

**noo**

National Obesity  
Observatory



# National Child Measurement Programme 2009/10

## Guidance for analysis

March 2011



NOO is delivered by Solutions for Public Health

**National Obesity Observatory**

DELIVERED BY



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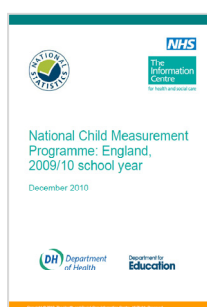
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## 1 Introduction

- 1.1 The National Child Measurement Programme (NCMP) is an annual programme which measures the height and weight of children in Reception (age 4-5 years) and Year 6 (age 10-11 years) within state maintained schools in England. Some independent and special schools also choose to participate, however these records are usually excluded from the analysis for national NCMP reports as the majority of such schools do not take part (see Section 4.4).
- 1.2 The NHS Information Centre for health and social care (IC) and the National Obesity Observatory (NOO) publish analyses of this dataset annually. However, Public Health Observatories (PHOs) and Primary Care Trusts (PCTs) might want to undertake additional analyses at regional or local level to inform the work of the NHS or Local Authorities (LAs) on the healthy weight agenda.
- 1.3 This document provides guidance to PHOs, PCTs and other organisations who wish to make use of the NCMP data. It covers:
- what analysis and tools will be provided by NOO and the IC
  - how to access the 2009/10 NCMP dataset
  - what NCMP data can be shared between organisations
  - guidance on the appropriate use of the NCMP dataset, to comply with data protection and disclosure rules
  - caveats associated with the NCMP data and its interpretation
  - suggestions for regional and local analyses
  - an 'FAQ' for NCMP analysis
  - suggestions for local data quality checks
- 1.4 If PHOs or PCTs have additional queries not covered in this guidance, they should contact NOO at [ncmp@noo.org.uk](mailto:ncmp@noo.org.uk).

## 2 National reports and data

### 2.1 NCMP data and analysis provided by the IC



2.1.1 Headline results from the 2009/10 NCMP, at national and sub-national level, are provided in the IC's report '*National Child Measurement Programme: England, 2009/10 school year*',<sup>1</sup> published in December 2010.

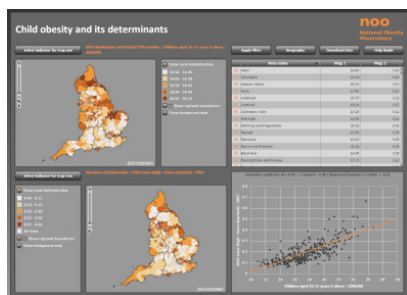
2.1.2 This report shows prevalence of child obesity and overweight by sociodemographic groups and includes comparison with the 2008/09 data. Excel data tables that were used to produce the IC report are available on the IC's NCMP pages (<http://www.ic.nhs.uk/ncmp>).

2.1.3 The IC's 'headline results' reports for earlier years are also available on the IC website.

### 2.2 NCMP data, analysis, and resources provided by NOO

#### *NCMP e-atlas*

2.2.1 The 2009/10 NCMP data are also available through the NOO NCMP child obesity e-atlas. This online tool presents LA and PCT data in maps, charts and data tables and is available on the NOO website: <http://www.noo.org.uk/visualisation/eatlas>.



2.2.2 The e-atlas also allows NCMP data to be compared with other indicators. The data presented in the e-atlas can be downloaded as an Excel file from within the e-atlas.

2.2.3 As well as including the main headline NCMP findings, as published in the IC's reports, the e-atlas also contains NCMP data broken down by sex and also data on measures of geographic deprivation and other determinants of child obesity. The e-atlas also contains NCMP data using the UK90 clinical cut-offs for child body mass index (BMI), as used for parental feedback within the NCMP (see Section 5).

2.2.4 NOO is planning to publish an e-atlas at Middle Super Output Area (MSOA) level, using three years data from 2007/08 to 2009/10, in spring 2011.

#### *NOO NCMP detailed reports*

2.2.5 Analysis of the 2009/10 NCMP will be published by NOO in spring 2011 to complement the IC's 2009/10 report.

2.2.6 It is anticipated that the 2009/10 NOO NCMP report will provide an update on the trends in obesity and overweight prevalence presented in the 2008/09 report. Additionally, NOO plans to publish national analysis using the Office for National Statistics Area Classification<sup>2</sup> to help local areas identify neighbourhoods which are likely to have a high prevalence of child obesity.

2.2.7 Users of the NCMP dataset might also find it useful to read the NOO reports on the 2006/07, 2007/08 and 2008/09 NCMP datasets, published in June 2008,<sup>3</sup> April 2009,<sup>4</sup> and June 2010.<sup>5</sup>



2.2.8 The 2006/07 and 2007/08 NOO reports examine some of the data quality issues observed within the NCMP database and describe the possible effect of these on reported prevalence of overweight and obesity.

2.2.9 These reports also show the effect of demographic and socioeconomic variables (principally ethnicity and deprivation) on prevalence figures and show that the combined effect of these, plus data quality indicators, could explain a substantial proportion of the variance in prevalence of obesity at PCT level.

2.2.10 The 2008/09 NOO report examines the emerging trends in the BMI of the Reception and Year 6 children measured within the previous three years (2006/07, 2007/08 and 2008/09) of the NCMP.

2.2.11 NOO also publishes the NOO newsletter which includes short articles communicating findings from NCMP analysis: [http://www.noo.org.uk/NOO\\_pub/newsletters](http://www.noo.org.uk/NOO_pub/newsletters).

2.2.12 Previous articles cover ethnicity and obesity (autumn 2008 edition), effect of time of measurement on obesity prevalence (autumn 2009 and autumn 2010 editions), and the use of the ONS Area Classification with NCMP data (spring 2010 edition). Further articles will be published in future newsletters.

*Regional analysis tool*

2.2.13 An updated NCMP Regional Analysis Excel Tool will be shared with PHOs in spring 2011. This tool is a macro-enabled Excel workbook containing charts and maps presenting prevalence by BMI status and data quality indicators for regional, PCT and LA geographies. PHOs can use the charts and maps in this tool for their own annual NCMP reports and presentations.

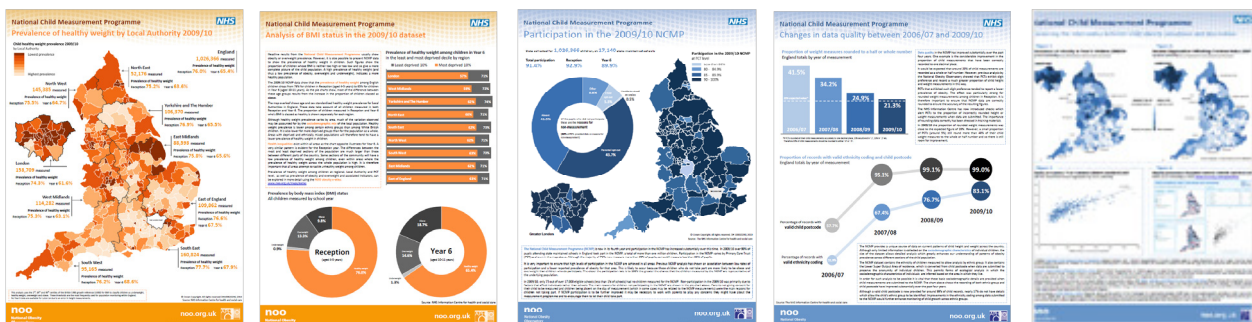
*School feedback tool*

2.2.14 NOO is updating the School Feedback Tool and will distribute it to PHOs in spring 2011. This is an Excel-based tool which can be used by PHOs or PCTs to generate letters to share information and data from the NCMP with schools. For more information on the tool see Section 3.4.

*Data visualisations*

2.2.15 Other NCMP analysis is provided through a series of data visualisations on the NOO website. These illustrate key issues within NCMP data such as data quality and participation, patterns of prevalence, and health inequalities within NCMP prevalence. These can be downloaded from the NOO website at:

<http://www.noo.org.uk/visualisation>.



**3 Obtaining and sharing the 2009/10 NCMP dataset**

**3.1 Obtaining the data**

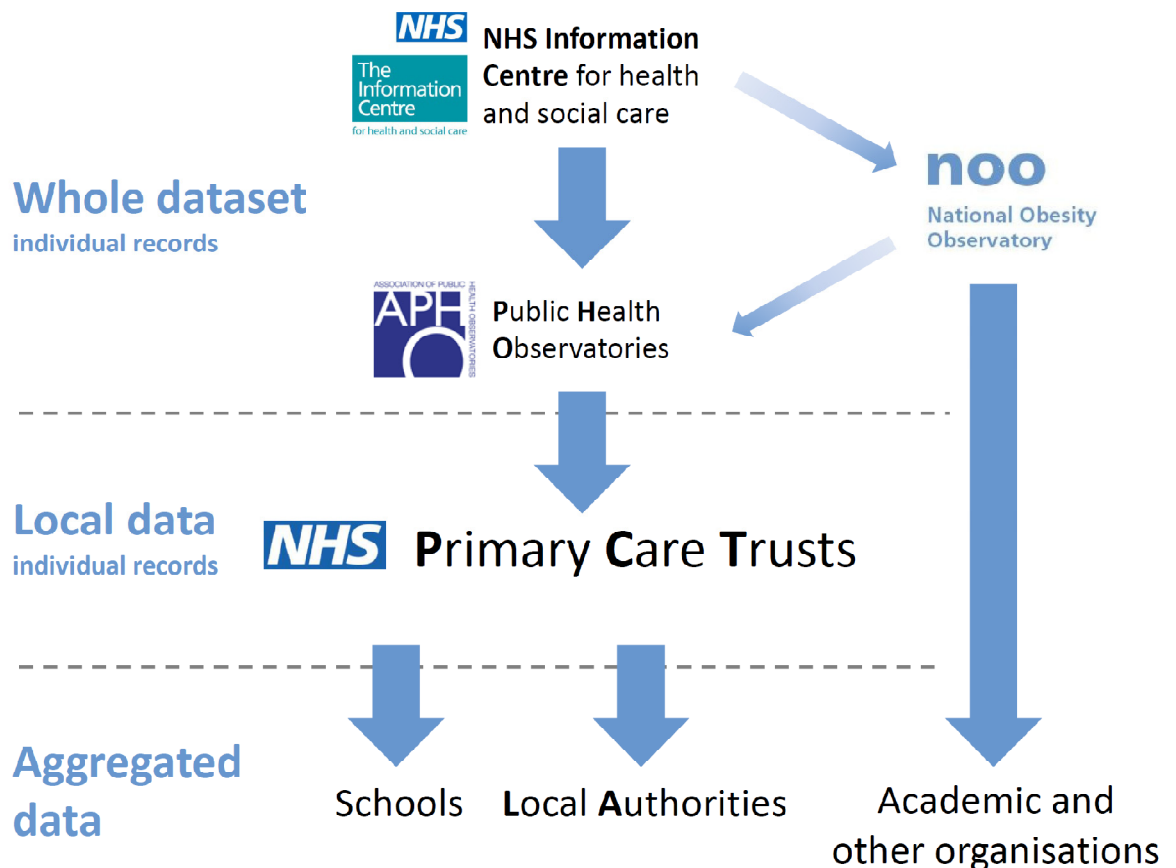
3.1.1 The IC makes available a cleaned copy of the 2009/10 NCMP dataset to PHOs through the 'Data Depot'. The dataset contains individual data records for all children measured for the NCMP.

3.1.2 The terms of the data-sharing agreement between the IC and the Association for Public Health Observatories (APHO) state that these data can be shared under certain conditions.

3.1.3 PCTs can request a cleaned copy of their own NCMP data from PHOs. Under the Information Governance guidelines for NCMP data, PCTs are not entitled to access the raw NCMP data for children where they did not collect the measurements.

- 3.1.4 Some PCTs might require NCMP data or analysis for areas other than their own in addition to the figures that are published by the IC/NOO. Where this is the case, this information can be requested from the regional PHO, or from NOO. However, this information will be provided in the form of aggregated data, rather than individual child records.
- 3.1.5 Other organisations, for example LAs, are able to request NCMP data from PCTs, PHOs or from NOO. However this information should again be shared in an aggregated form, unless there are exceptional circumstances as described in Section 3.3.

**Figure 1:** Level of access to NCMP by different organisations



3.1.6 More details on the data available to different organisations are given below.

### 3.2 Data available to local NHS

3.2.1 PCTs that want their own cleaned dataset should request it from their PHO. PHOs should provide PCTs with a copy of the full 2009/10 NCMP MS Access database, but with child records attributed to other PCTs deleted from the 'Pupil data' and 'Pupil data excluded' tables.\* In this way PCTs will have access to all the lookup tables and associated information contained within the database.

\* This can be achieved in a number of ways. One recommended option is to save a new copy of the database, then run a 'delete' query on the 'pupil data' and 'pupil data excluded' tables to remove records where the PCT field does not equal (<>) the PCT code of the desired PCT. In this way the relational structure between all tables in the dataset will be maintained.

- 3.2.2 PCTs should note that they will be able to access individual level data for their PCT only. If a PCT requests wider access to NCMP data, for example to make comparisons with the national or regional average, PHOs must ensure that the data are aggregated to ensure individual children cannot be identified. If aggregation precludes useful analysis, the PHO might be better placed to do such analysis on behalf of the PCT.
- 3.2.3 Although PCTs will already have access to their own NCMP data, it is recommended that cleaned data from the IC are used for local analysis, rather than the records held locally by PCTs. This is important to ensure potentially invalid records are not included in the analysis and for consistency with published figures.
- 3.2.4 The data sharing agreement states that all record level data must be treated in accordance with the Data Protection Act 1998,<sup>6</sup> and any data will, therefore, need to be transferred safely and securely to PCTs.
- 3.2.5 When sharing NCMP data with PCTs, PHOs are advised to ensure PCTs are aware of the terms of the data sharing agreement between PHOs and the IC, and that the relevant individuals in PCTs have read this guidance document. It is particularly important that PCTs appreciate the need to ensure that any published analysis does not risk identification of individual children, and that any comparisons made between different prevalence figures are performed using confidence limits or appropriate statistical testing.

### 3.3 Data available to non-NHS organisations

- 3.3.1 PHOs and PCTs may receive requests for local NCMP data (for example at school, electoral ward, or MSOA level from non-NHS sources, such as colleagues in LAs. Often the information needed will be available through the IC website and the NOO e-atlas and where possible users should be directed towards the existing resources.
- 3.3.2 In some cases the information requested will not be available, for example figures at school level, or for geographies smaller than LAs. PCTs and PHOs are able to provide such information, but this will need to be provided in an aggregated form. This ensures individual information is not shared unnecessarily, and also ensures analysis of the raw data is conducted by analysts trained in epidemiological techniques.
- 3.3.3 In most situations users outside the NHS can achieve their objectives by using aggregated data. However, in some cases this may not be possible. If individual records are essential for analysis, PHOs and PCTs should draw up a data sharing agreement for NCMP data if the transfer of such data is not covered by existing data sharing agreements (for example those between PCTs and LAs for sharing other forms of individual level data). A data sharing agreement template is available from NOO on request.
- 3.3.4 Where individual records must be shared, only data fields which are essential for the analysis should be included. This minimises the potential for individuals to be identified from the dataset. It is also important that any individuals or organisations working with NCMP data are given a copy of this guidance.
- 3.3.5 It is recommended that requests for NCMP data from academic organisations or individuals are forwarded to NOO, who will liaise with the IC to ensure any data shared do not identify individual children and are used for suitable purposes.



3.3.6 The IC will also be publishing a reduced NCMP dataset for all available years (2006/07 – 2009/10) on the UK data archive during 2011. This resource will be publicly available on registration with the UK data archive: <http://www.data-archive.ac.uk/>.

### 3.4 Feeding back NCMP results to schools

3.4.1 A standard school feedback letter for PCTs to use when returning data to participating schools is provided in Appendix 2.

3.4.2 To support the use of this letter, NOO has developed an Excel-based tool which can be used by PHOs or PCTs to generate and populate these school feedback letters automatically. The latest version of this tool containing the 2009/10 NCMP data will be released to PHOs in spring 2011 along with accompanying guidance. PCTs should contact their regional PHO to obtain a copy.

3.4.3 If feedback is given, it is important to ensure it is based on robust data and does not risk identification of results of individual children.

3.4.4 Neither school-level obesity prevalence rates, nor raw numerical data, should be fed back to schools. The reasons for this are:

- With small denominator populations, such as those for primary schools, the numbers of overweight and obese children are likely to be small. Publication of these small number data might therefore allow individual children to be identified. This would contravene disclosure rules and is not permissible.
- Class sizes in primary schools are small, so school-level prevalence figures will be subject to small number variation. They would, therefore, not provide robust measures of obesity prevalence, even if there was 100% coverage of all children in the relevant age-groups within a school.
- Most schools will have less than 100% coverage. Some groups, such as overweight or obese children, may be more likely to opt-out of being weighed and measured than others, thus introducing bias into the results and rendering them less reliable at school level.

3.4.5 As a result, any school feedback should be provided using one of the following categories (using the statistical methods provided in Appendix 4):

- significantly higher than the national/regional/PCT average
- significantly lower than the national/regional/PCT average
- no different from the national/regional/PCT average
- insufficient information to provide feedback.

3.4.6 The fourth category is suggested for use where the participation rate is low (e.g. less than 70%) in a school.

3.4.7 The choice of a suitable comparator (i.e. national, regional or PCT) should be made by the PHO or PCT, depending on local data. Within a small PCT, comparison of school data with the PCT average is unlikely to show many significant differences (because of the wide confidence limits around the PCT figure). Use of the national average reduces this problem, but for a region in which obesity prevalence is substantially lower or

higher than the national average, this could mean that most schools are rated as being significantly higher or lower than the comparator.

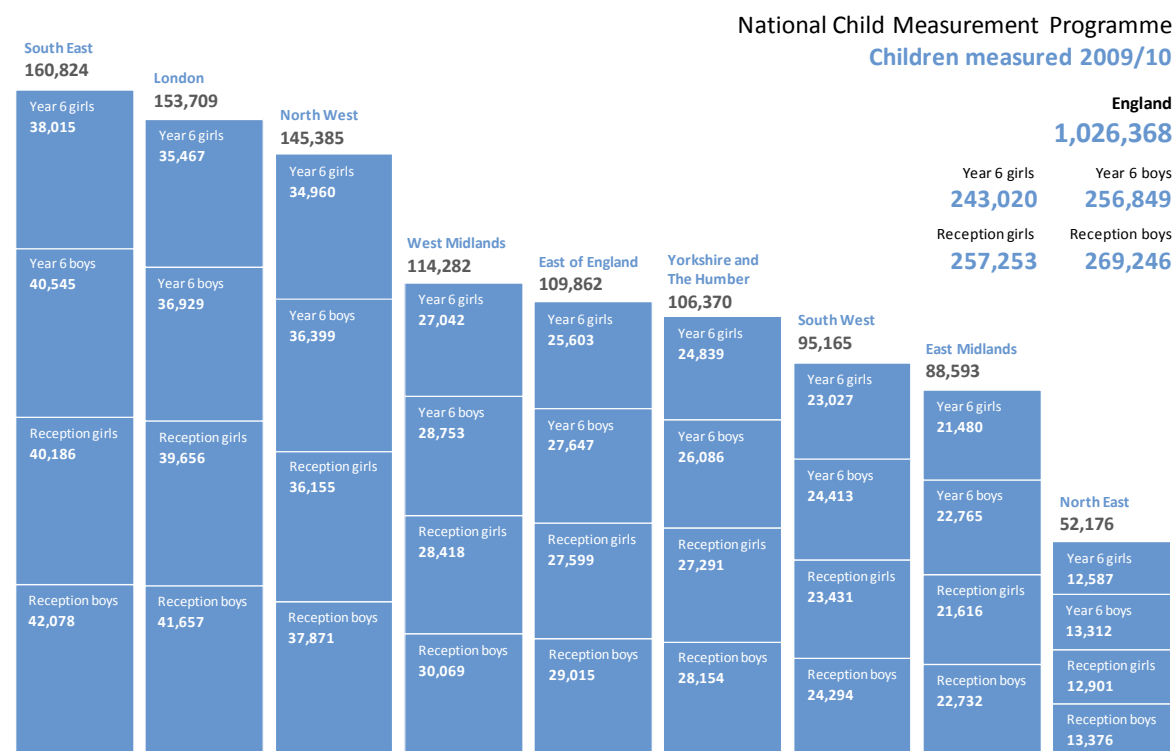
- 3.4.8 Although the NCMP dataset, as included in the school feedback tool, has already undergone rigorous data cleaning by the IC, it is not possible at national level to ensure all records within the NCMP are valid and correctly coded. Such errors within the dataset are likely to have minimal impact on obesity prevalence figures at national, regional, or PCT level, but at school level the impact could be far larger. PCTs are therefore advised to rigorously check the data being fed back to schools before they are released.
- 3.4.9 It is important to take great care to ensure that prevalence and participation information is fed back to the correct school (given the evidence that some pupils have been miscoded to schools within the NCMP dataset as described in Appendix 3). If for example, prevalence and participation information for Year 6 pupils is mistakenly fed back to an infant school that does not have Year 6 pupils, or if a school is incorrectly told that none of their pupils were measured, there is a real danger that this could prejudice school engagement in the NCMP in the future.
- 3.4.10 A number of schools will have too few pupils to show any significant difference in obesity prevalence from the chosen comparator. In addition, the minimum 70% participation limit suggested for providing feedback will exclude a further proportion of schools from receiving any feedback on their obesity prevalence. To minimise the number of schools affected in this way, users of the tool may wish to consider clustering schools to enable feedback to be provided for all schools.
- 3.4.11 Schools could be clustered geographically, or according to shared characteristics such as deprivation. PHOs should use local intelligence to determine how this could best be done for their area.

#### 4 The 2009/10 NCMP national dataset

- 4.1 The 2009/10 NCMP dataset consists of a single MS Access database with all the information required for local analysis.
- 4.2 The database is organised into a series of tables, which are shown in Appendix 1. The tables hold data at pupil, school, PCT, and Strategic Health Authority (SHA) level. In addition, a series of lookup tables are provided to allow the interpretation of coding used within the dataset (e.g. ethnicity, BMI classification and LA coding).
- 4.3 PHOs should note that this dataset has been cleaned according to the IC's data-cleaning protocol.<sup>7</sup> All invalid records have been removed but can be viewed in a separate table (Pupil\_data\_excluded).
- 4.4 The dataset includes a column labelled 'Exclude\_flag'. Records from independent schools and special schools are coded as 1. PCTs are not required to take measurements at these schools, and many independent and special schools do not participate in the NCMP. As a result these records cannot be seen as a representative sample of pupils attending such schools and are therefore not included in the national analysis. **These records need to be excluded if analysis is to match the IC's figures.**

4.5 The number of records in the 2009/10 NCMP dataset, excluding records from independent and special schools, is shown in Figure 2 by region, school year, and sex.

**Figure 2:** Number of records in the 2009/10 NCMP by region, school year, and sex (excluding records from independent and special schools)



4.6 It is important to note that the number of pupils in the final dataset has changed very slightly from that used in the tables published by the IC. Two additional pupils have been included in the overall dataset (within East and North Hertfordshire PCT), and BMI classification has changed for a small number of pupils within Redbridge PCT. The impact of these changes is negligible at national and regional level. However prevalence figures for Redbridge PCT have changed slightly from those published.

[http://www.ic.nhs.uk/webfiles/publications/003\\_Health\\_Lifestyles/ncmp/NCMP\\_Issue\\_Notification.pdf](http://www.ic.nhs.uk/webfiles/publications/003_Health_Lifestyles/ncmp/NCMP_Issue_Notification.pdf)

4.7 The dataset contains several fields that the IC has assigned to the data - e.g. codes for local government and health geographies. There are some boundary differences between PCTs and LAs; schools are allocated to LAs using the school postcode whereas PCT coding is based on the PCT that took the measurements. These two methods of assigning geographies may lead to small differences between LA and PCT, or Government Office Region (GOR) and SHA analysis in some cases.

4.8 The child's home postcode is a mandatory field in NCMP data collection and is available for the majority of children. The postcode is converted to a Lower Super Output Area (LSOA) code at the time of upload of data to the IC. Child LSOA can be used for further analysis, e.g. to assign a local deprivation score from the Indices of Deprivation or a larger geography such as MSOA. An Index of Multiple Deprivation (IMD) 2010 decile has been allocated to each record within the Pupil\_data table using the 2010 IMD. Children in IMD decile one are resident in LSOAs within the least deprived 10% of the national population, whereas children in decile ten are in the most deprived 10%. The child LSOA field is not used to assign other geographies, such as LA of child residence, because of incomplete reporting of valid postcodes.

## Geographic coding in the NCMP dataset

Geography:	Derived from:
Local Authority	School postcode
Government Office Region	School postcode
Primary Care Trust	PCT taking measures
Strategic Health Authority	PCT taking measures
Child LSOA	Child postcode
School LSOA	School postcode

- 4.9 Two sets of IMD deciles are provided - based on the LSOA of the school and based on the LSOA of residence of the children. The former indicator is available for all pupils, whereas the latter is not provided for those children where the LSOA of residence is not available. IMD decile based on the LSOA of residence will provide a more accurate indicator of individual children's socioeconomic status. However, in areas where a substantial proportion of children measured have no coding for area of residence, IMD decile based on the school postcode may yield more robust analysis.
- 4.10 The 'BMI\_class' field in the Pupil\_data table shows whether individual children are classified as underweight, healthy weight, overweight or obese, according to the 2<sup>nd</sup>, 85<sup>th</sup> and 95<sup>th</sup> centiles on the British 1990 growth reference (UK90).<sup>8,9</sup> The IC has also added the appropriate z and p scores for body mass index (BMI), height and weight for each child (see Section 5).

### Codes used within 'BMI\_class' field

BMI classification	UK90 population monitoring BMI centile range	School year	
		Reception	Year 6
Obese	>=95 <sup>th</sup> centile	1	2
Overweight	>=85 <sup>th</sup> and <95 <sup>th</sup> centile	3	4
Underweight	<2 <sup>nd</sup> centile	5	6
Healthy weight	>=2 <sup>nd</sup> and <85 <sup>th</sup> centile	7	8

- 4.11 The 2009/10 NCMP dataset contains no records for children in Year 6 measured by Luton PCT due to problems during data collection which resulted in child measurements being incorrectly recorded.

## 5 Z scores, centiles and BMI thresholds

- 5.1 The height, weight and BMI of children change as children grow, and also vary between boys and girls. In order to determine whether any individual child's measurements should be considered too low or too high, the child's height, weight or BMI must be compared to a child growth reference. Such references describe the expected pattern of growth for children at different ages and by sex, and are usually based on a relatively healthy historic population (i.e. one with low obesity prevalence).

- 5.2 A child growth reference can be used to convert the height, weight or BMI measurements of individual children into standard deviation scores (z scores) or centiles (p scores). These z scores describe whether the child has a higher or lower value for that measure than would be expected of children of the same age and sex.
- 5.3 For example, a child with a BMI z score of 0 (which equates to the 50th centile) has a BMI the same as the average value for children of the same age and sex in the 1990 reference population. A child with a BMI z score of +1.64 (the 95th centile) has a BMI that is higher than 95% of the 1990 reference population.

#### **BMI thresholds used with the NCMP dataset**

- 5.4 The NCMP uses the British 1990 growth reference (UK90)<sup>8,9</sup> for BMI and the 2<sup>nd</sup>, 85<sup>th</sup> and 95<sup>th</sup> centiles to define children as underweight, overweight or obese according to age and sex. This definition is the most commonly used in England for population monitoring – e.g. in Health Survey for England (HSE) figures.
- 5.5 It is important to note that the 85th and 95th centiles used in the NCMP are intended for population monitoring use only, and do not provide the number or percentage of individual children clinically defined as overweight or obese.
- 5.6 In clinical settings or when monitoring the BMI of individual children, the 2<sup>nd</sup>, 91<sup>st</sup> and 98<sup>th</sup> centiles of the UK90 reference are used in the UK to classify the BMI of individual children as underweight, overweight or obese respectively. The NCMP parental feedback letters issued by PCTs use these clinical cut-offs to classify individual children as underweight, overweight or obese.
- 5.7 It is important to note that the clinical cut-offs for child underweight, overweight, and obesity are in fact set at -2 (i.e. -6/3), +4/3, and +2 (i.e. 6/3) standard deviations. These actually equate to the 2.3<sup>rd</sup>, 90.9<sup>th</sup>, and 97.7<sup>th</sup> centiles, when rounded to one decimal place, although they are usually referred to as the 2<sup>nd</sup>, 91<sup>st</sup>, and 98<sup>th</sup> centiles.
- 5.8 Underweight prevalence figures using population monitoring or clinical thresholds are both labelled as using the 2<sup>nd</sup> centile. However, those based on the population monitoring thresholds use the 2<sup>nd</sup> centile, whereas those for clinical purposes use -6/3 standard deviations (i.e. the 2.3<sup>rd</sup> centile). Prevalence of underweight will therefore differ slightly between the population and clinical cut offs.
- 5.9 The NOO child obesity e-atlases present NCMP data using the population monitoring and clinical cut-offs. These data can be downloaded as an Excel workbook for PCT and LA geographies from within the e-atlases. <http://www.noo.org.uk/visualisation/eatlas>.
- 5.10 When presenting prevalence figures based on the 85<sup>th</sup> and 95<sup>th</sup> centile cut-offs, or any other BMI thresholds, it is important to state the thresholds being used to ensure valid comparisons can be made between the figures being presented and those from other sources.
- 5.11 If for any reason users need to calculate their own BMI z scores for NCMP or other data, this can be done quickly and easily using the 'LMS Growth' Microsoft Excel add-in software. This software is available at no charge from Harlow Publishing.  
<http://www.healthforallchildren.com/index.php/shop/product/1-Software/Gr5yCsMCONpF39hF/0>

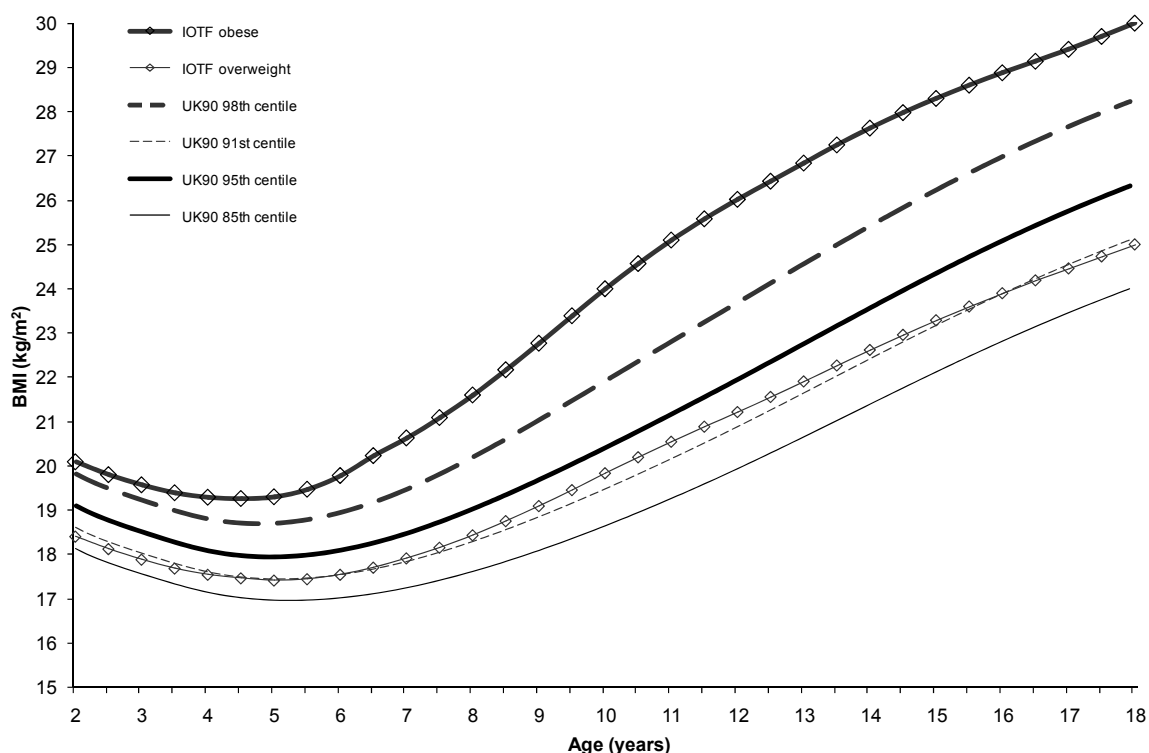
5.12 There are very slight differences between this Excel add-in and the approach used to assign BMI z scores and centiles in the NCMP dataset. These relate to the precise method used to allocate L, M and S variables to individuals. Hence, the resulting BMI, height and weight z scores assigned may differ by a small amount. However these differences do not have any noticeable impact on prevalence figures.

### Other thresholds for defining children’s BMI status

5.13 Users of the NCMP dataset should also note that other growth references are sometimes used to classify children as overweight or obese. For example, the World Health Organization (WHO) 2007 or International Obesity Task Force (IOTF) thresholds are sometimes used in the UK. The IOTF thresholds were used in the Foresight obesity modelling<sup>10</sup> and for child obesity prevalence figures from the Millennium Cohort Study.<sup>11</sup>

5.14 Although these alternative growth references show a broadly similar pattern of changing BMI with age, they produce very different thresholds for underweight, overweight and obesity. As a result, prevalence figures that use different references or thresholds cannot be compared directly.

**Figure 3:** Obesity and overweight thresholds for boys – UK90 and IOTF



5.15 Most published NCMP analyses use the recommended UK90 population monitoring thresholds to ensure consistency between published figures. If making comparisons with other published prevalence analyses, the same definition of obesity, overweight and underweight must be applied across all figures to determine which BMI category children fall into.

## 6 Essentials for NCMP analysis

- 6.1 When making NCMP data publicly available, counts of five or fewer children (excluding zeros) must be suppressed in figures for LAs and smaller geographies, such as electoral wards and SOAs. Corresponding cells providing totals should also be suppressed to avoid disclosure by differencing. However, figures for PCTs, SHAs and GORs do not need to be suppressed. This is in line with the guidance of the IC Information Governance team, as outlined in the PHO data-sharing agreement.
- 6.2 Users should familiarise themselves with the published data to ensure they are not just duplicating analysis that has already been performed nationally.
- 6.3 Wherever possible, local analysis should be checked against the figures published by the IC and NOO to ensure consistency. For example, if figures are produced for electoral wards within an LA, it should be possible to check that the total counts of children across all wards match with the published figures for the relevant LA.
- 6.4 Pupils measured attending independent and special school should be excluded to match published data.
- 6.5 Confidence limits are published in the Excel data tables provided by the IC and NOO and these should be used when comparing between areas or monitoring change over time. Users of the NCMP dataset should also apply confidence limits or statistical tests to their own analysis. Methods for doing this are outlined in Appendix 4 of this guidance.
- 6.6 Any publications using NCMP data should clearly state the thresholds used (usually the 85<sup>th</sup> and 95<sup>th</sup> centiles of the UK90 BMI growth reference) to derive obesity and overweight prevalence figures.
- 6.7 Any published analysis should include 'The NHS Information Centre for health and social care' as the data source for NCMP data.

## 7 Suggested analysis at regional and local level

### Data quality and participation

- 7.1. Previous analysis has shown that low levels of participation in the NCMP and poor data quality may affect the reported prevalence of obesity. At national level both participation and data quality have improved with each year of the NCMP, however there are still some parts of the country where these indicators are less good. It is therefore important that these issues are examined at a local level, both to determine whether further improvements can be made, and also to explore whether any observed changes in obesity prevalence might be related to changes in participation or data quality.
- 7.2. Participation rate and prevalence: Published analyses of the 2006/07 and 2007/08 NCMP datasets suggest that low rates of participation in the NCMP at PCT level may be associated with a lower reported prevalence of obesity, especially for Year 6. This effect may have been due to selection bias in children who were measured, whereby children who do not participate in the NCMP are more likely to be obese than those who do participate.
- 7.3. The impact of participation on prevalence appears to have declined in more recent years of the NCMP. However, the potential impact of participation should always be considered,



especially if comparing areas with very different participation rates or looking at change over time.

- 7.4. Local areas may wish to identify areas of low participation within their NCMP data, and also the reasons for these – for example whether this is due to entire schools not taking part, or due to individual children within schools not taking part. This information can then be used to increase participation for future years of the NCMP. The 'schools\_data' table in the NCMP dataset contains all eligible state schools, as well as a field to show which schools participated. This can be used to quickly identify which schools within a local area did not take part in the NCMP in 2009/10.
- 7.5. If investigating the impact of participation on prevalence, the participation rates used should ideally be based on the proportion of children measured in schools in which measurements were submitted. This is because if no pupils within a school have been measured it is unlikely to be due to selective opt-out of obese children, so the effect on prevalence figures is likely to be minimal. The participation rate is calculated by dividing the number of children measured by a PCT in each school year by the sum of the pupil numbers in schools in which measurements were taken. This figure may be higher than the published participation rate for the PCT.
- 7.6. Participation by sex: Previous NCMP analysis has also suggested that participation in the NCMP by girls may be lower than that for boys and differs by area. If this is due to a selective opt-out of overweight and obese girls from the NCMP measurements, any bias could be stronger for girls than for boys. This issue might also benefit from local analysis and should also be considered when looking at differences in prevalence by sex at a local level.
- 7.7. Data quality: The national NCMP dataset has undergone extensive cleaning but there is a limit on the checks that can be done nationally with such a large dataset. It is therefore advised that local areas assess the quality of their NCMP data before conducting detailed analysis. More information on suggested data quality checks is provided in Appendix 3.

### **Sociodemographic variation: effect of ethnicity, deprivation and setting**

- 7.8. Published NCMP analyses show that ethnicity, deprivation, and setting (e.g. urban/rural environment) may influence prevalence of obesity, overweight and underweight.
- 7.9. PCTs and PHOs should use their local intelligence and data to determine to what extent the variation within their local area can be explained by these variables. It may be useful to make comparisons with the regional or national average to determine whether the relationship between sociodemographic variables and child obesity prevalence in the local population is the same as that for all English children, or whether a different pattern is observed. Such information should be useful to assist any local targeting of interventions to tackle unhealthy weight among children.
- 7.10. Ethnicity: The NCMP dataset contains fields showing the ethnicity of individual children. Therefore analysis can easily be performed at a local level for different ethnic groups. To avoid problems due to potentially low numbers of children for some ethnic groups, it may be necessary to combine some ethnic groups when conducting such analysis at local level.
- 7.11. Socioeconomic status: Analysis of socioeconomic status or urban rural environment can be undertaken using the child's LSOA of residence to assign such variables to individual children. The IMD 2010 decile for the child's LSOA of residence has been assigned to each record in the



dataset with a valid LSOA code within England. The IMD 2010 decile based on the LSOA of the school is also included in the dataset with the School\_data table.

- 7.12. Analysis can be performed grouping child records according to quintiles or deciles of socioeconomic indicators (e.g. IMD 2010). Analyses can be produced for these groupings to determine the links between factors such as deprivation and prevalence of obesity. An example of such analysis can be found in the spring 2009 edition of the NOO newsletter, [http://www.noo.org.uk/NOO\\_pub/newsletters](http://www.noo.org.uk/NOO_pub/newsletters).
- 7.13. Setting: As shown in the IC's 2009/10 NCMP report, obesity prevalence can be seen to vary between urban and rural areas. However, it is likely that much of this pattern can be explained by differences in the sociodemographic mix of the urban and rural population.
- 7.14. The ONS Area Classification might provide a more useful way of analysing differences in obesity prevalence that takes account of the urban or rural setting, as well as the demographic and socioeconomic mix of the population. This population stratification system is available for free from the ONS website. More information on this can be found in the spring 2010 edition of the NOO newsletter, [http://www.noo.org.uk/NOO\\_pub/newsletters](http://www.noo.org.uk/NOO_pub/newsletters).
- 7.15. Users of the NCMP dataset who already have access to commercially available population stratification systems may use these to perform similar analysis.

### **Monitoring change over time**

- 7.16. Results from the NCMP 2006/07, 2007/08, and 2008/09 can be downloaded from the IC website, or produced locally through analysis of the datasets provided to PHOs by the IC. The IC will be reissuing the historic NCMP datasets, in the same relational database format as used for the 2009/10 dataset, in spring 2011.<sup>†</sup>
- 7.17. If users want to make comparisons with data from previous years, then the impact of changing participation rates and changes in data quality between the years should always be taken into account. Appropriate confidence limits or statistical testing should be undertaken to ensure any reported differences are indeed significant. The suggested method for use when detecting a change in prevalence is described in Appendix 4 of this guidance.
- 7.18. When examining change in populations over time a number of papers have suggested looking at change in a measure such as mean BMI z score, rather than change in prevalence figures.<sup>12,13</sup> This can easily be calculated within the NCMP dataset, using the 'BMI\_z' field. As this measure takes account of the whole child population, rather than just the proportion over a certain threshold, it may allow changes over time to be detected earlier than if prevalence figures alone are used.

### **Small area analysis**

- 7.19. Obesity prevalence figures are routinely published for PCTs and LAs. However, many practitioners require information for sub-populations within these areas. Often such small area analysis is required in order to focus resources on the most at risk areas or communities. Obesity prevalence figures for small populations might also be required in order to compare

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<sup>†</sup> The datasets for earlier years have undergone further rigorous cleaning since they were first released to PHOs and PCTs. Additional duplicate records have been removed – the records that have been removed are shown in the 'Pupil\_data\_excluded' tables. Additionally data for Redbridge PCT has been revised slightly in the 2008/09 dataset, and for Cumbria and Ashton, Leigh and Wigan PCTs in the 2007/08 dataset.

with other variables available for small geographies, enabling an investigation of the local determinants of obesity in a form of ecological analysis.

- 7.20. Sub-PCT or LA level geographical analysis is possible using NCMP data. Analysis can easily be performed using school or LSOA as the unit of analysis, or by assigning an MSOA, or ward code from the LSOA code. However, such analysis needs to be performed and interpreted with caution.
- 7.21. Prevalence figures for sub-PCT or LA populations are likely to be based on small numbers and so are subject to a high degree of natural variation. Confidence limits should always be used to ensure any apparent differences in prevalence between areas are statistically significant and not just the result of the small sample size at this level of analysis (see Appendix 4)
- 7.22. To tackle the issue of small numbers it is advised that, wherever possible, such analysis is conducted using more than one year of NCMP data. Combining three years of NCMP data appears to provide relatively robust figures for obesity prevalence at MSOA level. However, for smaller geographies (e.g. LSOAs or schools), even four years of data may not be enough to provide robust figures.
- 7.23. Other issues may also come into play with small area analysis that are less problematic for larger geographic areas. For example, the sex ratio of children measured is likely to show much greater variation across small populations than across PCTs or regions. As obesity prevalence varies significantly by sex, it is possible that small area figures could be affected by the sex ratio of children measured as well as by the underlying prevalence of obesity.
- 7.24. NOO is planning to publish an e-atlas showing NCMP data for MSOAs in spring 2011. These figures are based on data from 2007/08, 2008/09, and 2009/10 combined. NOO will also be publishing further guidance on using NCMP data for small area analysis at the same time. This guidance will explain the issues associated with presenting NCMP data at small area level as well as exploring what methods are appropriate and available for analysis that will ensure more useful and valid results.

#### **Alternatives to small area analysis**

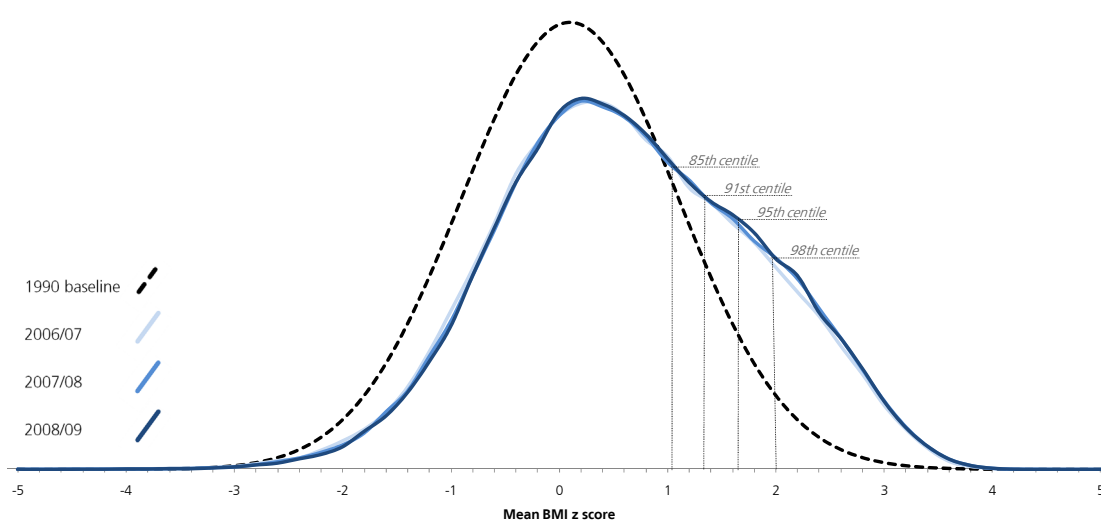
- 7.25. Rather than producing prevalence figures for small areas and then using these to target resources or investigate determinants, obesity prevalence may be better investigated using groups of pupils based on common characteristics. For example, the population could be grouped using an index of deprivation, ethnicity or the type of community in which they reside, as described in sections 7.8 to 7.15.
- 7.26. This approach has the advantage that, rather than producing figures for a large number of small areas (but only based on a small number of children measured in each area), the dataset is divided into a much smaller number of population groups. As a result, any analysis for each group is based on a greater number of children per group, and so can be considerably more robust.
- 7.27. For example, child obesity prevalence for each LSOA within a LA will tend to show only a very weak correlation with an index of socioeconomic deprivation at LSOA level. However, if the NCMP data for the same LA are grouped into deciles of deprivation (based on the LSOA of residence), this will usually show a strong pattern of increasing obesity prevalence with increased levels of socioeconomic deprivation. By using fewer groups, based on similar characteristics, the underlying pattern can be seen much more clearly.

7.28. Analysis of this form can often provide much more useful information regarding the local determinants of obesity. In addition such analysis can be used to provide more robust information on how best to target resources. If the most deprived parts of an LA can be shown to have the highest prevalence of obesity, then resources can be targeted at these areas with a good degree of confidence that they will be reaching those individuals most at risk of obesity.

## BMI distribution

7.29. Users of the 2009/10 NCMP dataset may wish to make use of the full range of height, weight and BMI measures to comment on the population as a whole rather than only considering the overweight, obese and underweight children. Figure 4 provides an example of the distribution of BMI z scores within the 2006/07 to 2008/09 NCMP datasets for boys in Year 6, compared to the 1990 baseline.

**Figure 4:** Change in the distribution of BMI z score for boys in Year 6 by year of measurement



7.30. In this case, the possible confounding effect of age on such analysis has been addressed by using BMI z scores. The expected height, weight and BMI of children vary substantially with age, so if age is not considered, the shape of the distribution will be affected. Users should therefore consider the use of the height, weight and BMI z scores for age of individual children. These scores are available in the dataset provided by the IC. It is important to note however that use of z scores from the UK90 growth reference will have the effect of normalising the distribution, so these curves should be interpreted in terms of difference from the normal distribution, rather than as the population distribution per se.

## 8 Analysis FAQ

8.1 The following questions have been compiled from common queries received by NOO and information included in previous NCMP guidance.

### Why should I use the IC's cleaned data?

8.2 Analysis should be based on the cleaned data from the IC rather than using the records held by PCTs, to ensure accuracy and consistency with published figures (except for minor differences resulting from post-publication cleansing of the dataset, see Section 4.6).

- 8.3 The IC performs extensive data quality checks before the dataset is distributed to PHOs and where data quality issues are identified this information is fed back to PCTs. However local areas may wish to perform further data quality checks of their own. Some suggested checks are outlined in Appendix 3.

#### **What sort of analysis do other areas perform?**

- 8.4 Links to regional and local reports from previous years (based on NCMP data) are available on the NOO website (<http://www.noo.org.uk/ncmp>). These documents provide an illustration of the sort of analysis that can be done with this dataset. Analysts may wish to look at some of these reports before performing their own analysis.
- 8.5 PHOs or PCTs undertaking analyses are asked to publish their reports on their own websites where possible. **NOO is keen to receive information about, and links to, any such reports at [ncmp@noo.org.uk](mailto:ncmp@noo.org.uk)**, so that such information can be posted on the NCMP pages of the NOO website and be available to all.

#### **How can I validate or QA my own analysis?**

- 8.6 Users should check that their analyses match prevalence figures published by the IC and NOO for PCTs, LAs and SHAs.

#### **Can I combine data for school years?**

- 8.7 Prevalence figures should usually be produced separately for Reception and Year 6, rather than combining the data. Prevalence of obesity and overweight differ with age, tending to be higher in the older age-groups. As a result, a combined prevalence figure will tend to be lower if a larger proportion of Reception children have been measured, and higher for areas in which a larger proportion of Year 6 children have been measured.
- 8.8 If combined prevalence figures are produced, they should be age standardised, rather than created by simply combining crude prevalence rates. A simple way to achieve this involves taking an average of the Year 6 and Reception figures, rather than by calculating a rate in the usual manner by combining data for both school years.

#### **Do I need to take account of the sex ratio of children measured?**

- 8.9 Obesity and overweight prevalence for children is known to vary by sex. Users of the NCMP dataset may wish to further investigate differences by sex within their local area. The NOO NCMP e-atlas (<http://www.noo.org.uk/visualisation/eatlas>) provides prevalence figures broken down by sex for LAs and PCTs, but users will need to perform their own analysis to obtain these figures for smaller geographies. An Excel workbook containing the data can be downloaded from within the e-atlases.
- 8.10 The 2006/07 NOO NCMP report noted substantial differences between the sex ratios of children measured in different areas, and this pattern appears to have continued in more recent years. In addition, at least at national level, more boys seem to participate than girls. Although this appears to have a minimal effect on PCT level prevalence figures, for smaller populations the possible impact of a skewed sex ratio is greater. Users should be aware of this issue and, if prevalence figures are to be compared for boys and girls combined, it should first be ensured that there are no large differences in sex ratio between the populations being examined.

8.11 This issue is likely to be particularly important at school level. Comparing prevalence of obesity at a single sex school with a prevalence figure for the PCT or region that includes girls and boys would produce inaccurate estimates of prevalence. This issue needs consideration, especially if feeding back results to schools. The NCMP school feedback tool standardises for sex when feeding back information on school level obesity prevalence.

**How can I check to see whether a change or difference in prevalence is meaningful?**

8.12 Comparison of prevalence figures with the regional or national rate, between different populations or over time should always take into account the degree of uncertainty around these figures.

8.13 The IC report and published data tables provide approximate confidence limits for PCT and LA prevalence rates. The methods used for these confidence limits are detailed in the IC report in Annex 3.

8.14 If users of the NCMP dataset want to calculate their own confidence limits for other geographical areas, or if they need to produce confidence limits for prevalence by sex or for underweight, the 'Wilson Score' method is recommended. This method is also used in the APHO Health Profiles. See Appendix 4.

8.15 If examining a reported change in rate for statistical significance, the approach recommended by Altman et al. should be used. See Appendix 4, section A4.5.

8.16 PHOs might also consider using funnel plots or control charts to show PCT prevalence rates with an indication of the expected variation around these figures dependent on the size of the population. An example of such analysis can be found in Section 4.2 of the 2007/08 NOO NCMP report.

## Appendix 1: NCMP 2009/10 data fields

A1.1. The 2009/10 NCMP dataset is supplied to PHOs by the NHS IC in a single Access database. The database contains five data tables which contain information at pupil (for both valid and excluded records), school, PCT, and SHA level. Eight additional tables are provided which allow users to assign descriptions to the coding used within the dataset. These lookup tables cover ethnic codes, LAs (former and current), GORs, Urban/Rural classification, school establishment type, BMI classification, and removal criteria. The field names and descriptions for the five data tables are outlined below:

**Table 1:** Pupil\_data and Pupil\_data\_excluded<sup>‡</sup>

Field Name	Field Description
Pupil_ID	Unique ID code for each pupil
Exclude_flag	Pupils attending independent and special schools are flagged as 1 (these records need to be excluded to match the published figures)
Sex	Sex of pupil
Age	Age of pupil (in months)
School_yr	School Year of pupil - derived from child age (R: Reception, 6: Year 6)
Ethnicity_full	Ethnicity code as entered by PCT
Ethnicity	Ethnicity recoded to NHS classification (see table Ethnicity_codes)
Height	Height of pupil (in cm)
Height_z	Height z score - derived from British 1990 growth reference, using Age, Sex and Height fields
Height_p	Height centile - derived from British 1990 growth reference, using Age, Sex and Height fields
Weight	Weight of pupil (in kg)
Weight_z	Weight z score - derived from British 1990 growth reference, using Age, Sex and Weight fields
Weight_p	Weight centile - derived from British 1990 growth reference, using Age, Sex and Weight fields
BMI	BMI of pupil in kg/m <sup>2</sup> - derived from height and weight
BMI_z	BMI z score - derived from British 1990 growth reference, using Age, Sex and BMI fields
BMI_p	BMI centile - derived from British 1990 growth reference, using Age, Sex and BMI fields
BMI_class	BMI classification to UK90 population monitoring centiles (85th/95th centiles for overweight and obese), plus 2nd centile for underweight (See table BMI_class)
Month_meas	Month of measurement (1: January, 2: February etc)
PCT	PCT that submitted measurement (see table PCT_data)
SHA	SHA - based on PCT that submitted measurement (see table SHA_data)
URN	DfE Unique Reference Number for school (see table School_data)
LA_current	Current Local Authority (post April 2009) - derived from postcode of school (see table Current_LAs)
LA_former	Former Local Authority (pre April 2009) - derived from postcode of school (see table Former_LAs)
GOR	Government Office Region - derived from postcode of school (see table GORs)
Child_LSOA	Lower Super Output Area of child - derived from child postcode
Child_urban	ONS Urban/ Rural classification - derived from child postcode (see table Urban_rural)
Child_IMD_decile	The decile that the Index of Multiple Deprivation (IMD) 2010 score falls into - derived from LSOA of child (0: not available, 1: 1st decile (least deprived),..., 10: 10th decile (most deprived))
School_child_distance	The straight line distance between the school postcode and child postcode (in km). Please note the child postcode, and all fields derived from it, have been deleted if this distance is greater than 60km, as the child postcode was thought to be erroneous
Removal_criteria	Removal criteria (see table removal_criteria)

<sup>‡</sup> The Local ID field has been removed from the 2009/10 dataset to comply with current Information Governance guidelines

**Table 2: PCT\_data**

Field Name	Field Description
PCT	PCT code
PCT_name	PCT name
SHA	SHA code of PCT
PCT_Meas_R	Number of pupils measured – Reception
PCT_Meas_6	Number of pupils measured - Year 6
PCT_Eligible_R	Eligible pupils figure (pupil denominator used for participation rates, as agreed with IC) - Reception
PCT_Eligible_6	Eligible pupils figure (pupil denominator used for participation rates, as agreed with IC) - Year 6
PCT_Particip_R	Participation rate – Reception
PCT_Particip_6	Participation rate - Year 6
Storage_R	Mode of data storage – Reception
Storage_6	Mode of data storage - Year 6
Parentopt_R	Number of pupils not measured due to parental opt-out - Reception
Parentopt_6	Number of pupils not measured due to parental opt-out - Year 6
Childopt_R	Number of pupils not measured due to child opt-out - Reception
Childopt_6	Number of pupils not measured due to child opt-out - Year 6
Unable_R	Number of pupils not measured because child unable to stand on scales - Reception
Unable_6	Number of pupils not measured because child unable to stand on scales - Year 6
Absent_R	Number of pupils not measured because child absent on day of measurement - Reception
Absent_6	Number of pupils not measured because child absent on day of measurement - Year 6
Schl_opt_R	Number of pupils not measured because school opted out of measurement - Reception
Schl_opt_6	Number of pupils not measured because school opted out of measurement - Year 6
nSchl_opt_R	Number of schools which opted out of measurement - Reception
nSchl_opt_6	Number of schools which opted out of measurement - Year 6
Other_R	Number of children not measured for other reasons - Reception
Other_6	Number of children not measured for other reasons - Year 6

**Table 3: SHA\_data**

Field Name	Field Description
SHA	SHA code
SHA_name	SHA name
SHA_Meas_R	Number of pupils measured - Reception
SHA_Meas_6	Number of pupils measured - Year 6
SHA_Eligible_R	Eligible Reception year pupils within SHA (derived from sum of PCT eligible figures)
SHA_Eligible_6	Eligible Year 6 pupils within SHA (derived from sum of PCT eligible figures)
SHA_Particip_R	Participation rate - Reception
SHA_Particip_6	Participation rate - Year 6

**Table 4: School\_data**

Field Name	Field Description
URN	DfE Unique Reference Number for school
Schl_name	School name
Schl_Addr1	School address line 1
Schl_Addr2	School address line 2
Schl_Addr3	School address line 3
Schl_Addr4	School address line 4
Schl_Addr5	School address line 5
Schl_pcode	School postcode
Schl_type	School establishment type (see table School_type)
Particip_schl	Schools that participated in the NCMP 0910 are flagged as 1. All schools in Luton PCT where Year 6 measurements were taken are flagged as 1, even though all these records were found to be unreliable and excluded (see Pupil_data_excluded)
Optional_schl	Schools where NCMP measurements are optional, i.e. independent and special schools, are flagged as 1
Schl_LSOA	Lower Super Output Area of school - derived from school postcode
LA_current	Current Local Authority (post April 2009) - derived from postcode of school (see table Current_LAs)
LA_former	Former Local Authority (pre April 2009) - derived from postcode of school (see table Former_LAs)
GOR	Government Office Region - derived from postcode of school (see table GORs)
Schl_urban	ONS Urban/ Rural classification - derived from postcode of school (see table Urban_rural)
Schl_IMD_decile	The decile that the Index of Multiple Deprivation (IMD) 2010 score falls into - derived from LSOA of school (0: not available, 1: 1st decile (least deprived),..., 10: 10th decile (most deprived))
PCT	PCT code of PCT responsible for taking NCMP measurements
SHA_code	SHA - based on PCT that submitted measurement (see table SHA_data)
Schl_Eligible_R	Eligible pupils figure supplied by PCT. Adjusted so not exceeded by number of pupils measured – Reception
Schl_Eligible_6	Eligible pupils figure supplied by PCT. Adjusted so not exceeded by number of pupils measured - Year 6





<PCT name>  
<PCT Address 1>  
<PCT Address 2>  
<PCT Address 3>  
<PCT Address 4>  
<PCT Address 5>

<School name>  
<School Address 1>  
<School Address 2>  
<School Address 3>  
<School Address 4>  
<School Address 5>

<Date>

## Results from the National Child Measurement Programme 2009/10

Dear <Headteacher>

I am writing to thank you for taking part in the National Child Measurement Programme (NCMP) in 2009/10 and to provide you with some feedback of your school's results from the programme.

Nationally, around 99% of eligible schools participated in the 2009/10 NCMP. We very much value your school's continuing engagement in the programme which enables us to collect the information we need to provide us with important information about child obesity to help us plan local services to tackle obesity.

Established in 2005, the NCMP for England takes weight and height measurements from children in Reception and Year 6. This valuable information is already being used to inform children's service planning and delivery locally, regionally and nationally. The programme also engages with parents on the importance of healthy weight in children, since their children's results are shared with them.

Obesity is a priority for the Government. The recent White Paper: *Healthy Lives, Healthy People* sets out the Government's commitment to continue to run the NCMP, providing local areas with information about levels of overweight and obesity in children to inform planning and commissioning of local services. The Government wants families to know that they can change their lifestyle and make a difference to their health so Primary Care Trusts (PCTs) are continuing to share a child's result with their parents so they can make informed lifestyle choices. The Government will be publishing a document on obesity in Spring 2011. This will set out the commitment to tackling obesity and the role that key partners can play.

The national results from the 2009/10 school year were recently published by the NHS Information Centre. You can find the results for your local area or download the full report at:  
<http://www.ic.nhs.uk/ncmp>

In addition, I am attaching a summary of the 2009/10 results for your school with some supporting information. This includes a comparison of the prevalence of underweight, overweight and obese children in your school with national, regional and local Primary Care Trust figures. Please note that specific percentages cannot be disclosed for individual schools to avoid identifying individual children.

Thank you again for your school's participation. If you want to discuss these results, please feel free to contact **[Insert name and contact details for appropriate contact]**

Yours sincerely

PCT obesity lead

# NCMP 2009/10 Results Summary

**Results for:** <School name>

**PCT:** <PCT name>

**Region:** <Region name>

In this report any differences between your school and the area of comparison have been checked for statistical significance. This means that, if your school appears to have a different participation rate or prevalence to the comparator, there is a 95% chance that these differences are real, and only a 5% chance that they have arisen by chance due to the random natural variation amongst schools.

## Participation rates

	Reception	Year 6	Total
<b>National participation rate:</b>			
<b>Regional participation rate:</b>			
<b>PCT participation rate:</b>			
<b>School participation rate:</b>			

Your school's participation rate in the 2009/10 NCMP was <similar to> the England average.

<Even in areas where participation was good, it is important to try and maintain, or ideally increase participation rates in future years.>

Analysis at the national level shows that lower participation rates are associated with lower reported prevalence of obesity. This is likely to be due to a selective opt-out of heavier children from the programme.

Even for schools with a good participation rate in 2009/10, it is still possible that such selective opt-out may occur, leading to an underestimation of the true prevalence of obesity for your school.

It is therefore important that we continue to look at ways to achieve as high a participation rate as is possible in future years of the NCMP and we would value your help towards achieving this.

If participation rates are below <70%>, the data for your school would be considered too unreliable to provide any meaningful information, and so your school will be shown as having 'insufficient information'.

## Prevalence of obesity, overweight and underweight

		Underweight	Overweight	Obesity
National prevalence:	Reception			
	Year 6			
Regional prevalence:	Reception			
	Year 6			
PCT prevalence rates:	Reception			
	Year 6			

It is important to note that the prevalence figures shown here use population monitoring definitions which are different, and less specific, than the definitions that would be used in a clinical setting. As a result these figures will be higher than the percentage of individual children who would be clinically diagnosed as being obese or overweight.

### School prevalence indicator:

Shaded cells indicate the position of your school

		No data or insufficient data	Below the <England> average	Similar to the <England> average	Higher than the <England> average
Reception	Underweight				
	Overweight				
	Obese				
Year 6	Underweight				
	Overweight				
	Obese				

If your school has a higher obesity and overweight prevalence than the area used for comparison, you may want to consider how you can help pupils at your school achieve and maintain a healthy weight as part of contributing to the wider well-being of children at school. The Government wants all children and young people to be healthy and to achieve their full potential. A range of resources and support has been developed to help make schools healthier places for pupils and staff to work and learn in.

If your school has a prevalence rate below that of the area used for comparison, I would encourage you to consider how you can continue to help your pupils towards achieving a healthy weight and their wider well-being.

If your school is shown to have 'insufficient data' this is either because your school had a very low participation rate in the NCMP or because the number of pupils in the school was below the minimum number required and so it would not be possible to provide accurate comparisons of the levels of child obesity. If your school has a low participation rate, encouraging full participation in the 2009/10 NCMP as part of contributing to the wider well-being of children at school may make it possible to provide prevalence figures for your school next year.

Useful resources to help you make your school a healthier place, and to improve NCMP response rates, are available at: [www.teachernet.gov.uk/wholeschool/obesity](http://www.teachernet.gov.uk/wholeschool/obesity)

### Appendix 3: Suggested data quality checks at local level

- A3.1. Although the NCMP dataset provided to PHOs has undergone extensive cleaning at national level, there is a limit on the checks and cleaning that can be done centrally on a dataset with over one million records from around 17,000 schools. As a result there may be some minor remaining data quality issues within the NCMP dataset.
- A3.2. In the 2006/07 dataset a number of issues were identified during analysis that had not been flagged by the NCMP validation process. These include: duplicate records in the dataset; entering the same pupil records for two adjacent schools; entering Year 6 pupils to infant schools or Reception pupils to junior schools; or submitting a large proportion of records with height and weight measurements rounded to the nearest whole number.
- A3.3. Since the 2006/07 dataset a number of additional validation checks have been introduced as part of the NCMP upload process, and further validation has been done by the IC on subsequent datasets. This process is described in the IC's annual NCMP report.<sup>1</sup> However, some data quality issues may remain despite these additional checks.
- A3.4. These quality issues have minor effects on national analyses but may be more important in detailed regional or local analyses by PHOs or PCTs. It is therefore important that basic quality checks on the dataset are performed and any anomalies are clarified with the relevant PCT or with the staff involved in collecting and processing measurements. Please report any errors or issues found from any data quality checks to NOO ([ncmp@noo.org.uk](mailto:ncmp@noo.org.uk)).
- A3.5. Users of the 2009/10 dataset may wish to check for some or all of the following issues before commencing detailed analysis.
- A3.5.1. **Records assigned to the wrong school:** In previous NCMP datasets a number of children have been found to be coded to the wrong school. This issue could often only be easily identified in the most obvious cases, such as where infant schools had Year 6 pupils coded to them and where Reception pupils were coded to junior schools. As a result, the true scale of this issue is unknown.
- A3.5.2. In many cases this miscoding seems to have occurred where schools share similar names (e.g. St Mary's Infants and St Mary's Junior) and all records for both schools have been assigned to one of the two institutions.
- A3.5.3. The NCMP upload process includes checks to warn PCTs where such miscoding may have occurred. For example, PCTs are warned of the number of schools for which no records are entered and also of the number of schools where the number of pupils measured exceeds the number of pupils reported to be at the school. However, it is still possible that some incorrect school coding may have occurred within the 2009/10 dataset.
- A3.5.4. If analysis is being undertaken at school level, and especially if NCMP feedback is being provided to schools, school level checks should be performed to identify those schools where pupils have been measured from a year group which Department for Education (DfE) headcounts suggest are not educated at that school.
- A3.5.5. If NCMP analysis is done at PCT level, any issues flagged during such checks could be followed up with the school nursing teams which visit the schools to collect NCMP data, or with staff at the Local Education Authority. Although such staff are unlikely to remember exactly how many pupils at a given school were eligible for the NCMP on

the day 2009/10 measures were taken, such staff may be able quickly to resolve whether pupils have been wrongly coded, or whether a school has recently expanded the ages of its intake.

- A3.5.6. At regional level PHOs may wish to send details of any schools flagged by such checks to PCTs for further investigation before any school level feedback or detailed analysis at school level takes place.
- A3.5.7. **Duplicate pupils:** Duplicate pupils assigned to a school should have been flagged during the upload process and removed before data were submitted to the NCMP database. However, in some situations (e.g. where duplicate records were submitted to separate schools or where records were actually part of a set of duplicated records in spite of having differing data for a given field) this may not have been picked up.
- A3.5.8. Detailed analysis of previous NCMP datasets has shown that a few PCTs had submitted the same set of records for more than one school. Often this occurred where pupils had been inaccurately coded to schools (as described in 3.5.2). For example, in some cases a group of Reception year pupils had been incorrectly added to a similarly named junior school as well as to the correct infant school.
- A3.5.9. Although the NCMP dataset is anonymised, it is possible to detect potential duplicate records by matching on fields such as age, sex, height and weight. Users of the 2009/10 dataset at local level may wish to check for such duplicate records, especially if errors are discovered in the way pupils have been coded to schools.
- A3.5.10. **Rounded records:** NOO analysis of previous NCMP datasets has shown that incorrectly rounded records (especially those for weight in the Reception year) are associated with a lower reported prevalence of obesity.
- A3.5.11. The IC run a validation check for rounded records during the data upload process, but as this warns PCTs of rounded records only after data have been collected, some PCTs still have a high proportion of rounded records in the 2009/10 dataset.
- A3.5.12. A summary of the proportion of rounded records for every PCT has been provided within the IC's 2009/10 NCMP report (Annex 2). Users of the NCMP data at local level are advised to check this list and, if the data for the population being studied have been submitted with rounded records, this issue may need to be taken into consideration when using prevalence figures for those areas. In addition it may prove beneficial to work with the teams responsible for collecting and entering NCMP data to ensure that data are correctly rounded within the 2010/11 NCMP dataset.

## Appendix 4: Methods for confidence limits

A4.1. We recommend that 95% confidence intervals are calculated with the method described by Wilson<sup>14</sup> and Newcombe<sup>15</sup> which is a good approximation of the exact method.

A4.2. The estimated proportions of children with and without the feature of interest were calculated:

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

sample size =  $n$

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

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

A4.3. Three values (A, B and C) were then calculated as follows:

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

where  $z$  is the appropriate value,  $z_{1-\alpha/2}$ , from the standard Normal distribution. Then the confidence interval for the population proportion is given by

$$(A-B)/C \quad \text{to} \quad (A+B)/C$$

A4.4. 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  $z^2/(n+z^2)$ . When  $r = n$  so that  $p = 1$ , the interval becomes  $n/(n+z^2)$  to 1.

A4.5. If the difference between two rates or proportions is being calculated, we recommend the use of the approach outlined by Altman et al. in *Statistics with Confidence* (edition 2):<sup>16</sup>

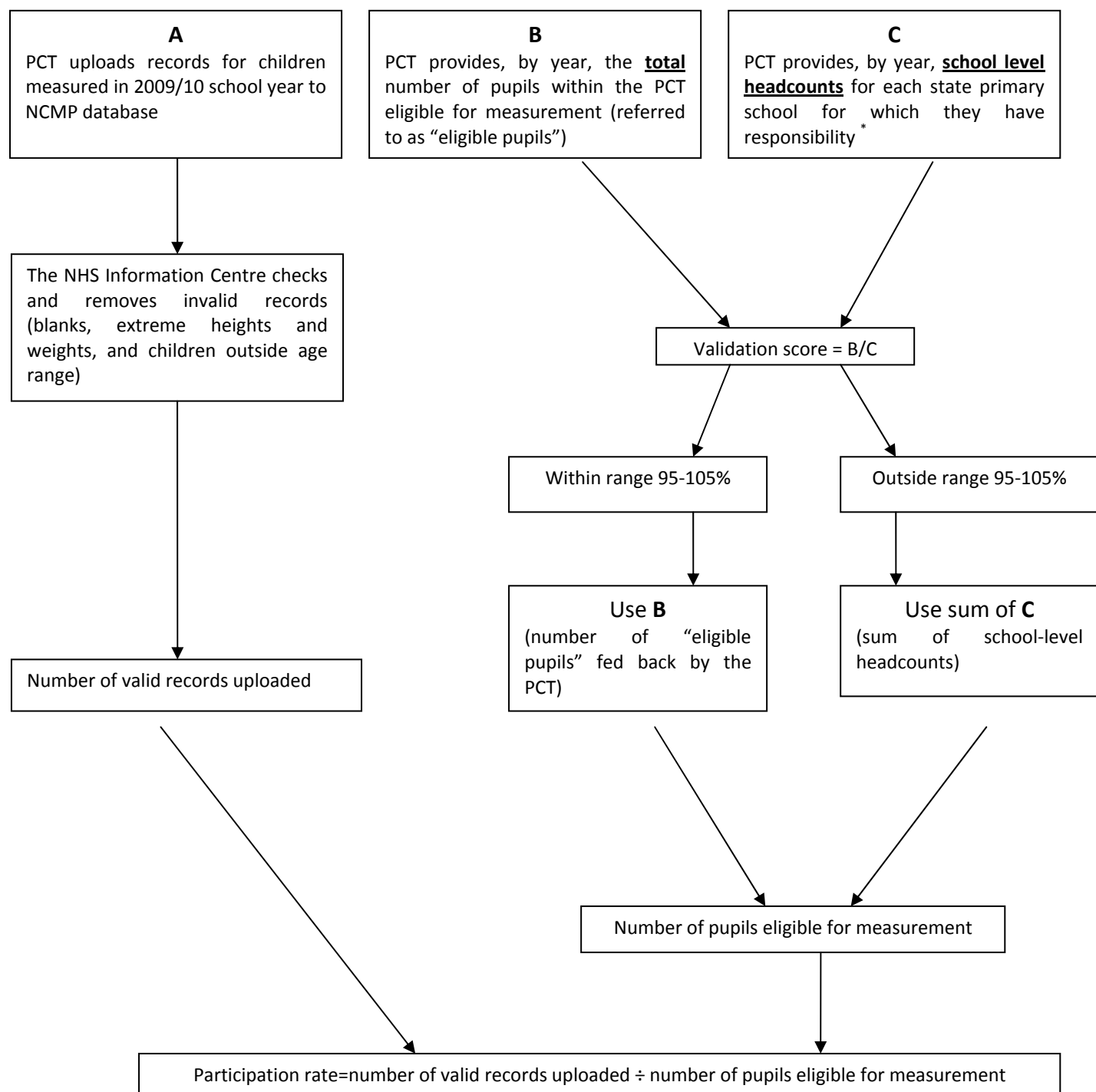
Where the difference in two rates or proportions,  $\hat{D} = \hat{p}_2 - \hat{p}_1$  has confidence limits from:

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

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.

A4.6. This method is also provided as 'method 10' in the Newcombe paper 'interval estimation for the difference between independent proportions: comparison of eleven methods'.<sup>17</sup>

## Appendix 5: Calculation of participation rates



\* Where the “school level headcount” provided by a PCT for an age-group is less than the number of pupils measured for that age-group, the number of pupils measured is used as the school-level headcount. This ensures participation rates do not exceed 100% for any school for either Reception year or Year 6.

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## Reader Information

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