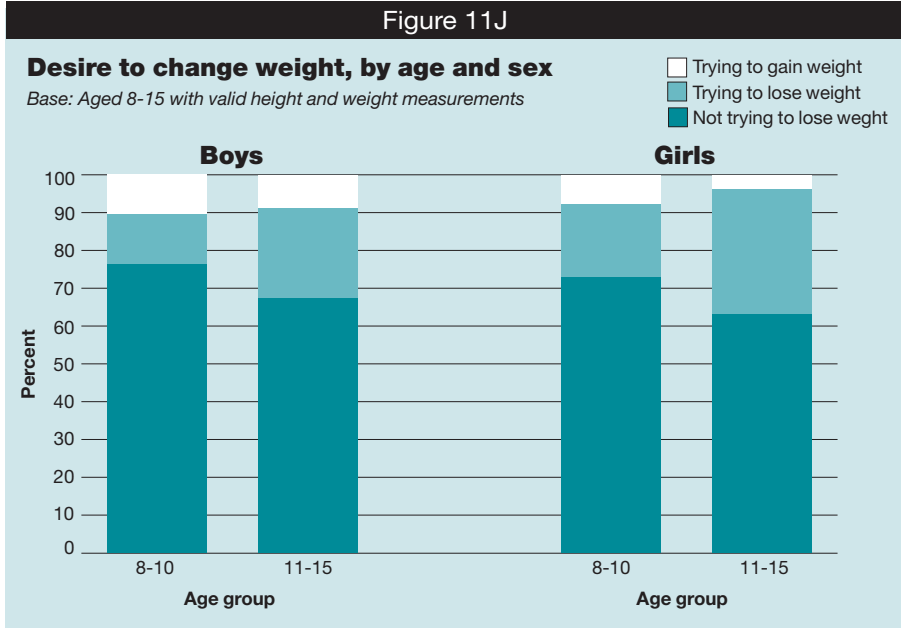


### 11.4.3 Children trying to change weight

The majority of children were not trying to change their weight (71% of boys and 66% of girls). Fewer boys than girls said they were trying to lose weight (20% and 29% respectively), and trying to lose weight was more common among older children for both sexes, as shown in Figure 11J.

The mean BMI of children trying to lose weight was 23.6kg/m<sup>2</sup>, compared with 16.7 kg/m<sup>2</sup> for those trying to gain weight and 18.8kg/m<sup>2</sup> for those who were not trying to change their weight. Among those who were trying to lose weight 24% were overweight and 47% were obese, while 29% were neither overweight nor obese (see Figure 11K).

Tables 11.10, 11.11, Figures 11 J, 11K



## 11.5 Trends in BMI, overweight and obesity

Mean BMI increased between 1995 and 2013 by 0.5kg/m<sup>2</sup> among boys aged 2-15 (from 17.7kg/m<sup>2</sup> to 18.2kg/m<sup>2</sup>), and by 0.4kg/m<sup>2</sup> for girls (from 18.1kg/m<sup>2</sup> to 18.5kg/m<sup>2</sup>). With fluctuations from year to year, overall increases in mean BMI were evident for both sexes during this period, although for the last few years mean BMI has been slightly lower than the peak around 2004/2005.

Figure 11L shows three-year moving averages from 1995 to 2013 for children aged 2-15 who were obese, and overweight including obese. Childhood obesity in England has increased significantly since 1995, when 11% of boys and 12% of girls were obese. The prevalence of obesity increased steadily in most years up to around 2004 and 2005, where it peaked at 18% to 19% among both boys and girls. Levels have been slightly lower than this peak in the last few years. The levels in 2013, at 16% for boys and 15% for girls, were not statistically significantly different from those over the last three or four years. It should be noted that bases for the last three years are smaller in the absence of a child boost, and margins of error are therefore wider. It will be important to continue to monitor the trends in future, using HSE data to confirm whether this is the beginning of a gradual downward shift or simply fluctuation in the flattening trend.

The proportion of children who were overweight varied less over the period than the proportion who were obese. While there has been a slight increase overall, there have been fluctuations from year to year. Changes in the proportion who were overweight including obese have therefore closely followed the pattern of changes in the proportion who were obese.

There were differences in trends according to age. Figure 11M shows, for the period from 1995 to 2013, the proportion of children aged 2-10 and 11-15 who were obese. Among both age groups and both sexes, there was a similar pattern of increase up to the peak around 2004/2005; since then the proportion who were obese in the 11-15 age group has remained at a broadly similar level (with some fluctuation) among both boys and girls. Among those aged 2-10 the proportion who were obese has decreased from between 2005 and 2013.

Tables 11.12-11.14, Figures 11L, 11M

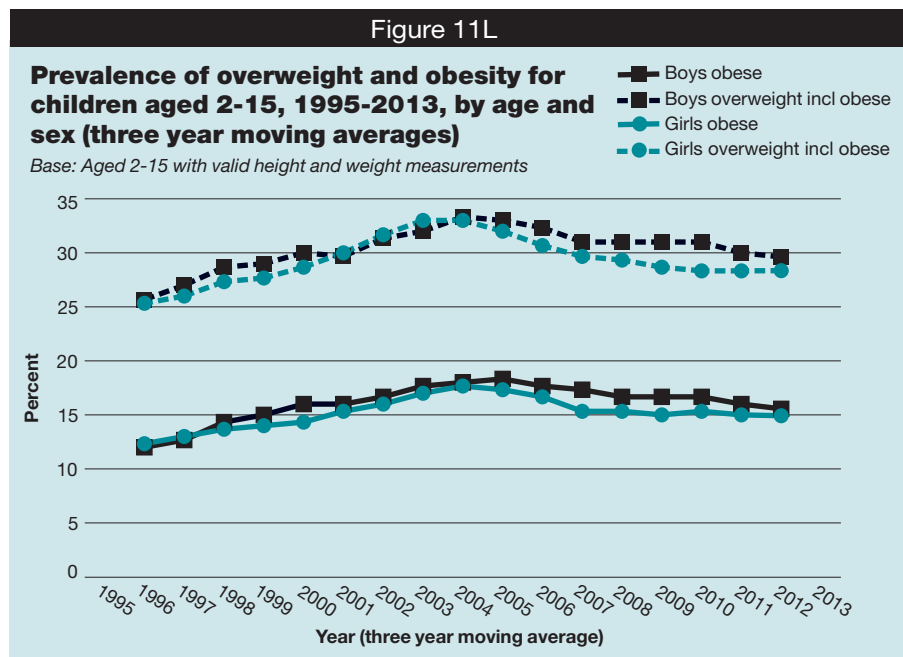
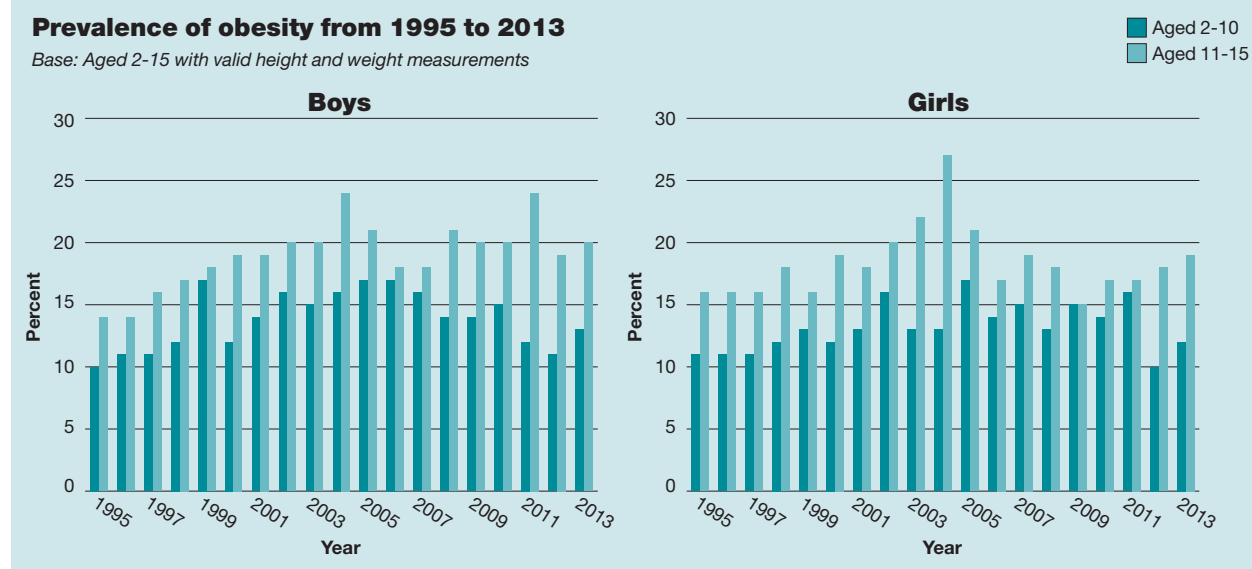


Figure 11M



## 11.6 Discussion

The findings presented in this chapter showed similar overall BMI for boys and girls aged 2-15. Mean BMI varied across age groups, being lower among younger children and increasing in older children. Consistent with previous years, children aged 11-15 were more likely to be overweight or obese than younger children aged 2-10.

As with previous HSE findings, inequalities in obesity prevalence were evident by equivalised household income for children. For both boys and girls, prevalence of obesity was around three times higher in the lowest income quintile than the highest quintile. This reflects the pattern among adults (see Chapter 10), with prevalence of obesity being higher in the lowest two income quintiles for both men and women. In 2013, obesity prevalence was also generally higher among children living in the more deprived areas of England. This disparity between higher and lower income families is a recognised issue amongst policy makers and has been acknowledged by the government's white paper *A Call to Action on Obesity in England*,<sup>10</sup> which set out to focus on combatting inequalities, and improving the health of the poorest as a matter of most immediate concern.

Trends over time show that there has been little significant change in the levels of obesity over the last few years among children aged 11-15, after steady increase between 1995 and the early 2000s. However, there has been a significant decrease in the proportion of children aged 2-10 that were obese, from 17% of both boys and girls in 2005 to 13% of boys and 12% of girls in 2013. Nevertheless, there remained a substantial proportion of children aged 8-15 – just under a quarter – who misjudged their weight, considering themselves to be about the right when in fact they were overweight or obese. Correspondingly, 29% of children who reported that they were trying to lose weight were neither overweight nor obese. These findings point towards the need for increased awareness and understanding of what a healthy weight is. Initiatives such as the Healthy Schools Programme<sup>44</sup> which includes a toolkit to help schools deliver information about health and healthy lifestyles, may play an important role in providing information on healthy choices to children.

Just as it is important for a child to be accurate in perceiving their own weight, accuracy among parents is similarly important, since they play an essential part in guiding their child's behaviours and attitudes towards healthy weight management.<sup>26,29</sup> According to previous studies,<sup>31,45</sup> parents of overweight and obese children often do not accurately perceive their child's weight status. Since 2011 parents interviewed in the HSE have been asked about their perceptions of their child's weight. Just under a quarter of parents of children aged 4-15 who thought their child was about the right weight had a child who was overweight or

obese. Although base sizes in the HSE are not large enough to detect different patterns between boys and girls, findings from previous studies have indicated that parents of obese and overweight boys were more likely to perceive their child's weight status inaccurately than parents of obese or overweight girls.<sup>46,47</sup> Information and guidance for parents is needed to improve understanding and lead to more accurate perceptions of their children's needs. Campaigns such as *Change4Life*<sup>9</sup> can play a role in this, providing parents with information about healthy eating and the importance of physical activity.

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## Tables

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### Notes on the tables

1. The group on which the figures in the table are based is stated at the upper left corner of the table.
2. The data in most tables have been weighted. See Volume 2, Chapter 7 of this report for more detail. Both unweighted and weighted sample sizes are shown at the foot of each table.
3. The following conventions have been used in tables:
  - no observations (zero value)
  - 0 non-zero values of less than 0.5% and thus rounded to zero
  - [ ] used to warn of small sample bases, if the unweighted base is less than 50. If a group's unweighted base is less than 30, data are normally not shown for that group.
4. Because of rounding, row or column percentages may not add exactly to 100%.
5. 'Missing values' occur for several reasons, including refusal or inability to answer a particular question; refusal to co-operate in an entire section of the survey (such as the nurse visit or a self-completion questionnaire); and cases where the question is not applicable to the participant. In general, missing values have been omitted from all tables and analyses.



Table 11.1

<b>Body mass index (BMI), by age and sex</b>						
<i>Aged 2-15 with valid height and weight measurements</i>						<i>2013</i>
BMI (kg/m <sup>2</sup> )	Age group					Total
	2-4	5-7	8-10	11-12	13-15	
<b>Boys</b>						
Mean	16.8	16.4	17.7	19.5	20.8	18.2
Standard error of the mean	0.18	0.18	0.28	0.48	0.39	0.15
5th percentile <sup>a</sup>	14.4	14.0	14.3	14.4	16.3	14.4
10th percentile	14.9	14.0	14.7	15.2	16.8	14.9
15th percentile	15.2	14.4	14.9	15.9	17.1	15.2
Median	16.5	16.0	16.9	19.0	19.6	17.2
85th percentile	18.0	18.0	19.9	23.1	24.3	21.5
90th percentile	18.4	18.8	21.9	24.1	25.2	23.1
95th percentile	19.5	20.1	24.8	28.2	30.1	25.0
<b>Girls</b>						
Mean	16.4	16.4	17.9	20.2	22.2	18.5
Standard error of the mean	0.15	0.19	0.25	0.42	0.37	0.18
5th percentile <sup>a</sup>	14.3	14.1	14.3	15.8	16.4	14.4
10th percentile	14.5	14.4	14.7	16.4	17.6	14.7
15th percentile	14.7	14.5	15.1	17.0	18.2	15.2
Median	16.2	16.0	17.3	19.6	21.3	17.5
85th percentile	17.9	18.5	21.1	23.0	26.4	22.0
90th percentile	18.4	19.0	21.8	23.9	28.1	23.7
95th percentile	19.1	20.4	23.4	29.8	30.8	25.9
<i>Bases (unweighted)</i>						
<i>Boys</i>	<i>158</i>	<i>152</i>	<i>163</i>	<i>105</i>	<i>148</i>	<i>726</i>
<i>Girls</i>	<i>154</i>	<i>151</i>	<i>150</i>	<i>113</i>	<i>157</i>	<i>725</i>
<i>Bases (weighted)</i>						
<i>Boys</i>	<i>142</i>	<i>153</i>	<i>159</i>	<i>102</i>	<i>171</i>	<i>727</i>
<i>Girls</i>	<i>145</i>	<i>148</i>	<i>140</i>	<i>108</i>	<i>148</i>	<i>689</i>

<sup>a</sup> Percentiles show a set of points within a scale from 1-100 which is divided into groups based on order of magnitude. For example, the group of those with a mean BMI that is equal to or less than the value of 5% of those who have valid height and weight measurements is expressed as the 5th percentile.

Table 11.2

**Overweight and obesity prevalence, by age and sex**

Aged 2-15 with valid height and weight measurements 2013

BMI status	Age group					Total
	2-4	5-7	8-10	11-12	13-15	
	%	%	%	%	%	%
<b>Boys</b>						
Overweight <sup>a,b</sup>	17	9	15	13	17	14
Obese <sup>a,b</sup>	9	14	16	26	17	16
<i>Overweight including obese</i>	25	23	31	39	34	30
<b>Girls</b>						
Overweight <sup>a,b</sup>	12	14	12	17	17	14
Obese <sup>a,b</sup>	9	11	16	16	22	15
<i>Overweight including obese</i>	22	25	28	33	39	29
<i>Bases (unweighted)</i>						
Boys	158	152	163	105	148	726
Girls	154	151	150	113	157	725
<i>Bases (weighted)</i>						
Boys	142	153	159	102	171	727
Girls	145	148	140	108	148	689

<sup>a</sup> Categories are mutually exclusive, i.e. overweight does not include those who are obese.

<sup>b</sup> Overweight was defined as at or above the 85th but below the 95th UK National BMI centile; obese was defined as at or above the 95th UK National BMI centile.

Table 11.3

**Body mass index (BMI), overweight and obesity prevalence, by equivalised household income and sex**

Aged 2-15 with valid height and weight measurements 2013

BMI (kg/m <sup>2</sup> ) and BMI status	Equivalised household income quintile				
	Highest	2nd	3rd	4th	Lowest
<b>Boys</b>					
Mean BMI	17.4	17.6	18.3	18.1	18.7
Standard error of the mean	0.28	0.31	0.39	0.35	0.38
Median BMI	16.7	16.7	17.1	17.3	17.5
% overweight <sup>a,b</sup>	10	12	10	16	16
% obese <sup>a,b</sup>	7	10	16	14	22
<i>% overweight including obese</i>	17	22	26	30	38
<b>Girls</b>					
Mean BMI	17.5	18.3	18.2	19.2	19.2
Standard error of the mean	0.32	0.30	0.30	0.43	0.49
Median BMI	16.6	17.4	17.2	18.0	17.8
% overweight <sup>a,b</sup>	11	14	12	23	14
% obese <sup>a,b</sup>	6	11	13	17	21
<i>% overweight including obese</i>	16	25	25	40	35
<i>Bases (unweighted)</i>					
Boys	83	122	133	112	180
Girls	100	119	139	127	154
<i>Bases (weighted)</i>					
Boys	77	120	137	114	182
Girls	92	107	136	126	146

<sup>a</sup> Categories are mutually exclusive, i.e. overweight does not include those who are obese.

<sup>b</sup> Overweight was defined as at or above the 85th but below the 95th UK National BMI centile; obese was defined as at or above the 95th UK National BMI centile.

Table 11.4

<b>Body mass index (BMI), overweight and obesity prevalence, by Index of Multiple Deprivation (IMD)<sup>a</sup> and sex</b>					
<i>Aged 2-15 with valid height and weight measurements</i>					<i>2013</i>
<b>BMI (kg/m<sup>2</sup>) and BMI status</b>	<b>IMD quintile</b>				
	Least deprived	2nd	3rd	4th	Most deprived
<b>Boys</b>					
Mean BMI	17.7	18.0	18.7	18.0	18.6
Standard error of the mean	0.28	0.29	0.43	0.32	0.37
Median BMI	16.9	17.2	17.3	17.0	17.5
% overweight <sup>b,c</sup>	14	15	17	8	16
% obese <sup>b,c</sup>	8	12	18	17	22
% overweight including obese	23	28	34	26	38
<b>Girls</b>					
Mean BMI	18.1	18.2	18.4	18.6	19.4
Standard error of the mean	0.27	0.37	0.30	0.34	0.56
Median BMI	17.2	17.4	17.7	17.5	17.9
% overweight <sup>b,c</sup>	10	11	16	17	17
% obese <sup>b,c</sup>	9	12	15	16	21
% overweight including obese	20	23	30	33	38
<i>Bases (unweighted)</i>					
<i>Boys</i>	<i>136</i>	<i>140</i>	<i>143</i>	<i>148</i>	<i>159</i>
<i>Girls</i>	<i>157</i>	<i>131</i>	<i>151</i>	<i>136</i>	<i>150</i>
<i>Bases (weighted)</i>					
<i>Boys</i>	<i>136</i>	<i>143</i>	<i>146</i>	<i>143</i>	<i>160</i>
<i>Girls</i>	<i>146</i>	<i>125</i>	<i>146</i>	<i>128</i>	<i>145</i>

<sup>a</sup> The Index of Multiple Deprivation 2010 (IMD) combines a number of indicators, chosen to cover a range of economic, social and housing issues, into a single deprivation score at the small area level in England.

<sup>b</sup> Categories are mutually exclusive, i.e. overweight does not include those who are obese.

<sup>c</sup> Overweight was defined as at or above the 85th but below the 95th UK National BMI centile; obese was defined as at or above the 95th UK National BMI centile.

Table 11.5

<b>Child's perception of own weight, by age and sex</b>			
<i>Aged 8-15</i>			<i>2013</i>
<b>Child's perception of own weight</b>	<b>Age group</b>		<b>Total</b>
	8-10	11-15	
	%	%	%
<b>Boys</b>			
About the right weight	60	56	58
Too heavy	6	13	11
Too light	11	10	10
Don't know	23	21	21
<b>Girls</b>			
About the right weight	52	53	52
Too heavy	6	20	15
Too light	5	4	4
Don't know	37	24	28
<i>Bases (unweighted)</i>			
<i>Boys</i>	<i>161</i>	<i>257</i>	<i>418</i>
<i>Girls</i>	<i>151</i>	<i>281</i>	<i>432</i>
<i>Bases (weighted)</i>			
<i>Boys</i>	<i>160</i>	<i>273</i>	<i>434</i>
<i>Girls</i>	<i>137</i>	<i>266</i>	<i>403</i>

Table 11.6

### Body mass index (BMI), overweight and obesity prevalence, by child's perception of own weight

Aged 8-15 with valid height and weight measurements

2013

BMI (kg/m <sup>2</sup> ) and BMI status	Child's perception of own weight		
	About the right weight	Too heavy	Too light
Mean BMI	18.8	26.2	16.3
Standard error of the mean	0.15	0.54	0.25
Median BMI	18.5	24.7	16.3
% neither overweight or obese	76	14	97
% overweight <sup>a,b</sup>	15	18	3
% obese <sup>a,b</sup>	8	68	-
% overweight including obese	24	86	3
<i>Bases (unweighted)</i>	424	102	52
<i>Bases (weighted)</i>	418	98	57

<sup>a</sup> Categories are mutually exclusive, i.e. overweight does not include those who are obese.

<sup>b</sup> Overweight was defined as at or above the 85th but below the 95th UK National BMI centile; obese was defined as at or above the 95th UK National BMI centile.

Table 11.7

### Parent perception of child's weight, by child's age and sex

Parents of children aged 4-15 with valid height and weight measurements

2013

Parent perception of child's weight	Mother's perception			Father's perception		
	Child's age group		Total	Child's age group		Total
	4-10	11-15		4-10	11-15	
	%	%	%	%	%	%
<b>Boys</b>						
About the right weight	86	72	80	88	82	85
Too heavy	4	14	8	2	9	5
Too light	10	13	12	9	9	9
<b>Girls</b>						
About the right weight	84	74	80	80	76	78
Too heavy	9	17	12	11	19	15
Too light	7	9	8	9	5	7
<i>Bases (unweighted)</i>						
<i>Boys</i>	300	209	509	193	126	319
<i>Girls</i>	300	217	517	196	143	339
<i>Bases (weighted)</i>						
<i>Boys</i>	300	217	517	164	118	282
<i>Girls</i>	282	205	487	162	120	282

Table 11.8

### Body mass index (BMI), overweight and obesity prevalence, by parent perception of child's weight, children aged 4-15

Parents of children aged 4-15 with valid height and weight measurements

2013

BMI (kg/m <sup>2</sup> ) and BMI status	Mother's perception			Father's perception		
	About the right weight	Too heavy	Too light	About the right weight	Too heavy	Too light
Mean BMI	18.0	25.3	16.4	17.8	[24.9]	[15.8]
Standard error of the mean	0.13	0.64	0.25	0.15	[0.66]	[0.30]
Median BMI	17.3	23.7	16.0	17.2	[24.6]	[15.3]
% neither overweight or obese	76	6	95	79	[5]	[98]
% overweight <sup>a,b</sup>	16	11	2	15	[14]	[0]
% obese <sup>a,b</sup>	9	83	3	6	[81]	[2]
% overweight including obese	24	94	5	22	[95]	[2]
<i>Bases (unweighted)</i>	693	81	81	433	48	45
<i>Bases (weighted)</i>	673	80	85	449	51	47

<sup>a</sup> Categories are mutually exclusive, i.e. overweight does not include those who are obese.

<sup>b</sup> Overweight was defined as at or above the 85th but below the 95th UK National BMI centile; obese was defined as at or above the 95th UK National BMI centile.

[ ] Results in brackets should be treated with caution because of the small base size.

Table 11.9

### Body mass index (BMI), overweight and obesity prevalence, by parent perception of child's weight, children aged 8-15

Parents of children aged 8-15 with valid height and weight measurements 2013

BMI (kg/m <sup>2</sup> ) and BMI status	Mother's perception			Father's perception		
	About the right weight	Too heavy	Too light	About the right weight	Too heavy	Too light
Mean BMI	19.0	26.4	16.9	18.6	[26.0]	[16.2]
Standard error of the mean	0.17	0.66	0.29	0.19	[0.65]	[0.38]
Median BMI	18.4	25.0	16.4	18.1	[25.5]	[15.9]
% neither overweight or obese	75	4	95	78	[6]	[97]
% overweight <sup>a,b</sup>	17	9	1	16	[14]	-
% obese <sup>a,b</sup>	8	87	4	6	[81]	[3]
% overweight including obese	25	96	5	22	[94]	[3]
Bases (unweighted)	436	68	64	278	40	33
Bases (weighted)	427	67	68	292	42	36

<sup>a</sup> Categories are mutually exclusive, i.e. overweight does not include those who are obese.

<sup>b</sup> Overweight was defined as at or above the 85th but below the 95th UK National BMI centile; obese was defined as at or above the 95th UK National BMI centile.

[ ] Results in brackets should be treated with caution because of the small base size.

Table 11.10

### Desire to change weight, by age and sex

Aged 8-15 2013

Desire to change weight	Age group		Total
	8-10	11-15	
	%	%	%
<b>Boys</b>			
Not trying to change weight	76	68	71
Trying to lose weight	13	24	20
Trying to gain weight	10	9	9
<b>Girls</b>			
Not trying to change weight	73	63	66
Trying to lose weight	20	33	29
Trying to gain weight	8	4	5
<b>Bases (unweighted)</b>			
Boys	163	254	417
Girls	151	282	433
<b>Bases (weighted)</b>			
Boys	162	271	433
Girls	137	266	404

Table 11.11

### Body mass index (BMI), overweight and obesity prevalence, by desire to change weight

Aged 8-15 with valid height and weight measurements 2012

BMI (kg/m <sup>2</sup> ) and BMI status	Desire to change weight		
	Not trying to change	Trying to lose weight	Trying to gain weight
Mean BMI	18.8	23.6	16.7
Standard error of the mean	0.15	0.31	0.35
Median BMI	18.2	22.9	16.4
% neither overweight or obese	76	29	92
% overweight <sup>a,b</sup>	13	24	5
% obese <sup>a,b</sup>	11	47	3
% overweight including obese	24	71	8
<b>Bases (unweighted)</b>			
	516	198	55
<b>Bases (weighted)</b>			
	516	186	56

<sup>a</sup> Categories are mutually exclusive, i.e. overweight does not include those who are obese.

<sup>b</sup> Overweight was defined as at or above the 85th but below the 95th UK National BMI percentile; obese was defined as at or above the 95th UK National BMI percentile.

Table 11.12

**Trends in body mass index (BMI), overweight and obesity prevalence among children aged 2-15, 1995-2013, by sex**

Aged 2-15 with valid height and weight measurements

1995-2013

BMI (kg/m <sup>2</sup> ) and BMI status	Survey year																			
	1995	1996	1997	1998	1999	2000	2001	2002	2003 <sup>a</sup>	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	
<b>Boys</b>																				
Mean	17.7	17.7	17.8	17.9	18.2	18.0	18.2	18.3	18.5	18.6	18.6	18.4	18.4	18.4	18.3	18.2	18.3	18.1	18.2	
Standard error of the mean	0.08	0.07	0.06	0.08	0.15	0.14	0.08	0.07	0.12	0.15	0.13	0.07	0.06	0.08	0.09	0.08	0.16	0.16	0.15	
Median	17.0	17.1	17.0	17.1	17.3	17.0	17.4	17.4	17.5	17.5	17.7	17.5	17.5	17.4	17.5	17.4	17.4	17.1	17.2	
% Overweight <sup>b,c</sup>	13	15	13	15	15	13	15	14	15	14	16	13	14	15	15	14	15	14	14	
% Obese <sup>b,c</sup>	11	12	13	13	17	15	16	17	17	19	18	18	17	17	16	17	17	14	16	
% Overweight including obese	24	27	26	28	32	27	31	31	32	33	35	31	31	31	31	31	31	28	30	
<b>Girls</b>																				
Mean	18.1	18.1	18.1	18.4	18.2	18.5	18.6	18.8	18.8	19.3	18.9	18.7	18.7	18.7	18.5	18.3	18.6	18.4	18.5	
Standard error of the mean	0.09	0.10	0.07	0.10	0.15	0.14	0.10	0.07	0.12	0.20	0.14	0.08	0.08	0.08	0.10	0.09	0.18	0.17	0.18	
Median	17.3	17.2	17.3	17.4	17.3	17.4	17.6	17.8	17.8	18.1	17.8	17.6	17.7	17.7	17.5	17.4	17.5	17.3	17.5	
% Overweight <sup>b,c</sup>	13	12	13	14	14	13	16	14	15	17	13	14	14	14	13	14	13	15	14	
% Obese <sup>b,c</sup>	12	12	13	14	14	14	15	17	16	18	19	15	16	15	15	15	16	14	15	
% Overweight including obese	26	24	26	28	28	27	31	32	32	35	32	29	31	29	28	29	28	28	29	
<b>Bases (unweighted)</b>																				
Boys	1697	1874	3275	1754	857	864	1490	3250	1417	635	1166	3029	3255	3030	1733	2303	678	664	726	
Girls	1672	1758	3288	1657	789	846	1532	3140	1416	578	1191	2950	3090	3068	1607	2219	660	657	725	
<b>Bases (weighted)</b>																				
Boys	1918	2130	3061	1980	977	875	1652	3744	1452	623	1102	2821	2885	2880	1526	2079	687	680	727	
Girls	1901	2013	3068	1872	950	841	1698	3634	1392	581	1091	2668	2792	2740	1464	2033	666	642	689	

<sup>a</sup> Data for all years have been weighted to correct for the probability of selection. From 2003, non-response weighting has also been applied.

<sup>b</sup> Categories are mutually exclusive, i.e. overweight does not include those who are obese.

<sup>c</sup> Overweight was defined as at or above the 85th but below the 95th UK National BMI centile; obese was defined as at or above the 95th UK National BMI centile.

Table 11.13

**Trends in body mass index (BMI), overweight and obesity prevalence among children aged 2-10, 1995-2013, by sex**

Aged 2-10 with valid height and weight measurements

1995-2013

BMI (kg/m <sup>2</sup> ) and BMI status	Survey year																			
	1995	1996	1997	1998	1999	2000	2001	2002	2003 <sup>a</sup>	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	
<b>Boys</b>																				
Mean	16.7	16.7	16.7	16.9	17.2	16.9	17.0	17.1	17.2	17.2	17.3	17.1	17.2	17.1	17.0	17.0	16.8	16.7	17.0	
Standard error of the mean	0.06	0.06	0.05	0.08	0.15	0.10	0.08	0.06	0.12	0.13	0.12	0.07	0.06	0.07	0.08	0.07	0.11	0.11	0.14	
Median	16.4	16.4	16.4	16.5	16.6	16.4	16.6	16.6	16.5	16.6	16.7	16.6	16.7	16.5	16.5	16.6	16.5	16.2	16.4	
% Overweight <sup>b,c</sup>	13	14	13	15	14	14	16	14	15	15	16	12	13	14	16	14	15	13	14	
% Obese <sup>b,c</sup>	10	11	11	12	17	12	14	16	15	16	17	17	16	14	14	15	12	11	13	
% Overweight including obese	23	25	25	27	31	26	30	29	31	31	34	30	30	28	30	30	27	24	26	
<b>Girls</b>																				
Mean	16.9	16.8	16.9	17	17	17	17.1	17.3	17.2	17.3	17.4	17.1	17.2	17.2	17.1	16.9	17.0	16.8	16.9	
Standard error of the mean	0.08	0.08	0.05	0.07	0.13	0.12	0.09	0.07	0.11	0.14	0.13	0.07	0.07	0.07	0.09	0.08	0.17	0.13	0.12	
Median	16.4	16.4	16.5	16.5	16.6	16.4	16.6	16.7	16.6	16.8	16.7	16.5	16.7	16.6	16.5	16.4	16.3	16.3	16.3	
% Overweight <sup>b,c</sup>	13	11	12	13	14	12	15	14	14	15	13	13	14	13	12	13	9	12	13	
% Obese <sup>b,c</sup>	11	11	11	12	13	12	13	16	13	13	17	14	15	13	15	14	16	10	12	
% Overweight including obese	23	22	23	25	27	24	27	30	27	28	30	27	29	26	27	27	24	23	25	
<b>Bases (unweighted)</b>																				
Boys	1113	1234	2159	1185	563	582	913	2036	864	404	707	1875	2006	1863	1086	1466	458	432	473	
Girls	1114	1178	2222	1082	535	537	980	1948	869	338	731	1845	1921	1909	1020	1453	453	424	455	
<b>Bases (weighted)</b>																				
Boys	1261	1418	2005	1336	633	570	1035	2364	878	379	664	1737	1766	1762	934	1293	434	415	454	
Girls	1266	1365	2081	1215	628	523	1094	2290	857	346	674	1635	1746	1701	916	1298	420	394	433	

<sup>a</sup> Data for all years have been weighted to correct for the probability of selection. From 2003, non-response weighting has also been applied.

<sup>b</sup> Categories are mutually exclusive, i.e. overweight does not include those who are obese.

<sup>c</sup> Overweight was defined as at or above the 85th but below the 95th UK National BMI centile; obese was defined as at or above the 95th UK National BMI centile.

Table 11.14

**Trends in body mass index (BMI), overweight and obesity prevalence among children aged 11-15, 1995-2013, by sex**

Aged 11-15 with valid height and weight measurements

1995-2013

BMI (kg/m <sup>2</sup> ) and BMI status	Survey year																			
	1995	1996	1997	1998	1999	2000	2001	2002	2003 <sup>a</sup>	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	
<b>Boys</b>																				
Mean	19.7	19.7	19.7	19.9	20.1	19.9	20.1	20.3	20.5	20.8	20.5	20.3	20.2	20.5	20.3	20.3	21.0	20.2	20.3	
Standard error of the mean	0.15	0.16	0.11	0.15	0.24	0.24	0.16	0.12	0.19	0.27	0.23	0.12	0.11	0.12	0.15	0.14	0.29	0.29	0.30	
Median	19.1	19.2	19.1	19.1	19.2	19.2	19.4	19.7	19.7	20.2	19.4	19.7	19.6	19.6	19.5	19.6	20.2	19.4	19	
% Overweight <sup>b,c</sup>	14	15	13	15	15	10	14	15	14	13	15	15	16	16	14	14	15	15	15	
% Obese <sup>b,c</sup>	14	14	16	17	18	19	19	20	20	24	21	18	18	21	20	20	24	19	20	
% Overweight including obese	28	29	29	31	33	29	33	35	35	37	36	33	34	36	34	34	38	34	36	
<b>Girls</b>																				
Mean	20.6	20.8	20.7	21.0	20.5	21.0	21.2	21.2	21.5	22.2	21.4	21.1	21.1	21.2	20.8	20.8	21.3	20.9	21.3	
Standard error of the mean	0.16	0.18	0.13	0.17	0.28	0.24	0.19	0.13	0.20	0.33	0.21	0.13	0.13	0.11	0.19	0.15	0.29	0.27	0.32	
Median	19.9	20.2	20.1	20.4	20.1	20.6	20.6	20.6	20.8	21.3	20.8	20.5	20.4	20.3	20.1	20.2	20.4	20.4	20	
% Overweight <sup>b,c</sup>	14	14	16	16	14	15	18	15	17	20	14	17	15	16	15	17	19	18	17	
% Obese <sup>b,c</sup>	16	16	16	18	16	19	18	20	22	27	21	17	19	18	15	17	17	19	19	
% Overweight including obese	30	30	32	34	29	33	36	35	39	46	36	34	34	34	31	33	36	37	36	
<b>Bases (unweighted)</b>																				
Boys	584	640	1116	569	294	282	577	1214	553	231	459	1154	1249	1167	647	837	220	232	253	
Girls	558	580	1066	575	254	309	552	1192	547	240	460	1105	1169	1159	587	766	207	233	270	
<b>Bases (weighted)</b>																				
Boys	658	713	1056	644	343	305	617	1380	573	244	438	1084	1120	1117	593	786	253	265	274	
Girls	635	648	987	657	322	318	604	1343	535	235	417	1033	1046	1039	548	734	245	248	256	

<sup>a</sup> Data for all years have been weighted to correct for the probability of selection. From 2003, non-response weighting has also been applied.

<sup>b</sup> Categories are mutually exclusive, i.e. overweight does not include those who are obese.

<sup>c</sup> Overweight was defined as at or above the 85th but below the 95th UK National BMI centile; obese was defined as at or above the 95th UK National BMI centile.