



Health & Social Care
Information Centre



National Child Measurement Programme:

England, 2014/15 school year

Published 26 November 2015



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This report may be of interest to members of the public, policy officials and other stakeholders to make local and national comparisons and to monitor the quality and effectiveness of services.

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- meet identified user needs;
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- are produced according to sound methods; and
- are managed impartially and objectively in the public interest.

Once statistics have been designated as National Statistics it is a statutory requirement that the Code of Practice shall continue to be observed.

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

Executive Summary

- 1,141,859 valid measurements were received for children attending state-maintained schools in England – approximately 95 per cent of those eligible¹.
- In reception:
 - The prevalence of obese children (9.1%) was lower than 2013/14 (9.5%) and 2006/07 (9.9%).
 - Over a fifth (21.9%) of the children measured were either overweight or obese. This was lower than in 2013/14 (22.5%) and 2006/07 (22.9%).
- In year 6:
 - The prevalence of obese children was similar to 2013/14 (19.1% in both collection years) but higher than in 2006/07² (17.5%).
 - Around a third (33.2%) of the children measured were either overweight or obese. This was lower than 2013/14 (33.5%) but higher than in 2006/07 (31.6%).
- By deprivation:
 - Obesity prevalence for children living in the most deprived areas was double that of those living in the least deprived areas³.
 - The obesity prevalence among reception year children living in the most deprived areas was 12.0 per cent compared with 5.7 per cent among those living in the least deprived areas. In year 6 these figures were 25.0 and 11.5 respectively.
 - The difference in obesity prevalence between children attending schools⁴ in the most and least deprived areas has increased over time. In 2014/15 the difference for reception year was 5.5 percentage points compared to 4.6 percentage points in 2007/08. The equivalent figures for year 6 were 12.0 and 8.9 percentage points.
- By geography:
 - Obesity prevalence varied by local authority⁵. For reception this ranged from 4.2 per cent in Richmond upon Thames to 13.6 per cent in Newham.
 - In year 6 the range was from 10.5 per cent in Richmond upon Thames, to 27.8 per cent in Southwark.

¹ Further information on which children were eligible for inclusion is provided in the National Child Measurement Programme Operational Guidance: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/463929/NCMP_Operational_Guidance_21015_16.pdf

² It is likely that year 6 obesity prevalence in the first years of the NCMP (2006/07 to 2008/09) were underestimates due to low participation. This, and the impact of other improvements in data quality, should be considered when making comparisons over time. More details in annex B.

³ As measured by the Index of Multiple Deprivation 2010 deciles.

⁴ Obesity prevalence by deprivation was not published for the 2006/07 collection year so a comparison has been made with 2007/08.

⁵ This is based on the upper tier local authority that the child lived in.

1 Introduction

1.1 Background

Established in 2005/06, the National Child Measurement Programme (NCMP) records height and weight measurements of children in reception (aged 4–5 years) and year 6 (aged 10–11 years) in state-maintained schools⁶ in England.

The programme now holds nine years of reliable data (2006/07 is the first year that the data are considered to be robust due to the low participation in 2005/06), and annually measures over one million children. Details of how data are collected and validated are available in annex B.

Public Health England (PHE) has responsibility for national oversight of the programme, and on its behalf, the central collation and analysis of the NCMP data is coordinated by the Health and Social Care Information Centre (HSCIC). Local Authorities have a statutory responsibility to deliver the National Child Measurement Programme.

1.2 Purpose

The NCMP provides robust data for the child excess weight indicators in the Public Health Outcomes Framework, and is a key element of the Government's approach to tackling child obesity.

The data are regarded as a valuable tool for driving action to tackle child obesity both locally and nationally. Through provision of a child's result to their parents, the NCMP also provides local areas with an opportunity to raise parents' awareness of child obesity as an issue, raise parents' awareness of their own child's weight status and potential health impacts, and provides an opportunity to offer further support to families to make healthy lifestyle changes.

1.3 Report content

This report contains high-level analyses of the prevalence of the BMI classifications ('underweight', 'healthy weight', 'overweight', 'obese' and 'combined overweight and obese') for children measured in state-maintained schools in England in the 2014/15 school year. Annex C gives details on how BMI classifications have been assigned and prevalence has been calculated.

Breakdowns are given by: child age and sex; local authority and region; levels of deprivation; urban/rural classification; ethnicity and ONS area classification. The report also contains comparisons over time where appropriate.

Local authority data is presented in three ways: based on the local authority that provided the data; where the child lived; and where the child went to school. Further details on local authority based data, including guidance on which breakdowns to use for different situations, are available in annex G.

A non-identifiable version of the 2014/15 dataset will be published on the HSCIC website in early 2016.

⁶ The NCMP includes all state schools in England (unless the school declined to participate or if the responsible organisation did not measure in that school for other reasons). Any data collected from independent or special schools is excluded from this analysis. See "Coverage" in annex B for more details.

1.4 Comparison of prevalence: considerations

Comparisons of prevalence estimates between groups and over time have been statistically tested to determine whether differences are genuine (i.e. statistically significant) or the result of random natural variation.

In the tables accompanying this report, 95 per cent confidence intervals have been provided around the prevalence estimates and should be considered when interpreting results. When the confidence intervals of prevalence estimates do not overlap the differences are considered as statistically significantly different. Annex E provides further details.

When the confidence intervals overlap the differences may still be statistically significantly different. In these cases significance tests have been used to check whether the differences between prevalence estimates are statistically significantly different. Annex F provides further details.

Where prevalence estimates are found to be statistically significantly different they are described with terms such as “higher”, “lower”, “increase” or “decrease”. Where no statistically significant difference was found terms such as “similar” or “no change” have been used.

When comparing prevalence figures it is also important to consider how participation and data quality might affect the calculated prevalence figures. Further details are available in annex D.

2 Age and sex

Table 1 shows the prevalence of the BMI classifications by school year and sex in England for 2014/15.

Figures 1 and 2 present the same data⁷ from 2006/07⁸ to 2014/15.

Key findings are summarised below.

2.1 Age

Reception:

- The prevalence of obese children (9.1%) was lower than 2013/14 (9.5%) and 2006/07 (9.9%).
- Over a fifth (21.9%) of the children measured were either overweight or obese. This was lower than in 2013/14 (22.5%) and 2006/07 (22.9%).
- The prevalence of underweight children (1.0%) was similar to 2013/14 (0.9%) but lower than in 2006/07 (1.3%).

Year 6:

- The prevalence of obese children was similar to 2013/14 (19.1% in both collection years) but higher than in 2006/07 (17.5%).
- Around a third (33.2%) of the children measured were either overweight or obese. This was lower than 2013/14 (33.5%) but higher than in 2006/07 (31.6%).
- The prevalence of underweight children (1.42%) was higher than 2013/14 (1.36%) but lower than in 2006/07 (1.5%).

Comparisons of reception with year 6 measurements:

- The percentage of obese children in year 6 (19.1%) was over double that of reception year children (9.1%).
- The prevalence of underweight children was higher in year 6 (1.4%) than in reception (1.0%).
- The prevalence of healthy weight children was lower in year 6 (65.3%) than in reception (77.2%).

⁷ The prevalence of healthy weight children is not shown in any of the charts as it is much higher than the other categories, which would affect the scale of the charts making it difficult for differences to be seen in the other categories.

⁸ It is likely that year 6 obesity prevalence in the first years of the NCMP (2006/07 to 2008/09) were underestimates due to low participation. This should be considered when making comparisons over time. More details in annex B.

2.2 Sex

- The prevalence of obesity was higher among boys than girls in both school years.
 - In reception, 9.5 per cent of boys and 8.7 per cent of girls were classified as obese.
 - In year 6 the percentages were 20.7 per cent and 17.4 per cent respectively.
- In both reception and year 6 a higher percentage of girls were of a healthy weight than boys.
 - In reception 78.1 per cent of girls and 76.2 per cent of boys were a healthy weight.
 - In year 6 this was 66.9 per cent and 63.9 per cent respectively.
- The prevalence of underweight was higher for boys in reception and girls in year 6.
 - In reception 0.7 per cent of girls and 1.2 per cent of boys were underweight.
 - In year 6 this was 1.6 per cent and 1.2 per cent respectively.

Table 1: Prevalence of the BMI classifications, by school year and sex, England 2014/15

		BMI Category				Overweight and obese combined
		Underweight	Healthy Weight	Overweight	Obese	
Reception	Boys	1.2	76.2	13.1	9.5	22.6
	Girls	0.7	78.1	12.5	8.7	21.2
	Both	1.0	77.2	12.8	9.1	21.9
Year 6	Boys	1.2	63.9	14.2	20.7	34.9
	Girls	1.6	66.9	14.1	17.4	31.5
	Both	1.4	65.3	14.2	19.1	33.2

Source: Health and Social Care Information Centre

Notes:

1. Confidence intervals are provided in the Excel tables and should be considered when interpreting results. Further information on confidence intervals is available in annex E

Figure 1: Prevalence⁹ of the BMI classifications, reception year, 2006/07 to 2014/15

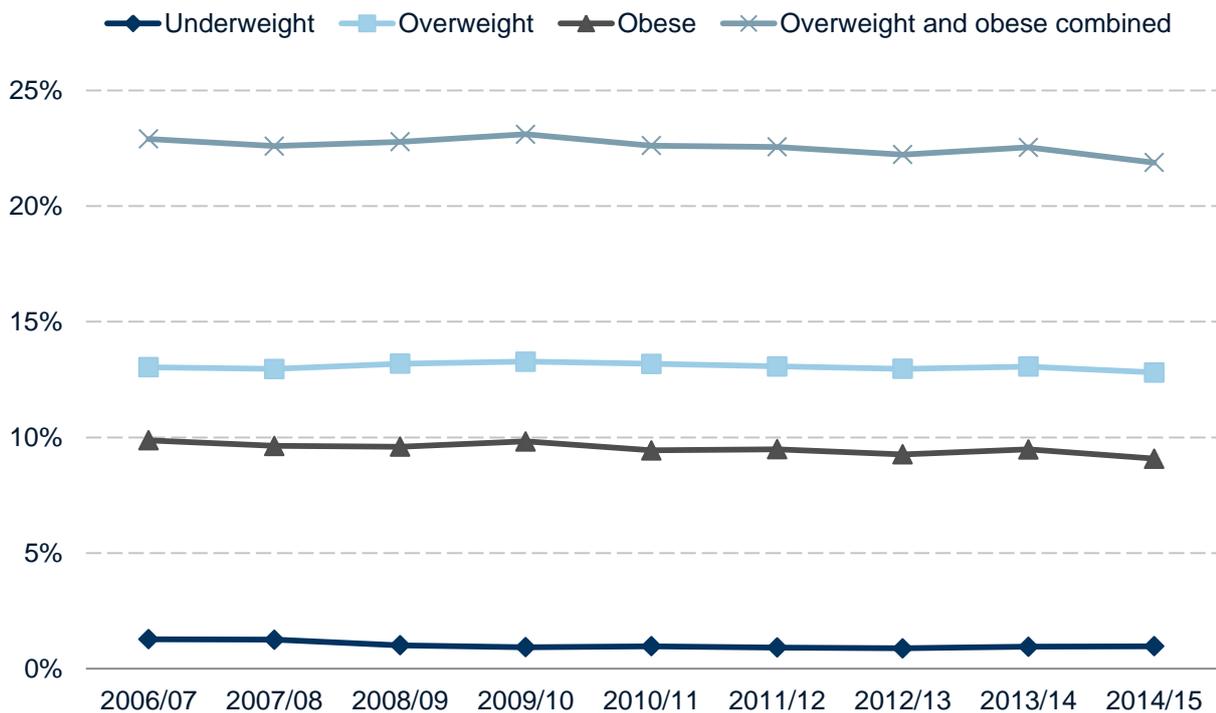
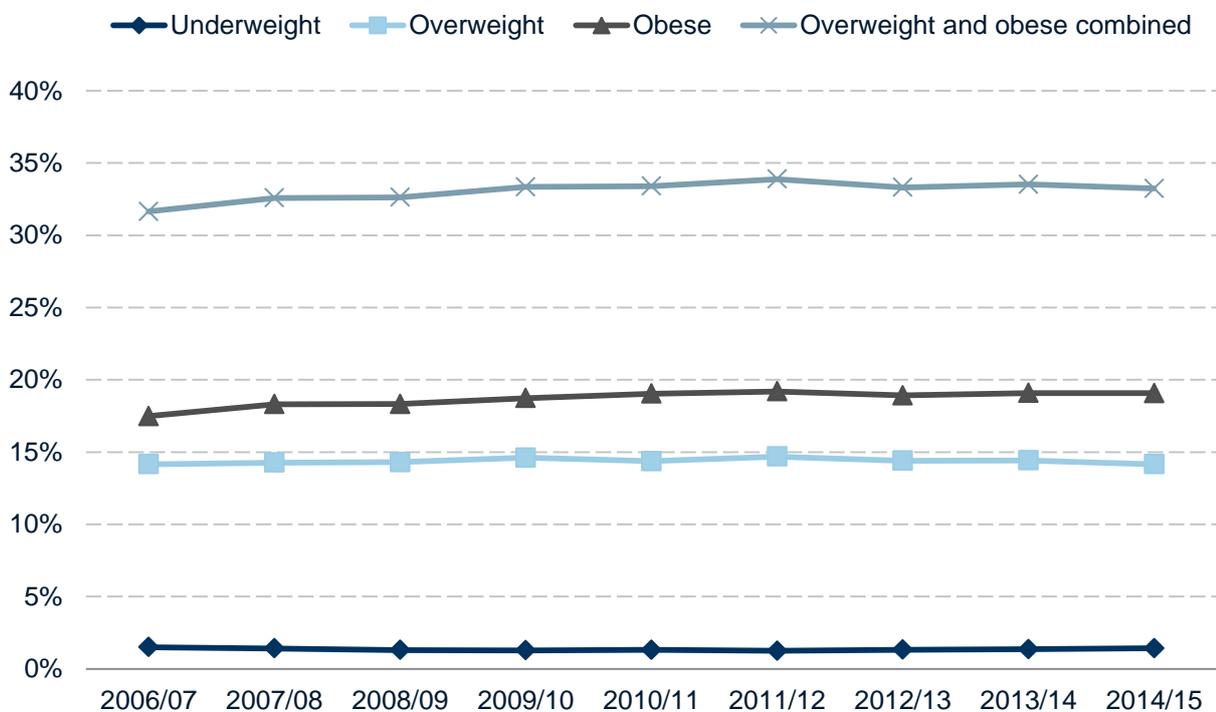


Figure 2: Prevalence⁹ of the BMI classifications, year 6, 2006/07¹⁰ to 2014/15



⁹ Confidence intervals are provided in the Excel tables and should be considered when interpreting results. Further information on confidence intervals is available in annex E.

¹⁰ It is likely that year 6 obesity prevalence in the first years of the NCMP (2006/07 to 2008/09) were underestimates due to low participation. This should be considered when making comparisons over time. More details in annex B.

3 Geography

3.1 Region

The prevalence of the underweight and obese children in reception and year 6 for 2014/15, by the region in which the child lived¹¹, is shown in Figures 3 and 4 respectively.

- Regions with high obesity prevalence or high underweight prevalence in reception year also tended to have high obesity prevalence or high underweight prevalence in year 6.
- The South East, South West, East of England and East Midlands had lower obesity prevalence than the national average in both school years while the West Midlands, London and the North East had higher obesity prevalence in both school years¹².
- The North East and South West had lower underweight prevalence in both school years than the national average. London and the West Midlands had higher underweight prevalence in reception while London and East Midlands had higher underweight prevalence in year 6.

¹¹ All geographic analyses presented in this report are based on where the child lived unless otherwise stated

¹² Statistically significant when compared to the equivalent England figures

Figure 3: Prevalence¹³ of underweight and obese children in reception, by region, England, 2014/15

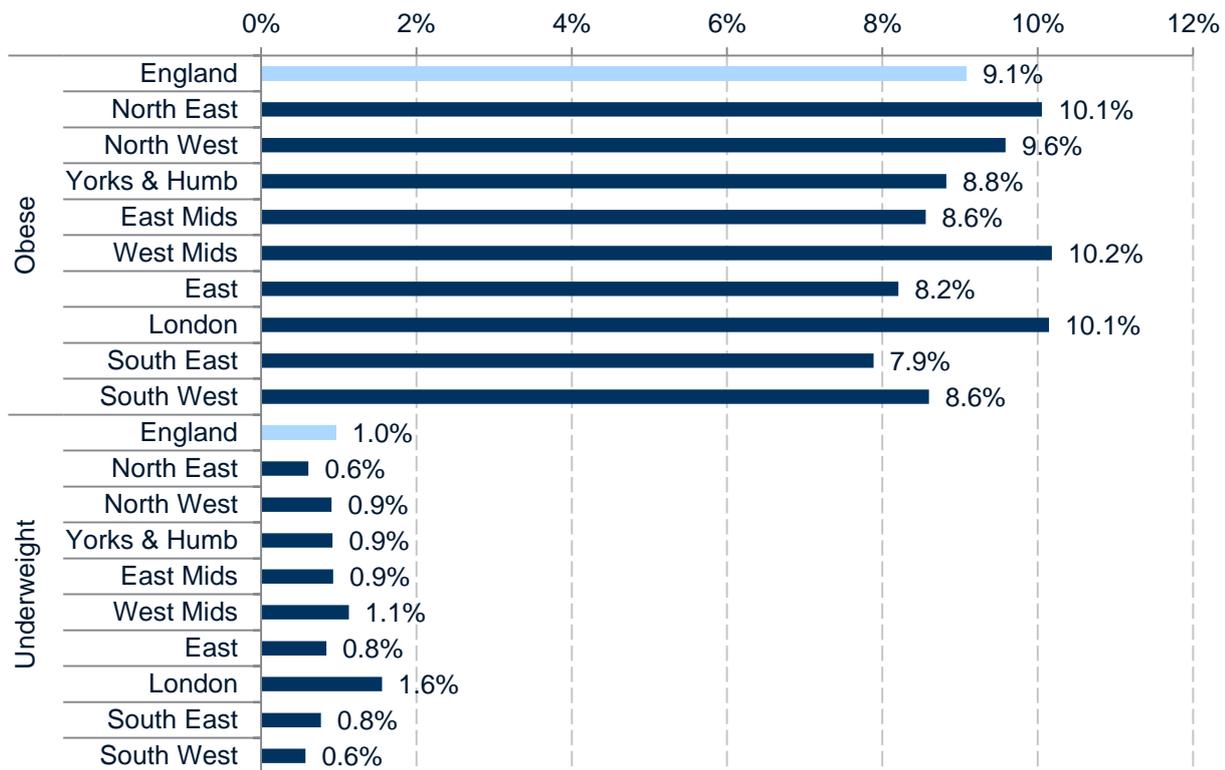
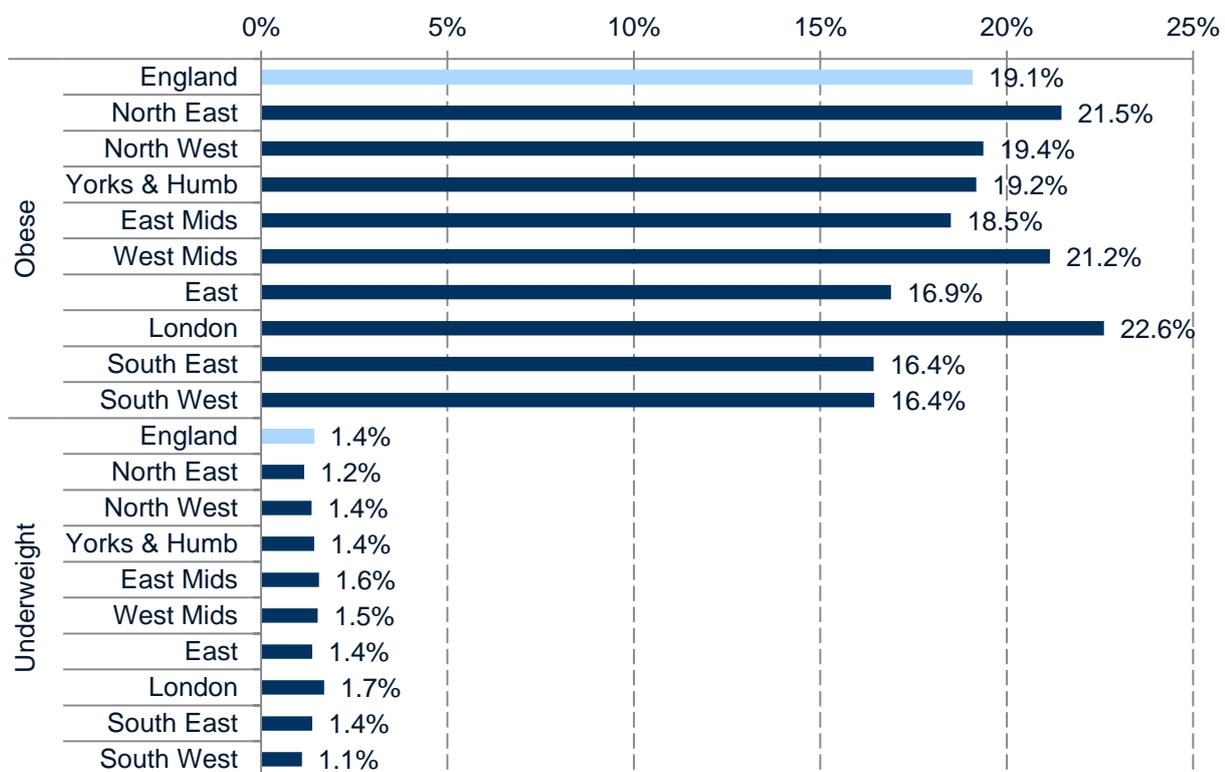


Figure 4: Prevalence¹³ of underweight and obese children in year 6, by region, England, 2014/15



¹³ Confidence intervals are provided in the Excel tables and should be considered when interpreting results. Further information on confidence intervals is available in annex E.

3.2 Local authority

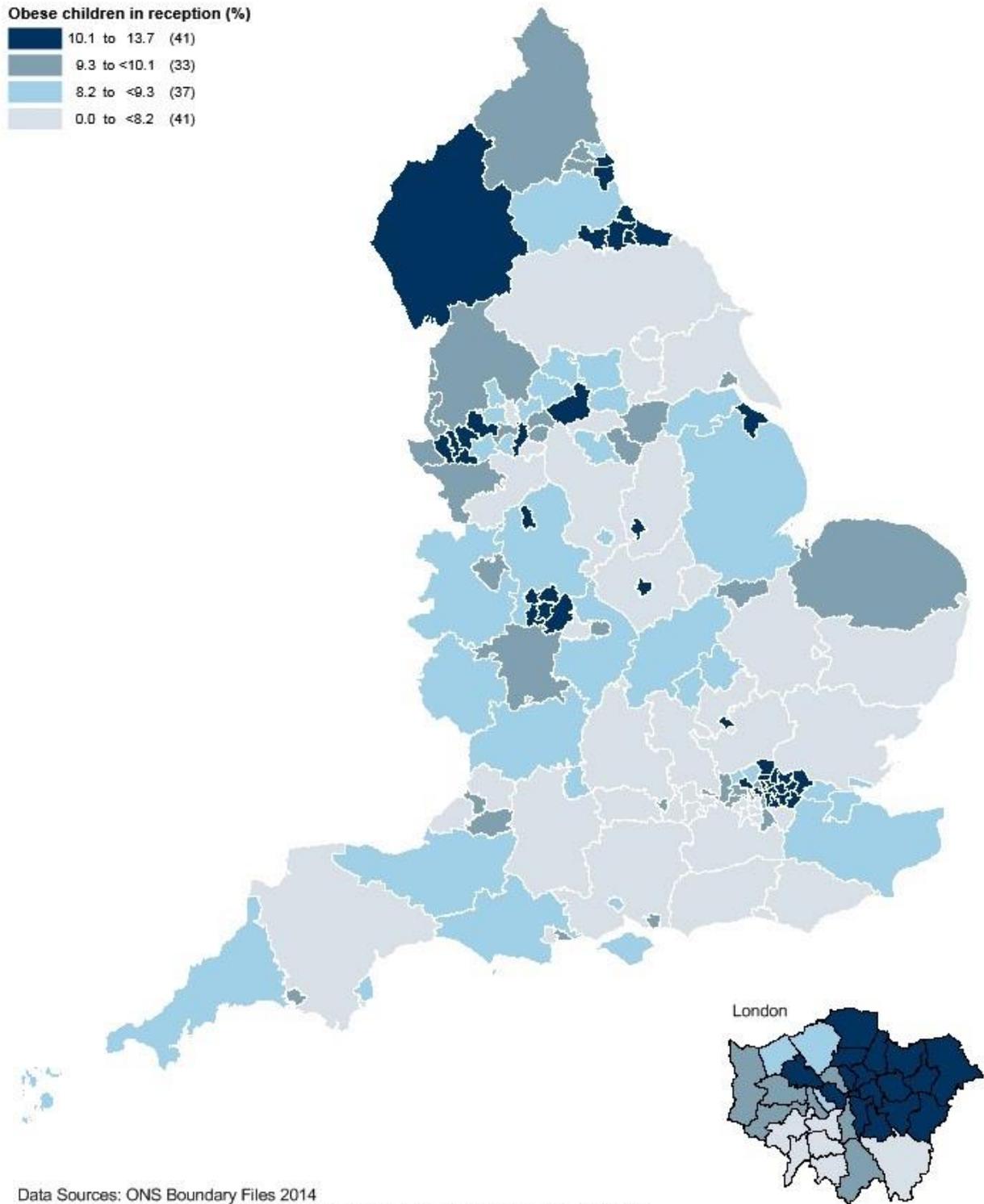
Local authority data is presented in the Excel tables in three ways: by the upper tier local authority who submitted the data (Online Table 2); by the upper and lower tier local authority where the child attended school (Online Table 3A) and by the upper and lower tier local authority in which child lived (Online Table 3B). Annex G provides guidance on which breakdowns to use for different situations.

Figures 5 and 6 show obesity prevalence by school year, based upon the upper tier local authority in which the child lived.

Key findings are summarised below.

- Obesity prevalence varied by local authority. For reception this ranged from 4.2 per cent in Richmond upon Thames to 13.6 per cent in Newham.
- In year 6 the range was from 10.5 per cent in Richmond upon Thames, to 27.8 per cent in Southwark.

Figure 5: Prevalence of obese children in reception, by local authority in which the child lived, England, 2014/15

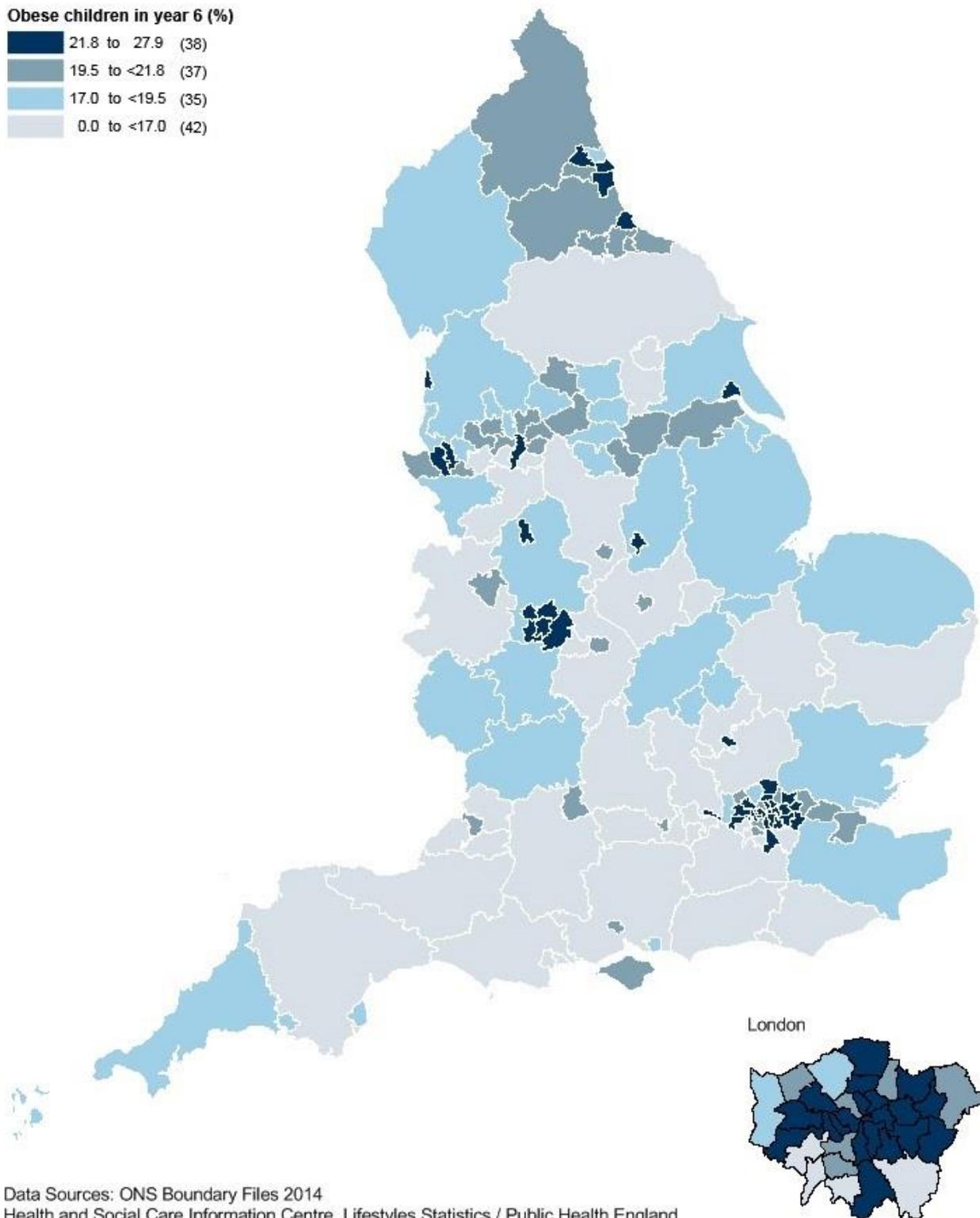
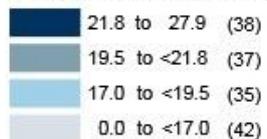


Data Sources: ONS Boundary Files 2014
Health and Social Care Information Centre, Lifestyles Statistics / Public Health England

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Figure 6: Prevalence of obese children in year 6, by local authority in which the child lived, England, 2014/15

Obese children in year 6 (%)



Data Sources: ONS Boundary Files 2014
Health and Social Care Information Centre, Lifestyles Statistics / Public Health England

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4 Deprivation

The prevalence of the BMI classifications in 2014/15 by school year and the 2010 Index of Multiple Deprivation (IMD)¹⁴ decile is presented in the Excel tables in two ways: based on the postcode of the child (Online Table 6A) and based on the postcode of the child's school (Online Table 6B).

Figures 7 and 8 show, for reception and year 6 respectively, the prevalence of the BMI classifications by IMD decile based on the postcode of the child.

Key findings in 2014/15:

- As in previous years there was a strong relationship between deprivation and obesity prevalence for children in both school years with obesity prevalence increasing as deprivation increased.
 - The obesity prevalence among reception year children living in the most deprived areas was 12.0 per cent compared with 5.7 per cent among those living in the least deprived areas.
 - Similarly, obesity prevalence among year 6 children living in the most deprived areas was 25.0 per cent compared with 11.5 per cent among those living in the least deprived areas.
- There is also a relationship between the proportion of children classified as underweight and deprivation.
 - 1.2 per cent of children in reception living in the most deprived areas were classified as underweight compared to 0.8 per cent in the least deprived areas.
 - 1.6 per cent of children in year 6 living in the most deprived areas were classified as underweight compared to 1.4 per cent in the least deprived areas.

Figures 9 and 10 present obesity prevalence for the most and least deprived IMD deciles from 2007/08¹⁵ to 2014/15, for reception and year 6 respectively. These charts use IMD decile based on the postcode of the child's school for comparability purposes¹⁶ and the gap between the most and least deprived deciles is highlighted.

Key findings:

- Since 2007/08 the difference in obesity prevalence between children attending schools in the most and least deprived areas has increased:
 - The difference in obesity prevalence between children attending schools in the most and least deprived areas has increased over time. In 2014/15 the difference for

¹⁴ The Index of Multiple Deprivation is a local measure deprivation in England. More information on the IMD is available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/6871/1871208.pdf. The new 2015 Indices of Deprivation published on 30 September 2015 were not available early enough to be used in this report.

¹⁵ Obesity prevalence by deprivation was not published for the 2006/07 collection year so a comparison has been made with 2007/08.

¹⁶ In the earlier years of the NCMP the data quality of child postcodes was not as high as it is now making comparisons over time potentially misleading. Therefore it is better to use school postcodes for comparisons over a long period as these have always been provided.

reception year was 5.5 percentage points compared to 4.6 percentage points in 2007/08.

- The equivalent figures for year 6 were 12.0 and 8.9 percentage points

Figure 7: Prevalence¹⁷ of the BMI classifications, reception, by child residence 2010 IMD decile, England, 2014/15

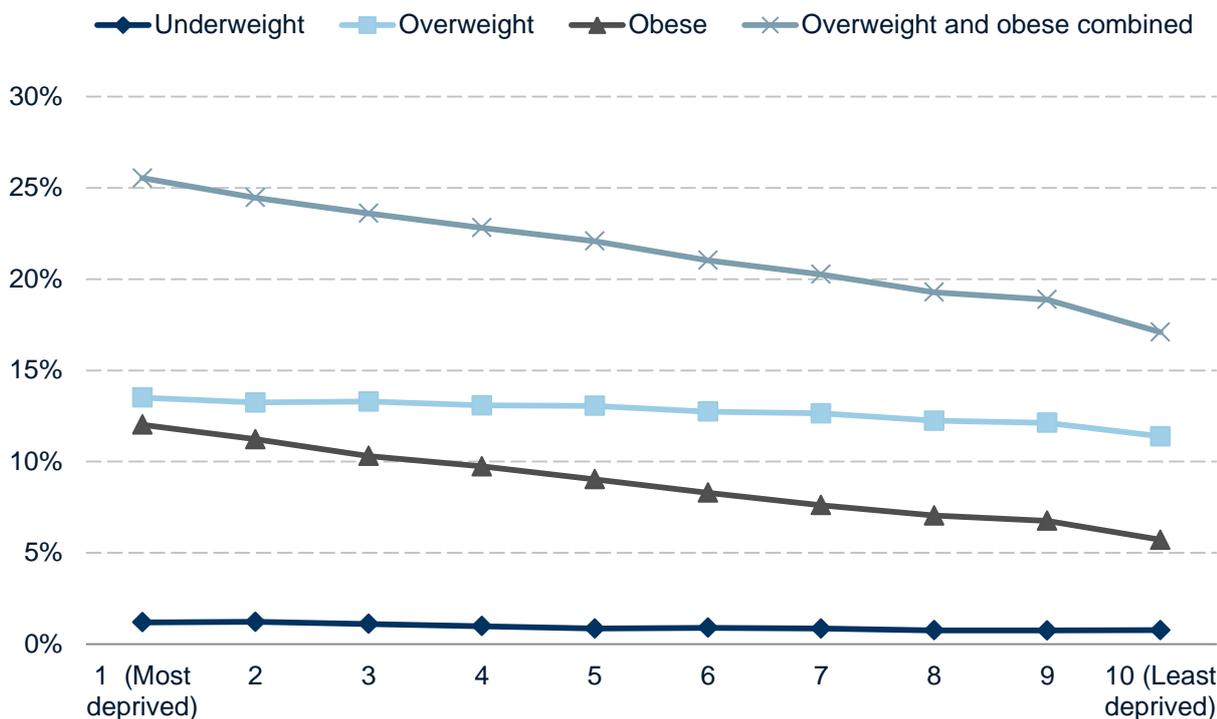
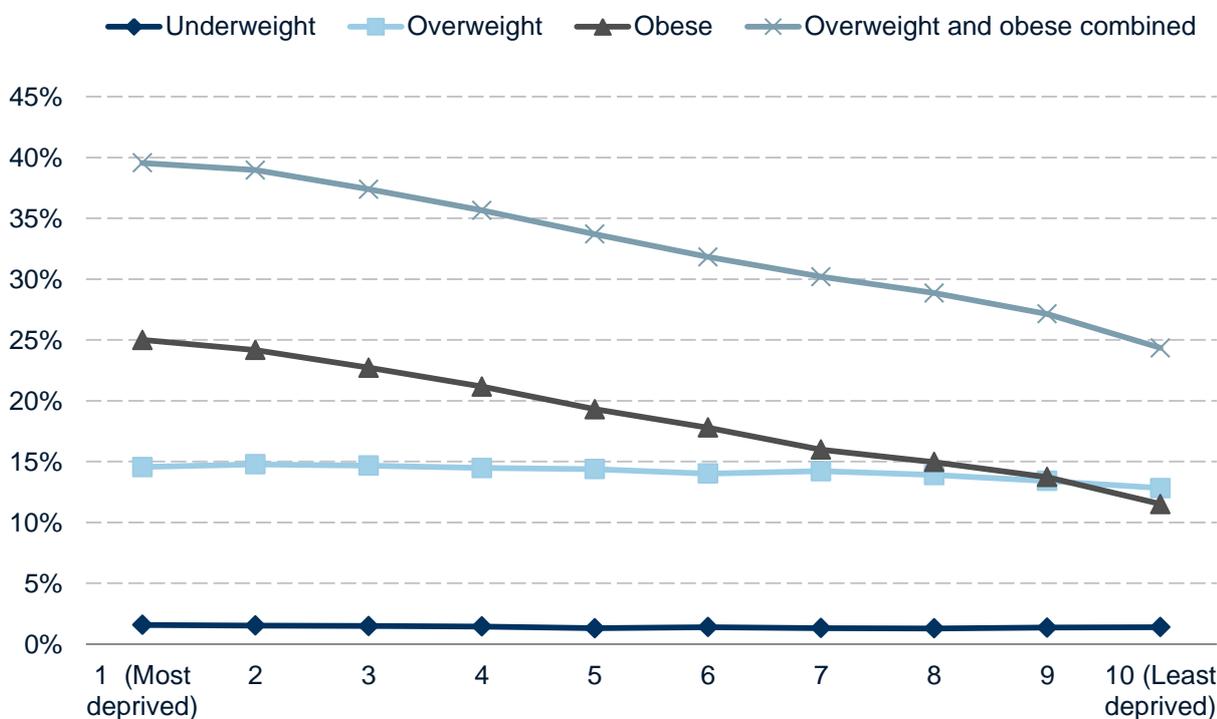


Figure 8: Prevalence¹⁷ of the BMI classifications, year 6, by child residence 2010 IMD decile, England, 2014/15



¹⁷ Confidence intervals are provided in the Excel tables and should be considered when interpreting results. Further information on confidence intervals is available in annex E.

Figure 9: Prevalence of obese children in reception for the least and most deprived IMD deciles based on school postcode, England, 2007/08 to 2014/15

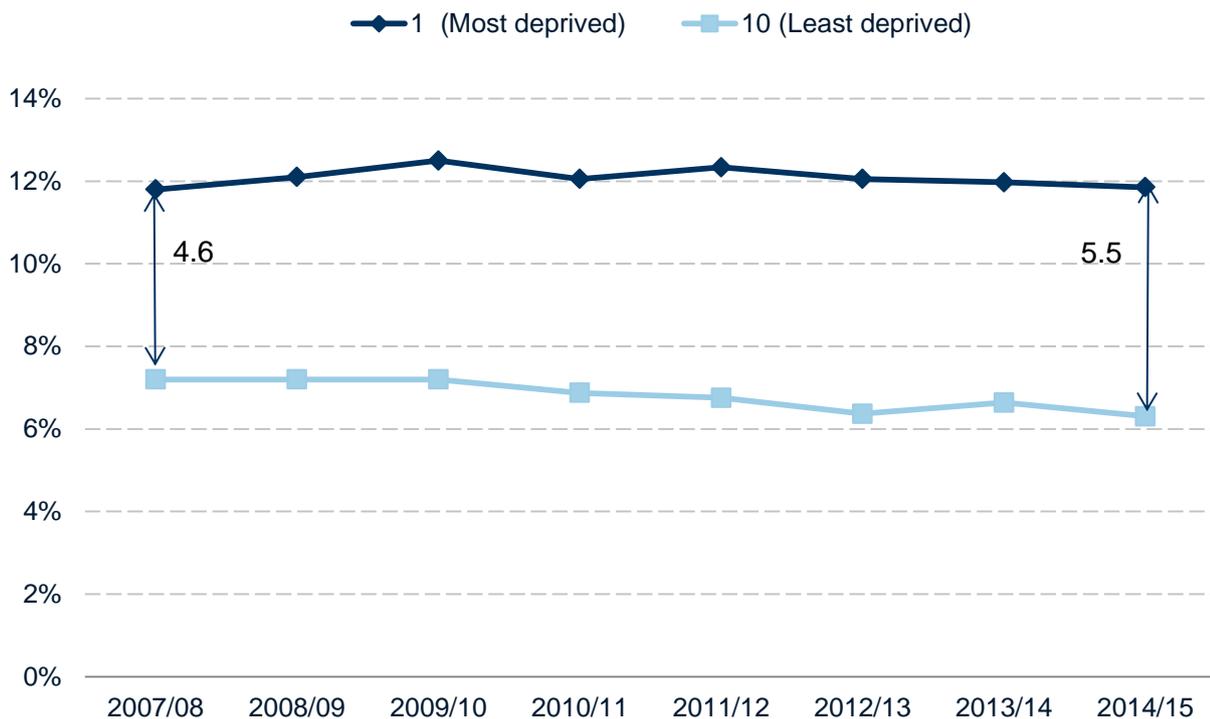
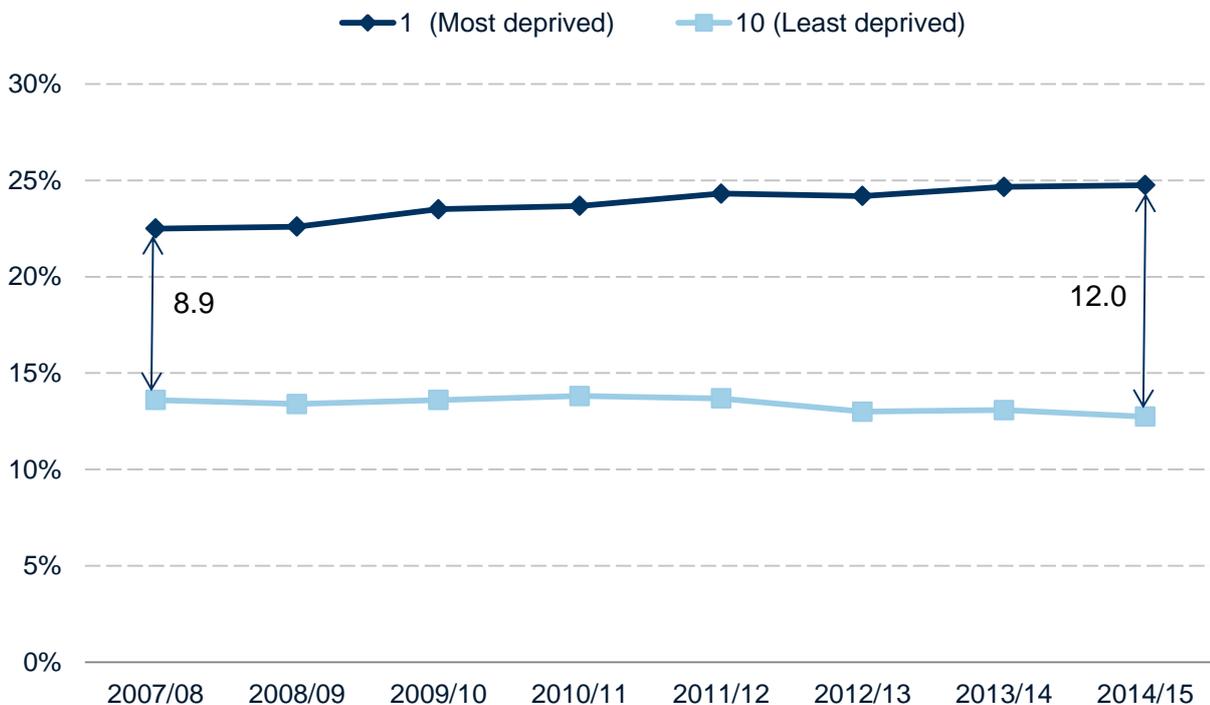


Figure 10: Prevalence of obese children in year 6 for the least and most deprived IMD deciles based on school postcode, England, 2007/08 to 2014/15



5 Rurality

The prevalence of the BMI classifications in 2014/15 by school year and rural/urban classification¹⁸ is presented in the Excel tables by postcode of the child's residence (Online Table 5A) and by postcode of the child's school (Online Table 5B).

The prevalence of underweight and obese children in reception and year 6 in 2014/15, by rural/urban classification, is shown in figures 11 and 12 respectively. These charts and the key findings use rural/urban classification based on the postcode of the child's residence.

Key findings:

- As in previous years, obesity prevalence was significantly higher in urban areas than in rural areas for each age group.
 - The obesity prevalence among reception children living in urban areas was 9.4 per cent compared with 8.0 per cent and 7.2 per cent of those living in town areas and village areas respectively.
 - Similarly, obesity prevalence among year 6 children living in urban areas was 19.9 per cent compared with 16.0 per cent and 14.8 per cent of those living in town areas and village areas respectively.
- The prevalence of underweight children was significantly higher in urban areas than in rural areas for both school years.
 - In reception, 1.0 per cent of children in urban areas were underweight compared to 0.6 per cent of those living in town areas and village areas.
 - In year 6 these percentages were 1.5 per cent, 1.2 per cent and 1.3 per cent respectively.

The PHE Obesity K&I's reports in 2006/07^a and 2007/08^b show that confounding factors exist, and that variation in child obesity prevalence between urban and rural areas can possibly be explained by differences in the degree of deprivation and the ethnic mix in such areas.

¹⁸ This classification defines areas through two measures: settlement form and sparsity. The analyses in this report have combined 'sparse' with 'less sparse' so classifications are purely based on settlement form. Further details are available at: www.ons.gov.uk/ons/guide-method/geography/products/area-classifications/rural-urban-definition-and-la/rural-and-urban-statistics-guidance-notes.pdf

Figure 11: Prevalence¹⁹ of underweight and obese children in reception, by rural/urban classification of child residence, England, 2014/15

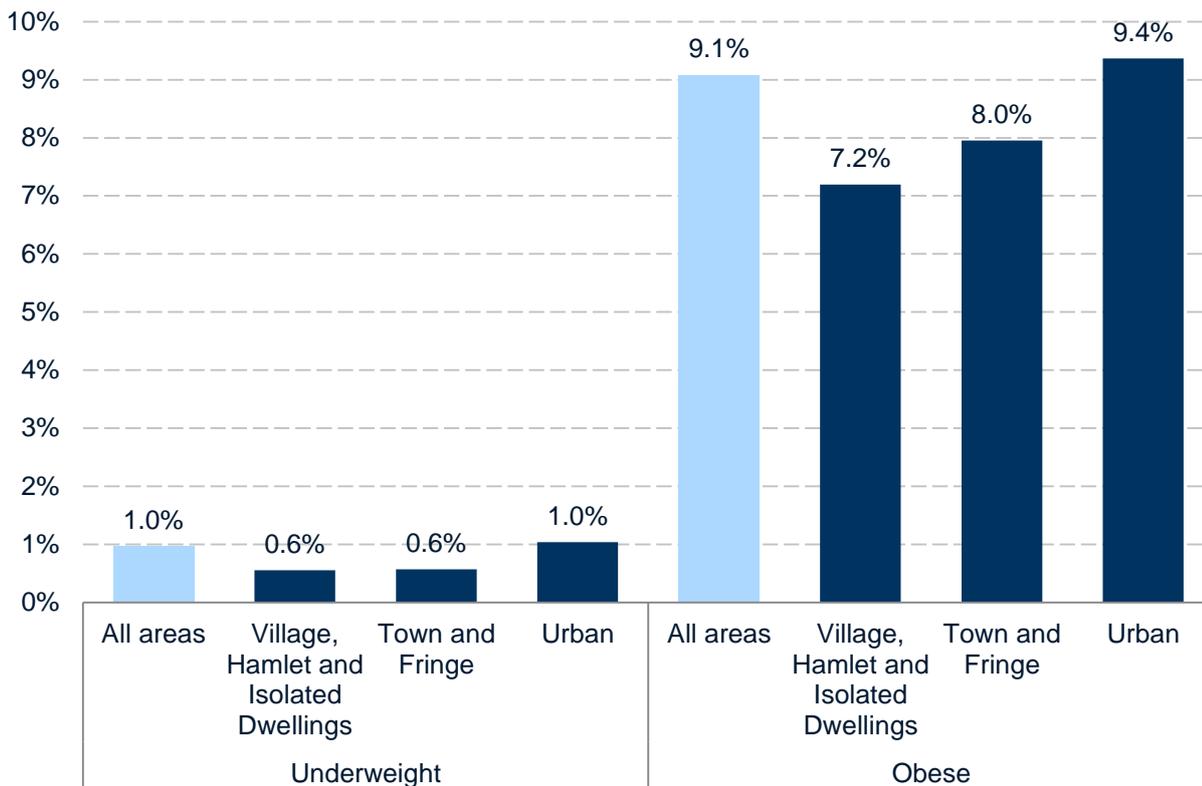
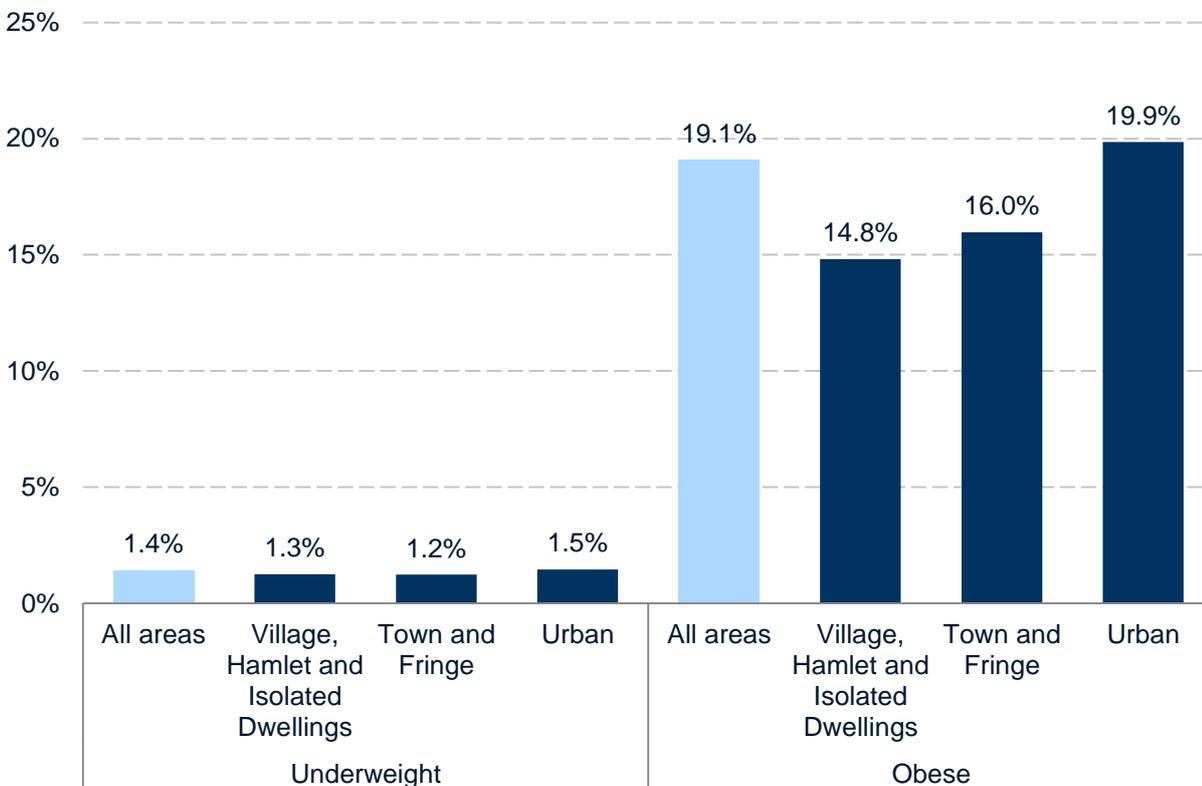


Figure 12: Prevalence¹⁹ of underweight and obese children in year 6, by rural/urban classification of child residence, England, 2014/15



¹⁹ Confidence intervals are provided in the Excel tables and should be considered when interpreting results. Further information on confidence intervals is available in annex E.

6 ONS Area Classification

The prevalence of the BMI classifications in 2014/15 by school year and the ONS Area Classification (ONS-AC)²⁰ is presented in the Excel tables by postcode of the child's residence (Online Table 7A) and by postcode of the child's school (Online Table 7B).

The prevalence of underweight and obese children in reception and year 6 in 2014/15, by ONS-AC, is shown in figures 13 and 14 respectively. These charts and the key findings use ONS-AC based on the postcode of the child's residence.

The highest level of this classification consists of seven groups which are called "supergroups". These are named in a way that describes the type of population predominant in those areas, for example 'Disadvantaged Urban Communities' or 'Professional City Life'.

PHE Obesity K&I have produced a report 'NCMP: Analysis using the ONS Area Classification' which provides more information on this approach^c.

Key findings:

- Children in the Multicultural City Life group had the highest obesity prevalence (11.5% in reception and 25.4% in year 6).
- Children in the Urban Fringe group had the lowest obesity prevalence (6.4% in reception and 13.2% in year 6).

²⁰ This classification is a system of population stratification that categorises local areas based on a range of socio-demographic characteristics, including deprivation, ethnicity and urban/rural environment into groups. More information on National Statistics 2011 Area Classification available at: www.neighbourhood.statistics.gov.uk/dissemination/Info.do?page=nessgeography/areaclassification/area-classification.htm

Figure 13: Prevalence²¹ of underweight and obese children in reception, by ONS Area Classification based on child residence, England, 2014/15

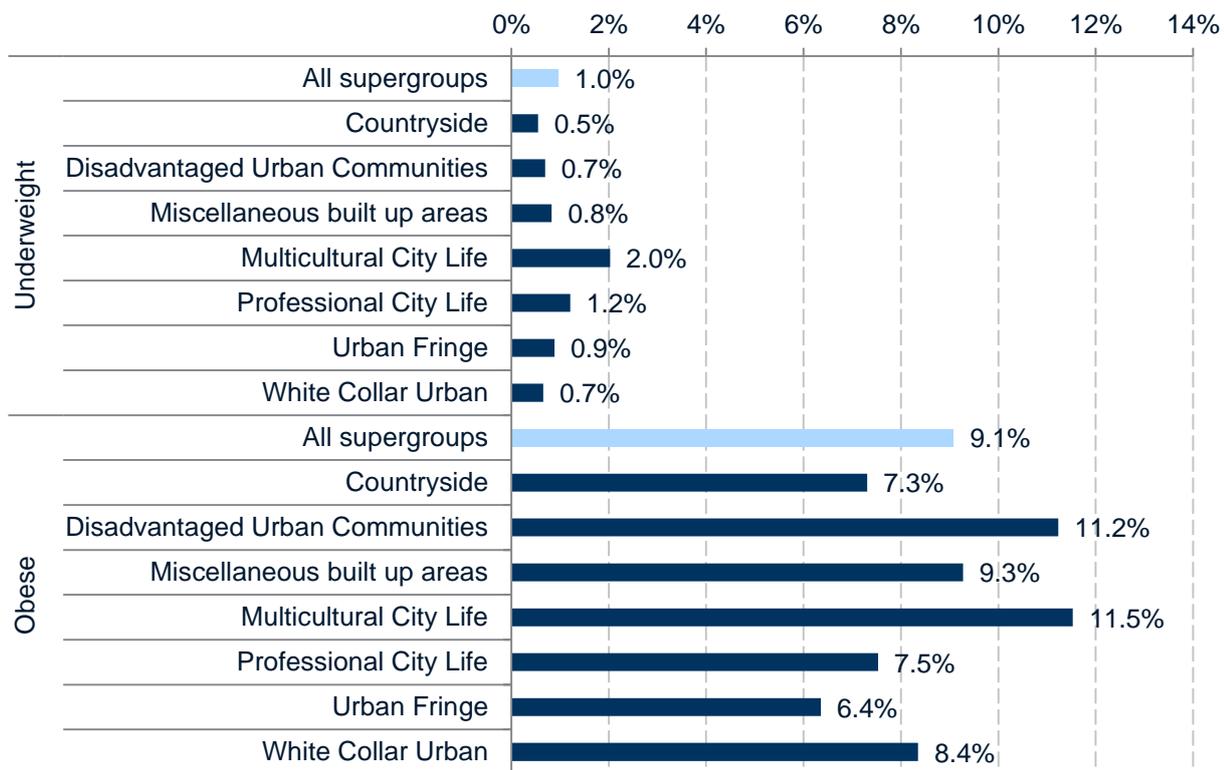
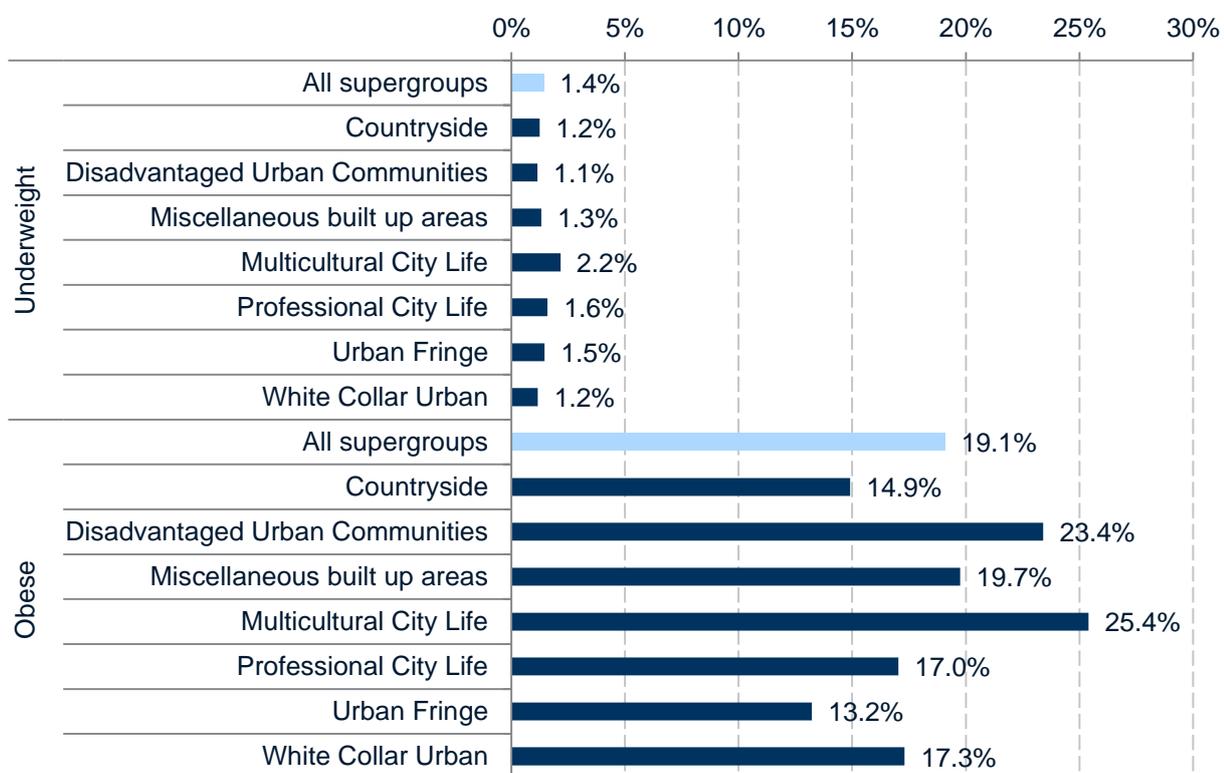


Figure 14: Prevalence²¹ of underweight and obese children in year 6, by ONS Area Classification based on child residence, England, 2014/15



²¹ Confidence intervals are provided in the Excel tables and should be considered when interpreting results. Further information on confidence intervals is available in annex E.

7 Ethnicity

The prevalence of underweight and obese children in reception and year 6 in 2014/15, by ethnic category²², is shown in figures 13 and 14 respectively. The prevalence of all BMI classifications by ethnicity is provided in Online Table 4.

Of the 1,141,859 children from state schools for whom valid measurements were submitted, 82 per cent (932,542) of records included a valid ethnic code (for the purpose of this report, 'not stated' and 'unknown' are considered invalid). This is an improvement on the earlier years of the NCMP but a slight decrease on 2013/14 when the proportion was 83 per cent.

Key findings:

- Obesity prevalence was significantly higher than the national average for children in both school years in the following ethnic groups:
 - 'Black or Black British' (14.7% in reception and 27.9% in year 6)
 - 'Any Other Ethnic Group' (11.0% and 24.4%)
 - 'Asian or Asian British' (10.0% and 24.1%)
 - 'Mixed' ethnic group (9.9% and 21.2%).
- Obesity prevalence was significantly lower than the national average for children in both years in the following ethnic groups:
 - 'White' (8.5% in reception and 17.7% in year 6)
 - 'Unknown' (8.8% and 18.1%)
 - 'Chinese' for reception only (7.6%).
- Underweight prevalence was significantly higher than the national average in both years in the 'Asian or Asian British' group (3.6% in both years) and significantly lower in both years in the 'White' group (0.6% and 1.2%). The 'Black or Black British' group was also significantly lower but in year 6 only (1.0%).

There are known associations between ethnicity and area deprivation^d. Deprived urban areas in England tend to also have a higher proportion of individuals from non-White ethnic groups, so it is likely that there are confounding factors which affect obesity prevalence by ethnic group.

²² Ethnic codes were grouped into seven categories for national analysis. Details of the ethnic groups covered by each category are available in Online Table 4.

Figure 13: Prevalence²³ of underweight and obese children in reception, by ethnic category, England, 2014/15

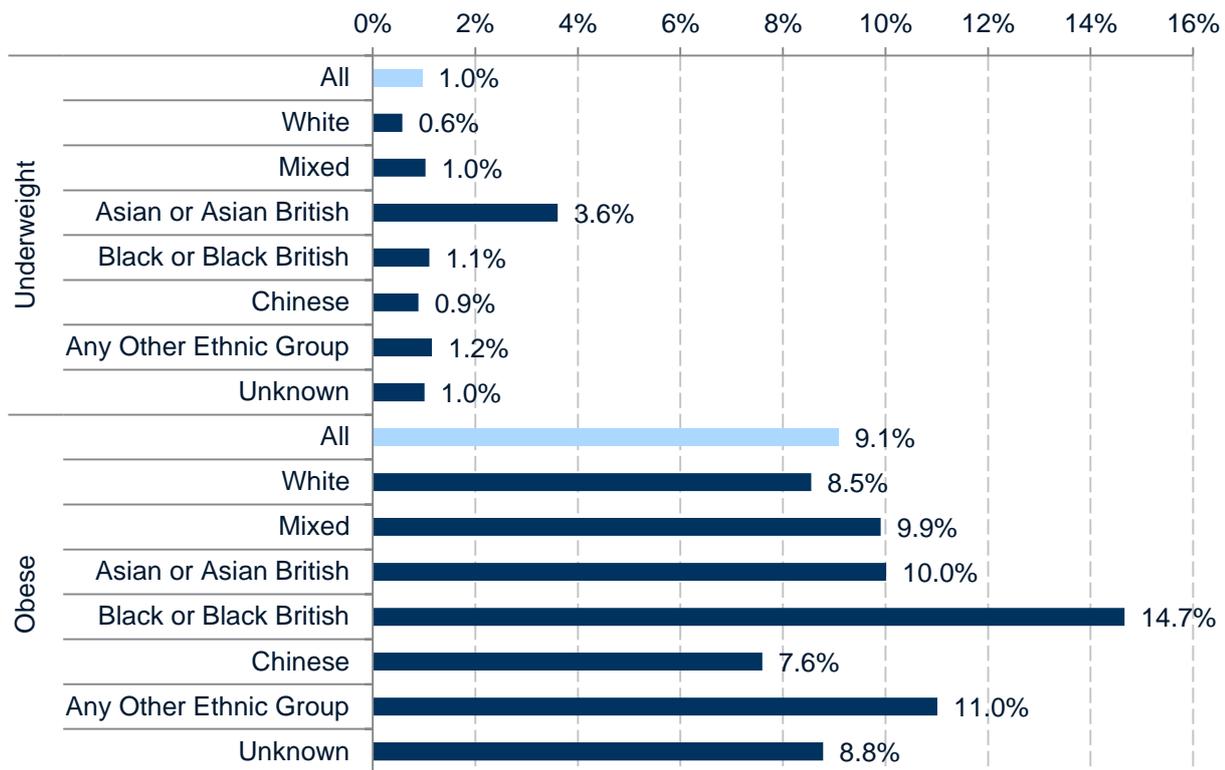
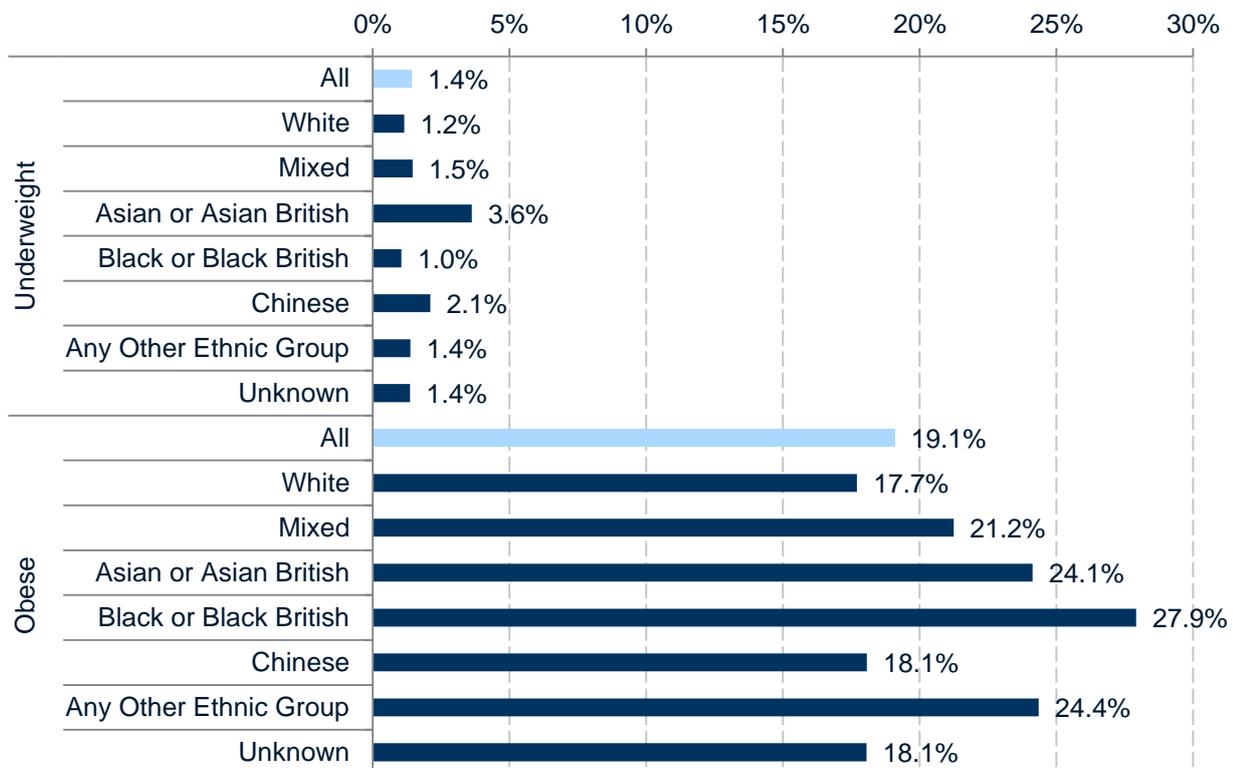


Figure 14: Prevalence²³ of underweight and obese children in year 6, by ethnic category, England, 2014/15



²³ Confidence intervals are provided in the Excel tables and should be considered when interpreting results. Further information on confidence intervals is available in annex E.

8 Child measurement in the other UK countries

The NCMP covers children attending schools in England only. Other countries in the UK publish similar reports and these are signposted below. There are differences in methods of collection and ages of the children measured which must be taken into consideration when comparing data across the UK countries.

Northern Ireland

Children are measured during their first school year (aged between 4.5 and 5.5 years) and in Year 8 (aged between 11.5 and 12.5 years) and data are recorded in the Child Health System. Child obesity data are published annually in Health Inequalities NI Health & Social Care Inequalities Monitoring System. The latest publication is available here:

<http://www.dhsspsni.gov.uk/hscims-2014-bulletin.pdf>

Scotland

Height and weight measurements are recorded at the routine Primary 1 school review (aged between 4.5 and 6.25 years) and data are recorded in the Child Health Systems Programme (CHSP) School System. Child obesity data are published annually in Primary 1 Body Mass Index (BMI) Statistics. The latest publication is available here:

<http://www.isdscotland.org/Health-Topics/Child-Health/Publications/2015-02-17/2015-02-17-P1-BMI-Report.pdf>

Wales

Children in reception (aged 4 and 5 years) are measured and child obesity data are published in an annual report Child Measurement Programme for Wales. The latest publication is available here:

[http://www2.nphs.wales.nhs.uk:8080/ChildMeasurementDocs.nsf/85c50756737f79ac80256f2700534ea3/692fe9649b4fc8be80257e49002a4bcb/\\$FILE/ATT0SH7G.pdf](http://www2.nphs.wales.nhs.uk:8080/ChildMeasurementDocs.nsf/85c50756737f79ac80256f2700534ea3/692fe9649b4fc8be80257e49002a4bcb/$FILE/ATT0SH7G.pdf)

Annex A – Data quality report

Table A1 shows the key data quality measures, at national level, since the first year of robust NCMP data was collected in 2006/07. Online table 8 shows the same data quality measures at submitting local authority level for 2014/15. Further commentary on data quality is provided in the data quality note which accompanies this report.

Table A1: LA data quality report for NCMP 2006/07 to 2014/15

Year	2006/07 ¹	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15
Reception participation rate	83%	89%	91%	93%	93%	94%	94%	94%	96%
Year 6 participation rate	78%	87%	89%	90%	92%	92%	93%	94%	94%
Overall participation rate	80%	88%	90%	91%	93%	93%	93%	94%	95%
Percentage of records with heights rounded to whole numbers	-	30%	21%	18%	19%	17%	17%	17%	17%
Percentage of records with weights rounded to whole numbers	-	23%	15%	12%	12%	10%	10%	10%	10%
Percentage of records with missing home/child postcodes	-	3%	2%	1%	0%	1%	0%	0%	0%
Percentage of records with missing ethnicity codes ²	-	33%	23%	17%	17%	15%	14%	9%	10%
Percentage of records with missing NHS numbers ³	-	-	-	-	-	-	-	39%	33%

Notes:

1. The values were not calculated for all data quality measures in 2006/07.
2. Missing codes excludes 'Not Stated' which is considered a valid code for this table.
3. This data quality measure only became available from 2013/14 when the new NCMP IT system was launched.

Key:

Data Quality indicator	Red	Amber	Green
Reception participation rate	<85%	≥85% or <90%	≥90%
Year 6 participation rate	<85%	≥85% or <90%	≥90%
Overall participation rate	<85%	≥85% or <90%	≥90%
Percentage of records with heights rounded to whole numbers	>50%	≥25% or ≤50%	<25%
Percentage of records with weights rounded to whole numbers	>50%	≥25% or ≤50%	<25%
Percentage of records with missing child postcodes	>50%	≥25% or ≤50%	<25%
Percentage of records with missing ethnicity codes	>50%	≥25% or ≤50%	<25%
Percentage of records with missing NHS numbers	>50%	≥25% or ≤50%	<25%

Annex B – Data collection

Coverage

The National Child Measurement Programme (NCMP) collects height and weight measurements of children in reception (aged 4–5 years) and year 6 (aged 10–11 years) in schools in England.

Local authorities are mandated to collect data from mainstream state-maintained schools but collection of data from special schools (schools for pupils with special educational needs and pupil referral units) and independent schools is encouraged.

For the 2014/15 collection, 2,512 records were collected relating to pupils in independent/special schools. This represents only 0.2% of the total number of records across all state and independent/special schools.

Since the proportion of records from independent and special schools varies each year this report excludes such records to ensure consistency over time. There are also concerns around how representative the participating independent and special schools would be.

However, independent and special schools are encouraged to feedback the results to the parents of the children they measure.

Measurement

The measurement of children's heights and weights, without shoes and coats and in normal, light, indoor clothing, was overseen by healthcare professionals and undertaken in school by trained staff. Public Health England provides guidance to local authorities on how to accurately measure height and weight^e.

Measurements could be taken at any time during the 2014/15 academic year. Consequently, some children were almost two years older than others in the same school year at the point of measurement. This does not impact upon a child's BMI classification since BMI centile results are adjusted for age. Also the age range is a year for the majority of records: in 2014/15 86% of reception pupils were aged between 4.5 years and 5.5 years when they were measured and 78% of year 6 pupils were aged between 10.5 years and 11.5 years.

Validation

Full details about validation are provided in the HSCIC's validation document^f and have been summarised below.

Local authorities enter data into the NCMP system which validates each data item at the point of data entry. Invalid data items (e.g. incorrect ethnicity codes) are rejected and unexpected data items (e.g. "extreme" heights) have warning flags added.

During the collection the NCMP system provides each local authority with real time data quality indicators, based on the data they have entered, for monitoring and to ensure the early resolution of any issues. At the end of the collection each local authority must confirm any data items with warning flags and sign off their data quality indicators. The main data quality indicators are shown in annex QX along with local authority performance.

After the collection has closed the HSCIC carries out further data validation which includes:

- Querying data quality indicators not matching the required conditions.
- Comparing each local authority's dataset with their previous year's dataset and querying unexpected changes.

- Looking for clusters of unexpected data items to identify data quality issues affecting particular schools.

Participation rates

The participation rate is the proportion of children who were measured out of those eligible for measurement. Children eligible for measurement are sometimes not measured for a range of reasons such as the child being absent on the day of measurement or not consenting to be measured. This means that the NCMP dataset is a sample (albeit a very large sample) and the prevalence of the BMI classifications in this report are estimates assumed to apply to the entire population.

To ensure the NCMP sample is representative, it is important to verify that non-participation is equally likely for each child. If, for example, all non-participating children were obese then the sample would be biased and obesity prevalence underestimated.

Analysis on the NCMP datasets between 2006/07 and 2008/09 established that there was a relationship between the PCT participation rate and year 6 obesity prevalence. It was estimated that year 6 obesity prevalence may be underestimated by around 1.3 percentage points for 2006/07^g, around 0.8 percentage points for 2007/08^h, and around 0.7 percentage points for 2008/09ⁱ (with the impact reducing as participation rates increased). This may be due to obese year 6 children being less likely to participate in the NCMP than other children during these collection years. Therefore the upper confidence interval for the national year 6 obesity prevalence rate was increased for 2006/07 to 2008/09 by these amounts. For other BMI classifications the relationship was found to be negligible.

In 2009/10^j and 2010/11^k the participation rate continued to increase and the same analysis found the relationship to be negligible. As the participation rate increased again in 2011/12 and has remained similar since 2012/13, it was considered unnecessary to repeat the analysis in recent years. We will continue to monitor this in the future.

Participation rates at local authority level are provided in Online table 2 and these should be considered when comparing local authority prevalence figures.

Calculating participation rates:

Rates are calculated by dividing the number of valid records from state schools, submitted by the local authority, by the number of children eligible for measurement and multiplying the result by 100.

The number of children eligible for measurement, in each school year within a local authority, is calculated by aggregating headcounts across the state-maintained schools within the local authority's postcode boundary. The NCMP system provides default headcounts based on Department for Education (DfE) census data but these can be amended by the local authority where necessary. The NCMP system validates headcounts through checking that the number measured at a school does not exceed the number eligible for measurement. When the number measured did exceed the number eligible, the system corrected the 'eligible' figure by increasing it to match the number measured thus ensuring a maximum school-level participation rate of 100 per cent.

Annex C – Calculation of prevalence

The prevalence of children in a BMI classification is calculated by dividing the number of children in that BMI classification by the total number of children and multiplying the result by 100.

The National Obesity Observatory (now part of PHE) provides detailed guidance on how to derive BMI classification¹. A brief overview is provided below.

The BMI classification of each child is derived by calculating the child's BMI centile and assigning the BMI classification based on the following thresholds²⁴:

- **Underweight** is defined as a BMI centile less than or equal to the 2nd centile
- **Healthy weight** is defined as a BMI centile greater than the 2nd centile but less than the 85th centile
- **Overweight** is defined as a BMI centile greater than or equal to the 85th centile but less than the 95th centile (i.e. overweight *but not* obese)
- **Obese** is defined as a BMI centile greater than or equal to the 95th centile.

The child's BMI centile is a measure of how far a child's BMI is above or below the average BMI value for their age and sex in a reference population. In England the British 1990 growth reference (UK90) is recommended for population monitoring and clinical assessment in children aged four years and over. UK90 is a large representative sample of 37,700 children which was constructed by combining data from 17 separate surveys. The sample was rebased to 1990 levels and the data were then used to express BMI as a centile based on the BMI distribution, adjusted for skewness, age and sex using Cole's LMS method^m.

The child's BMI centile is calculated in the following way:

- i. Calculate the child's BMI (weight(kg)/height² (m²))
- ii. Calculate the child's BMI z-score:
 - look up child age (rounded to the nearest whole month) and sex on the UK90 BMI centiles classification;
 - retrieve the corresponding L, M, and S values for use in the following formula (where y is the BMI score):

$$z = \frac{\left(\frac{y}{M}\right)^L - 1}{LS}$$

- iii. Converting the BMI z-score to the BMI centile using the standardised normal distribution.

²⁴ These thresholds are conventionally used for population monitoring and are not the same as those used in a clinical setting (where overweight is defined as a BMI greater than or equal to the 91st but below the 98th centile and obese is defined as a BMI greater than or equal to the 98th centile).

Annex D – Comparing prevalence: considerations

When comparing prevalence figures between groups and over time it is important to consider how participation and data quality might affect the calculated figures. Comparisons between two groups with differing data quality or participation may be skewed and this should be taken into account as it may partly explain any difference in prevalence figures.

Analyses looking at the impact of data quality on prevalence were carried out by the National Obesity Observatory (now part of PHE) for the 2006/07ⁿ and 2007/08^o collection years and by the National Centre for Biotechnology Information (NCBI), a division of the U.S. National Library of Medicine (NLM), for the 2007/08 collection year^p.

No analysis has been carried out to quantify any impact on 2014/15 data but improvements in data quality and participation since the first years of the NCMP should have lessened any impact. However, it is still important to consider data quality and participation when making comparisons. Information on the 2014/15 data quality and participation is provided in the data quality table (annex A) and the Data Quality Statement that accompanies this report.

It is also important to realise that, since the NCMP dataset is a sample (albeit a very large sample), the prevalence figures in this report are estimates assumed to apply to the entire population. These estimates are subject to natural random variation. Confidence intervals and significance testing have been used in this report to take account of such variation. Further details are available in annexes E and F.

Annex E – Confidence intervals

A confidence interval gives an indication of the likely error around an estimate that has been calculated from measurements based on a sample of the population. It indicates the range within which the true value for the population as a whole can be expected to lie, taking natural random variation into account. Confidence intervals should be considered when interpreting results.

Larger sample sizes lead to narrower confidence intervals, since there is less natural random variation in the results when more individuals are measured. The NCMP has relatively narrow confidence limits because of the large size of the sample and high participation rates.

In the tables accompanying this report, 95 per cent confidence intervals have been provided around the prevalence estimates. These are known as such because if it were possible to repeat the same programme under the same conditions a number of times, we would expect 95 per cent of the confidence intervals calculated in this way to contain the true population value for that estimate.

The confidence intervals in this report have not had the finite population correction (FPC) applied and have therefore not been reduced on the basis of coverage. This approach is consistent with that used throughout the public health community. For example, census, mortality and hospital admission data represent a 100 per cent sample, yet the associated confidence intervals are routinely calculated without the FPC adjustment.

Methodology

Confidence intervals have been calculated using the method described by Wilson^g and Newcombe^f.

The steps needed are:

- 1) Calculate the estimated proportions of children with and without the feature of interest (e.g. percentage of obese children in reception year) as follows.

$p = r / n =$ proportion with feature of interest

$r =$ observed number of obese children in reception year in each area

$n =$ sample size

$q = (1 - p) =$ proportion without feature of interest

- 2) Calculate three values (A, B and C) as follows:

$$A = 2r + z^2; B = z \sqrt{z^2 + 4rq} \text{ and } C = 2(n + z^2)$$

where z is $z_{(1-\alpha/2)}$ from the standard Normal distribution.

- 3) Then the confidence interval for the population proportion is given by:

$$\left(\frac{A-B}{C} \right) \text{ to } \left(\frac{A+B}{C} \right)$$

This method is superior to other approaches because it can be used for any data.

When there are no observed events, then r and hence p are both zero, and the recommended confidence interval simplifies to 0 to $\frac{z^2}{n + z^2}$.

When $r = n$ so that $p = 1$, the interval becomes $\frac{n}{n+z^2}$ to 1.

Annex F – Significance Testing

Significance tests have been used in this report to determine whether differences between prevalence estimates are genuine differences (i.e. statistically significant) or the result of random natural variation.

A quick and easy check to see if two prevalence estimates are significantly different is to compare the confidence intervals of the estimates. When the confidence intervals do not overlap the differences are considered as statistically significantly different. This approach was used in NCMP reports prior to 2009/10.

However, it is not always the case that overlapping confidence intervals indicate no significant difference. In some cases estimates with overlapping confidence intervals will still be statistically significantly different. Consequently some significant differences may have been missed in NCMP reports prior to 2009/10. A more robust way of checking if two prevalence estimates are significantly different is to use significance testing.

The significance testing methodology used in NCMP reports since 2009/10 follows the approach outlined by Altman et al.^s. This methodology is consistent with that used by Public Health England.

A 95% level of significance has been used in the tests throughout this report. This means that when prevalence estimates are described as being different, (e.g. higher/lower or increase/decrease etc.) the probability that the difference is genuine, rather than the result of random natural variation, is 0.95.

Methodology

The steps for the approach outlined by Altman et al. are:

- 1) Calculate the absolute difference between the two proportions, $\hat{D} = \hat{p}_2 - \hat{p}_1$
- 2) Then calculate the confidence limits around \hat{D} as:

$$\hat{D} - \sqrt{(\hat{p}_2 - l_2)^2 + (u_1 - \hat{p}_1)^2} \quad \text{to} \quad \hat{D} + \sqrt{(\hat{p}_1 - l_1)^2 + (u_2 - \hat{p}_2)^2}$$

where \hat{p}_i is the estimated prevalence for year i , and l_i and u_i are the lower and upper confidence intervals for \hat{p}_i respectively.

- 3) A significance difference exists between proportions \hat{p}_1 and \hat{p}_2 if and only if zero is not included in the range covered by the confidence limits around the difference \hat{D} .

Annex G – Local Authority tables: guidance

Local authority data is presented in three ways:

- By the upper tier local authority who submitted the data (Online Table 2).
- By upper and lower tier local authority, based on the local authority in which the school is located (using the school postcode of each child) (Online Table 3A).
- By upper and lower tier local authority, based on the local authority in which the child lives (using the postcode of residence of each child) (Online Table 3B).

Users may want to use the different breakdowns for different purposes. For example, users who want to look at the impact of interventions which are targeted through schools, such as healthy school meals or physical activity provision, may want to use the results which are based on where the school is located. Other users who want to look at interventions which are more residence based, such as provision of leisure facilities or parks, may want to use the residence based results.

Users particularly interested in looking at results over time should be aware that provision of the child's residence postcode only became a required field in 2007/08. Therefore, users wanting to compare current results with those in 2006/07 should use the results based on school location (Online table 3A).

For most local authorities, the three sets of figures will not differ substantially. Some examples where differences may occur are:

- There may be a difference in results between submitting local authority (Online table 2) and those based on the location of the school (Online table 3A) where a local authority has an arrangement with a neighbouring local authority to collect measurements in a few schools outside of their own geographical boundary.
- There may be a difference in results between those based on the location of the school (Online table 3A) and those based on child residence (Online table 3B) where a relatively high number of pupils attend a school located in an local authority different to the one in which they live. This is particularly the case in inner London.

Annex H – How are the statistics used?

Users and uses of the report

From our engagement with customers, we know that there are many users of the NCMP statistics. There are also many users of these statistics who we do not know about. We are continually aiming to improve our understanding of who our users are in order to enhance our knowledge on what the uses of these data are via consultations and feedback forms available online. Below is listed our current understanding of the known users and uses of these statistics. Also included are the methods we use to attempt to engage with the current unknown users.

Known Users and Uses

Department of Health (DH)

The NCMP is a key element of the Government's approach to tackling child obesity. NCMP statistics are used to inform policy and set national ambitions such as those detailed in Healthy Lives, Healthy People: A call to action on obesity in England (<https://www.gov.uk/government/publications/healthy-lives-healthy-people-a-call-to-action-on-obesity-in-england>)

Public Health England (PHE)

PHE are responsible for the Public Health Outcomes Framework (PHOF) which sets out the desired outcomes for public health and how these will be measured. The NCMP provides robust data for the child excess weight indicators in the PHOF.

The PHE Obesity Knowledge & Information team (formerly the National Obesity Observatory) conduct additional analyses on the NCMP data, including regional and local analyses, and produce a range of reports and tools:

- https://www.noo.org.uk/NCMP/National_report
- <http://www.noo.org.uk/visualisation>
- <http://fingertips.phe.org.uk/profile/national-child-measurement-programme>.

Local Authorities - frequently use NCMP statistics for analyses, benchmarking and to inform decision making.

Academia and Researchers - Non-identifiable versions of the annual NCMP datasets are deposited in the UK Data Archive and this NCMP data is used by academics in their research papers.

Media – NCMP data are frequently used to underpin articles in newspapers, journals, etc.

Public – Aggregated NCMP data, as published in the HSCIC's national report and PHE's more detailed analyses, is accessible for general public use.

Public Health Campaign Groups - data are used to inform policy and decision making and to examine trends and behaviours.

Ad-hoc requests – NCMP statistics are used by the Health and Social Care Information Centre (HSCIC) to answer Parliamentary Questions (PQs), Freedom of Information (FOI) requests and ad-hoc queries. Ad-hoc requests are received from

health professionals; research companies; public sector organisations, and members of the public, showing the statistics are widely used and not solely within the profession.

Unknown Users

This publication is free to access via the HSCIC website (<http://www.hscic.gov.uk/ncmp>). Consequently the majority of users will access the report without being known to the HSCIC. Therefore, it is important to put mechanisms in place to try to understand how these additional users are using the statistics and also to gain feedback on how we can make these data more useful to them. On the webpage where the publication appears there is a link on the right-hand side to a feedback form which the HSCIC uses to capture feedback for all its reports.

- The specific questions asked on the form are:
- How useful did you find the content in this publication?
- How did you find out about this publication?
- What type of organisation do you work for?
- What did you use the report for?
- What information was the most useful?
- Were you happy with the data quality?
- To help us improve our publications, what changes would you like to see (for instance content or timing)?
- Would you like to take part in future consultations on our publications?

Any responses via this form are passed to the team responsible for the report to consider. We also capture information on the number of web hits the reports receive, although we are unable to capture who the users are from this.

^a 'National Child Measurement Programme: Detailed Analysis of the 2006/07 National Dataset': www.noo.org.uk/uploads/doc168_2_NOO_NCMP_report230608.pdf

^b National Child Measurement Programme: Detailed Analysis of the 2007/08 National Dataset': www.noo.org.uk/uploads/doc168_2_noo_NCMPreport1_110509.pdf

^c 'NCMP: Analysis using ONS Area Classification' (www.noo.org.uk/uploads/doc/vid_12524_NCMP_Analysis%20using%20the%20ONS%20Area%20Classification.pdf)

^d 'National Child Measurement Programme; Detailed Analysis of the 2006/07 National Dataset'

www.noo.org.uk/uploads/doc168_2_NOO_NCMP_report230608.pdf

^e National child measurement programme operational guidance:

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/463929/NCMP_Operational_Guidance_21015_16.pdf

^f Validation of National Child Measurement Programme Data: http://www.hscic.gov.uk/media/16230/Validation-of-National-Child-Measurement-Programme-Data/pdf/Validation_Principle_and_Rules.pdf

^g <http://www.hscic.gov.uk/catalogue/PUB02302/nati-chil-meas-prog-resu-2006-2007-rep.pdf>

^h <http://www.hscic.gov.uk/catalogue/PUB02314/nati-chil-meas-prog-resu-2007-2008-rep.pdf>

ⁱ <http://www.hscic.gov.uk/catalogue/PUB00760/nati-chil-meas-prog-eng-2008-2009-rep.pdf>

^j <http://www.hscic.gov.uk/catalogue/PUB00776/nati-chil-meas-prog-eng-2009-2010-rep.pdf>

^k <http://www.hscic.gov.uk/catalogue/PUB03034/nati-chil-meas-prog-eng-2010-2011-rep1.pdf>

^l A simple guide to classifying body mass index in children:

http://www.noo.org.uk/uploads/doc/vid_11601_A_simple_guide_to_classifying_BMI_in_children.pdf

^m 'Growth monitoring with the British 1990 growth reference'. *Cole Arch Dis Child*.1997; 76: 47-49.

ⁿ 'NCMP: Detailed Analysis of the 2006/07 National Dataset'

www.noo.org.uk/uploads/doc168_2_NOO_NCMP_report230608.pdf

^o 'NCMP: Detailed Analysis of the 2007/08 National Dataset'

www.noo.org.uk/uploads/doc168_2_noo_NCMPreport1_110509.pdf

^p 'Variations in data collection can influence outcome measures of BMI measuring programmes'

www.ncbi.nlm.nih.gov/m/pubmed/21834603

^q Wilson EB (1927) Probable inference, the law of succession, and statistical inference. *J Am Stat Assoc*; **22**:209-212

^r Newcombe RG (1998) Two-sided confidence intervals for the single proportion: comparison of seven methods. *Stat Med*; **17**:857-72

^s Altman DG et al. (eds). *Statistics with confidence* (2nd edn). London: BMJ Books; 2000: 46-8.

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