Childhood Vaccination Coverage Statistics
Quality Statement for 2016-17

Published 20 September 2017

This document is designed to accompany the main publication document and includes contextual information, the methods used to compile the statistics and other background information readers may find useful.
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This is a National Statistics publication

National Statistics status means that official statistics meet the highest standards of trustworthiness, quality and public value.

All official statistics should comply with all aspects of the Code of Practice for Official Statistics. They are awarded National Statistics status following an assessment by the Authority’s regulatory arm. The Authority considers whether the statistics meet the highest standards of Code compliance, including the value they add to public decisions and debate.

It is NHS Digital’s responsibility to maintain compliance with the standards expected of National Statistics. If we become concerned about whether these statistics are still meeting the appropriate standards, we will discuss any concerns with the Authority promptly. National Statistics status can be removed at any point when the highest standards are not maintained, and reinstated when standards are restored.


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.
Introduction

This publication reports childhood vaccination statistics for England in 2016-17, and relates to routine and selective vaccinations offered to all children up to the age of 5 years. The statistics show the number of children vaccinated as a proportion of the eligible population (coverage), and are derived from information collected by Public Health England (PHE) through the Cover of Vaccination Evaluated Rapidly (COVER) and Seasonal Influenza programmes.

The statistics are used to inform the development and evaluation of government policy on immunisation and to assess the delivery of different immunisations in the national programme. The statistics also help inform vaccine policy decisions, such as national and regional catch-up programmes for specific immunisations. At a local level the statistics are used to monitor performance. A number of the statistics from this publication also contribute to indicators for the government’s Public Health Outcomes Framework (PHOF)\(^1\).

1.1 Data Sources

Most of the vaccination data used in this report are collected annually from Child Health Record Departments (CHRDs) and NHS England local teams and are extracted from Child Health Information Systems (CHISs). Data on seasonal flu are collected from GP practices. Two separate collections have been used to gather the data as follows:

1) Cover of Vaccination Evaluated Rapidly (COVER)

Information on childhood immunisation coverage at ages one, two and five are collected through the UK COVER collection by PHE. These aggregated data are collected from CHISs, computerised systems storing clinical records supporting health promotion and prevention activities for children, including immunisation. In England, COVER data for 2016-17 have been collected for Upper Tier Local Authorities (LAs) using the COVER data collection form, which can be found in Appendix I of the main report.

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2) Seasonal Flu

Information on children aged 2, 3 and 4 immunised against seasonal flu are collected by PHE. These data are collected from GP practices through PHE’s ImmForm\(^2\) system. Patient age is identified by their age on the 31\(^{st}\) August of the vaccinating year e.g. a patient aged 2 on the 31\(^{st}\) August 2016 will be included in the aged 2 cohort.

The NHS Data Model and Dictionary Service (on the link below) contain more information on the COVER collection, including guidance on content, completion and definitions.

Further information on the COVER collection can be found in NHS Digital’s List of Administrative Sources, available through the following link:
http://content.digital.nhs.uk/pubs/listadminsources

The data from this return are collected at the end of each financial year in aggregate form.

Data collections are quality assured at the time of collection by the collecting agency (PHE for COVER and Flu data). Further data validation and quality assurance is carried out by NHS Digital prior to publication. Appendix E of the main report contains more information on the data validation process.

PHE also undertake quarterly collections of COVER data, which provide early indications of vaccine coverage trends and are an important means of identifying any data quality issues prior to the annual collection.

1.2 Methods Used to Compile the Statistics

NHS Digital validates and analyses the COVER data using spreadsheets (Microsoft Excel) and automated processes developed in SAS\(^3\).

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\(^2\) Seasonal flu uptake data is submitted on-line via the ImmForm website either through an automated data extraction or by an on-line manual submission: https://www.gov.uk/government/collections/immform

\(^3\) Statistical Analysis System (SAS) is an integrated system of software products which enables functions such as data management, statistical analysis and quality improvement.
Selective neonatal hepatitis B (HepB) vaccination coverage data are reported by LA responsible population for the second time in this publication.

Some or all of the data required on infants born to hepatitis B positive mothers could not be supplied for some LAs. HepB findings are discussed in the main report, along with Bacillus Calmette–Guérin (BCG) Vaccination, in the newly added ‘Selective Neonatal Vaccinations Programmes’ chapter. It would be inadvisable to draw conclusions from either of these sets data at national or regional level.

All figures in the report are presented as simple counts or percentages (rounded to one decimal place). Coverage (defined below) is reported for the seasonal flu vaccination offered to children aged 2, 3 and 4 and for the following routine childhood vaccinations:

- Diphtheria, tetanus, pertussis, polio and *Haemophilus influenzae* type b (DTaP/IPV/Hib)
- Diphtheria, tetanus, pertussis, polio (DTaP/IPV)
- Pneumococcal conjugate vaccine (PCV)
- *Haemophilus influenzae* type b and Meningococcal group C (Hib/MenC)
- Measles/mumps/rubella (MMR)
- Meningococcal group B (MenB)
- Rotavirus

### Definitions

**Immunised**: Where a course consists of more than one dose of vaccine, administered at set intervals, immunised means having had all doses required for a full course. However, for some vaccines (i.e. Hib/MenC and PCV) the number of doses required to complete a course is age dependent. For example, a child who was not given the recommended two doses of PCV before 12 months but did receive a PCV booster dose after the first birthday will still be considered appropriately vaccinated for their age.

**Coverage**: Coverage is defined as the number of persons immunised as a proportion of the eligible population. The formula for the calculation of coverage is:

\[
\text{Coverage} = \frac{\text{Total number of eligible persons immunised}}{\text{Total number of persons in the eligible population}} \times 100
\]

4 Prior to the 2009-10 publication, this report used the term ‘uptake’ to describe the percentage of the eligible population who are vaccinated. It was decided to replace the term ‘uptake’ with ‘coverage’ in 2009-10 as this is more widely used in reporting the proportion of a target population known to have received the appropriate vaccine(s).
Specific and detailed formulae and links for all the coverage statistics presented in this report are provided in Appendix C of the main report. This includes definitions of the numbers of eligible persons immunised and specifies the number of doses of different vaccines that an individual is required to have by a particular age in order to be considered immunised.

Eligible population:
Different eligible populations are used for calculating coverage for different vaccinations. For the routine childhood vaccinations listed above, the eligible population is defined as the total number of children in the LA responsible population, reaching their nth birthday in the collection year (see below for more information on the LA responsible population). Coverage is calculated for three separate cohorts (children reaching their first, second and fifth birthdays in the collection year) and so the eligible population differs for each cohort.

LA responsible population:
2016-17 is the first year that all data has been collected using LA responsible population, and this reflects a change from previous years. Coverage figures are supplied for patients registered with GPs based in that LA and for unregistered patients who were resident in that LA. The LA responsible population is therefore different from the estimated resident population figures produced by the Office of National Statistics (ONS) for each LA. For the COVER collection, the LA responsible population is usually derived from the population registers held on CHISs.

In previous years, for LAs that shared the same geographical boundaries as the old Primary Care Trusts (PCTs), i.e. were coterminous, the LA responsible population was estimated to be the same as the old PCT responsible population. Where LA and PCT boundaries were not coterminous, data suppliers were asked to supply figures for the LA responsible population if these were available. Where data suppliers were not able to provide data for the LA responsible population, NHS Digital estimated LA figures by apportioning PCT data on the basis of population (see below for more information on the apportioning methodology). All data received from 2016-17 onwards is supplied at LA resident level, negating the need to use estimation.

Please note that the local, regional and national statistics reported in publications prior to 2016-17 were based on an LA dataset that included some estimated data (from supplied PCT data), and estimated figures were clearly marked with an ”e” in the data tables which accompany those publications.

The previous estimation technique used is described below and users may want to consider this when making comparisons between findings across the years (i.e. prior to 2016-17) where apportioning was used. In 2015-16 only the national data set comprised of both submitted LA and PCT data.
Apportioning former PCT data to create LA data

Where a former PCT is split across two or more LAs, population data from ONS Output Areas, which fit both the LA and the former PCT’s boundaries, are used to estimate the percentage of the former PCT population that falls within each LA. This estimate is then used to create a weighting which is applied to the vaccination data to produce the LA figures.

For example, if 75% of PCT1’s population falls within LA1 and 25% of PCT1’s population falls within LA2, then 75% of the PCT1s eligible population and 75% of PCT1s vaccinated population is allocated to LA1. LA2 receives 25% of PCT1’s eligible and vaccinated population.

For LAs whose boundaries are contained wholly within a single PCT, but are not equal to the whole PCT, the LA counts are estimated as a proportion of the PCT figure (based on population data from ONS Output Areas).

Some caution should be exercised when using LA data created from apportioned PCT data as the weightings used are based on population counts and therefore do not take account of variation in coverage across a PCT. One PCT may, for example, have some areas where vaccination coverage is relatively high and others where it is relatively low, yet where apportioning is used the overall coverage data for the PCT is split to create the LA data, regardless of which parts of the PCT fall into which LAs. This could lead to coverage figures in some LAs being either under or overestimated.

The file used to create the apportioned data which contains more information on methodology as well as the weightings used, was produced by PHE and is available via a link in previous versions of the report where it was used.

This is the same methodology that was used to calculate the Public Health Outcome Framework indicators 3.03 for LAs for previous years.

http://www.phoutcomes.info/public-health-outcomes-framework

This year most of the PHOF 3.03 indicators will be sourced from the National Statistics reported in this publication.

Mapping LA data to create Commissioning Region and Local Team data

COVER statistics for NHS England Commissioning Regions and Local Teams have been produced from mapping to LA data supplied by PHE. Flu data is mapped to these geographies by PHE.
1.3 Relevance

Appendix F of the main report gives details of who uses the statistics in this publication and what they use them for.

1.4 Accuracy and Reliability

These are established collections based on total populations i.e. not a sample.

COVER Data

For the COVER collection, submissions were made by all data suppliers and data are published for all LAs in 2016-17.

Some caution should be exercised when comparing coverage figures over time due to data quality issues reported by some data suppliers in recent years. Apparent trends could reflect changes in the quality of data reported as well as real changes in vaccination coverage. While this issue will be more apparent at a local level, it will also have an impact on the national figures. Similarly, some caution should also be exercised when comparing coverage between different areas where data quality issues have been reported.

Any missing data are clearly marked within the data tables.

Data quality issues are discussed in more detail in Appendix E of the main report on Data Validation and Quality.
Flu Data

For seasonal influenza vaccinations in children aged 2, 3 and 4, coverage data are based on submissions made for GP practices – with the exception of some 4 year olds in Essex, Thurrock and Southend on Sea LAs who were vaccinated via a school programme. The data represents 97.4% of GP practices in England5.

1.5 Timeliness and Punctuality

Data on immunisations are made available as soon as possible after they have been compiled and validated (usually in the September following the end of the financial year to which the data relate).

A copy of last year’s report can be found here.

1.6 Accessibility and Clarity

Most data fields are published in the Data Tables which are available as Excel files and CSV files, on NHS Digital’s Immunisation web pages:

http://digital.nhs.uk/pubs/childvaccstats1617

Further analysis may be available on request, subject to resource limits and compliance with disclosure control requirements. Note that the data held by NHS Digital cannot be disaggregated below LA level.

Figures displayed in the charts within the report publication and as part of the data tables have been subject to rounding to one decimal place. Analysis of the data tables may occasionally throw up differences to the published figures. For example, an LA may display a figure of 95.0% which has been rounded up from 94.9978%. Original values are available in all data tables.

This statistical publication has been in existence for a number of years and publications are available on NHS Digital’s and The National Archives websites dating back to 1997-986. The bulletin was originally published by the Department of Health. Responsibility for the publication transferred to the Health and Social Care Information Centre (HSCIC) after its formation in 2005. The HSCIC is now known as NHS Digital.

Data Source: Public Health England – Seasonal flu vaccine uptake in GP patients, final data from 1 Sept 2016 to 31 Jan 2017: by Local Authority.

Copies of previous editions published by NHS Digital can be accessed via the following link: http://www.content.digital.nhs.uk/searchcatalogue?q=nhs+immunisation+statistics%2Cengland&area=&size=10&sort=Relevance

Prior to 2004/05 this bulletin was published by the Department of Health. These editions can be found at:
1.7 Coherence and Comparability

Changes in the UK Immunisation programme

A number of changes to the immunisation programme have been made since 2003 and these are detailed in full in Appendix D of the main report. Changes in the schedule need to be considered when interpreting trend data. Importantly, when a new vaccine is first introduced, coverage is usually below that of other vaccines given at a similar time in the first year of evaluation (and sometimes for some years after introduction). Recording/reporting issues may, in some instances, affect completeness and/or data quality in the first year(s) following the introduction of a vaccine or when the number of doses required or the timing of doses is changed.

The schedule for the entire routine immunisation programme, as at Autumn 2017 is shown in Appendix B of the main report. In 2013-14, the introduction of influenza vaccination for healthy children began with vaccines offered to all children aged two and three years of age. In 2014-15 this was extended to also include all children aged four years of age. In addition, from July 2013 an infant rotavirus vaccination was introduced and a reduction from two to one dose of MenC to be offered in the first year of life, though MenC was subsequently removed from the schedule in 2016 (protection is still offered against MenC through the Hib/MenC vaccine administered at 12-13 months).

More recent changes to the immunisation schedule, including the introduction of adolescent MenACWY, are not evaluated in this report. MenB coverage data are offered as part of this report for the first time and are labelled as ‘Experimental’ Statistics.

A link to the most recent formal immunisation schedule (Autumn 2017) is available on the following link below:


Meningococcal group B (MenB) vaccine

The MenB vaccination was introduced from 1 September 2015 for infants due to receive their primary immunisations starting at two months of age on or after 1 September 2015 (i.e. those born on or after 1 July 2015). The vaccine is offered alongside other routine immunisations at two and four months of age, with a booster dose at 12-13 months\(^7\). A limited one-off catch-up programme was also delivered targeting infants born in May (one dose only) and June 2015 (two doses).

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\(^7\) Quarterly coverage statistics were first published by PHE in February 2016 and related to the September – December 2015 quarter.
This report presents data for the first financial year (i.e. 2016-17) that MenB data have been available. As such they are designated as Experimental Statistics within this report as the quality and completeness of these data continue to be assessed. Given the status of these data it would be inadvisable to draw conclusions from them at this stage.

Preliminary vaccine coverage figures for MenB collected by PHE\(^8\) indicate that the vaccine has been positively accepted and delivered well, achieving high coverage levels in the first year of adoption.

Data were originally collected by PHE via a temporary sentinel surveillance programme from GP IT systems, then once the first cohort routinely vaccinated with MenB reached their first birthday they have been reported through the quarterly COVER programme. Quarterly MenB coverage estimates for children aged 12 months in the period July 2016 to March 2017 show national coverage reaching 92\% (published in December 2016, March and June 2017).\(^9\)

MenB data are presented, where available, at LA and regional level. National figures are not given due to the incompleteness of the data. Please see data table Annex A accompanying the main publication.

**Rotavirus vaccine**

A vaccine to protect babies against rotavirus was introduced into the childhood immunisation schedule from July 2013. The rotavirus vaccine is offered routinely to all babies at the age of 8 weeks and again at 12 weeks when they attend for their first and second routine childhood immunisations. Opportunities for children to catch up missed doses are limited as rotavirus vaccine cannot be given beyond six months of age.

In order to rapidly assess rotavirus vaccine coverage, PHE introduced a temporary sentinel collection via ImmForm to extract monthly coverage data directly from GP practices in England for children who had reached the upper age for receiving the vaccine (25 weeks). This early evaluation of vaccine coverage\(^10\) has provided reassurance that the rotavirus vaccine has been well accepted in England ahead of the routine 12 month coverage data being available through the routine COVER programme.

The quality and completeness for the rotavirus data have improved to allow them to be included under the National Statistics designation for the first time within this publication.

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Changes to the COVER data collection

Changes to the COVER collection form were made by PHE from April 2013 to enable collection by Local Authority. The data collection form has also been subject to amendments to reflect changes to the routine schedule when vaccines have been added, amended or withdrawn.

Statistics on the number of persons receiving BCG vaccinations were previously published in this bulletin until the KC50 data collection was suspended following a review in 2013. Neonatal BCG coverage data are now collected as part of the COVER programme in accordance with the updated COVER Information Standards Notice (ISN)\(^\text{11}\) published in November 2014. Data on BCG vaccination coverage are published, along with HepB data, in the ‘Childhood Selective Vaccinations’ chapter of the main report.

Time series

The report shows trends in vaccination coverage and where possible seeks to explain these. The main Excel Data Tables contain historical data, which enable examination of trends in vaccination coverage. Throughout the Analysis and Commentary section, coverage statistics for 2016-17 are compared with previous years and where applicable time series data are shown. The time series for MMR vaccine coverage evaluated at two years are extended back to 1988 which is the year the MMR vaccine was first introduced and when current definitions for measuring coverage came into effect. For completed DTaP/IPV/Hib vaccine primary course coverage at one year back to 2006-07. Historical interpretation of time series data in the Analysis and Commentary section has been assisted by experts in PHE.

Local and regional comparisons

The statistics are presented at a national and regional level and by Upper Tier Local Authority (LA). Due to the different sources and methods by which the LA data have been derived (see definition of LA responsible population under Definitions in section 1.2 ‘Methods Used to Compile the Statistics’), some caution should be exercised when comparing coverage figures over time.

Statistics are also presented by NHS England Commissioning Region and Local Team\(^\text{12}\) in the Data Tables (Tables 8d, 9d and 10d) and these are derived from LA data supplied by PHE, see 'Notes and definitions' and 'LA to LT Lookups' tabs within the data tables for more information.

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12 From 1st April 2015 Area Teams are known as Local Teams and have reduced in number from 25 to 13
Comparisons with other UK countries

The NHS Immunisation Statistics, England publication has included additional annual coverage statistics for other countries in the UK since 2009-10. This report includes the following coverage statistics for all UK countries:

- **At 12 months**  
  DTaP/IPV/Hib, PCV, Rotavirus

- **At 24 months**  
  DTaP/IPV/Hib, Hib/MenC, PCV, MMR1

- **At 5 years**  
  DTaP/IPV/Hib, DTaP/IPV, MMR1, MMR2\(^{13}\), Hib/MenC

Vaccination data for Northern Ireland, Scotland and Wales are also available through the following links:

**Northern Ireland:**
http://www.publichealth.hscni.net/directorate-public-health/health-protection/vaccination-coverage

**Scotland:**

**Wales:**

Outside the UK, national vaccination policies differ and countries use different methods to calculate vaccination coverage, therefore direct comparison with countries outside the UK is not always appropriate. However, the World Health Organisation (WHO) and UNICEF attempt to determine the most accurate and up-to-date estimates of immunisation coverage for different countries through their joint annual reporting form submission from national experts. These estimates of national immunisation coverage are reported on the WHO website and available through the following link:

http://www.who.int/immunization/monitoring_surveillance/en/

Information on research undertaken to examine comparability of vaccination coverage amongst European countries can be found on the VENICE Project website:

http://venice.cineca.org/reports.html

and

http://venice.cineca.org/publications.html

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\(^{13}\) MMR1 is used to indicate at least one dose of MMR has been received. MMR2 indicates that two doses of MMR have been received (anytime from 12 months up to the child’s 5th birthday).
1.8 Performance Cost and Respondent Burden

The data used in the publication are aggregated LA level data gathered by PHE as part of their management of the immunisation programme. These are the only sources of the data required for the report.

All data collections used in this publication have been subject to the Review of Central Returns (ROCR) procedure and licensed by ROCR (from July 2014 replaced by the Burden Advice and Assessment Service (BAAS)). This is to ensure that data collections do not duplicate other collections, minimise the cost to all parties and have a specific use for the data collected. In November 2014, the revised COVER ISN\textsuperscript{14} was published following approval from SCCI (Standardisation Committee for Care Information).

1.9 Confidentiality, Transparency and Security

The standard NHS security and confidentiality policies have been applied in the production of these statistics. An annual risk assessment is undertaken prior to publication which addresses any potential issues around disclosure in accordance with the Anonymisation Standard for Publishing Health and Social Care Data\textsuperscript{15}. Disclosure controls have been applied to the neonatal hepatitis B data in Tables 11b and 11c, in accordance with the Standard and are as follows;

- Suppress all data (i.e. number eligible, number vaccinated and coverage) where the number eligible is 1 or 2 (cells with 2 are suppressed as otherwise it would be clear all suppressed cells have a value of 1).

- Where the number of eligible children is greater than 0 and the number of children vaccinated is 0 or 1, suppress the number of children vaccinated and the coverage (cells with 1 need to be suppressed as otherwise it would be clear that all suppressed cells have a value of 0).

The eligible populations in three LAs are very small and in these instances their data have been combined and reported under other LAs. Data for the Isles of Scilly are reported under Cornwall, City of London data are reported under Hackney and Rutland is reported under Leicestershire. Statistics in this report are therefore presented by 149 Upper Tier Local Authorities.

\textsuperscript{14} \url{http://webarchive.nationalarchives.gov.uk/+/http://www.isb.nhs.uk/documents/isb-0089/amd-8-2014/index.html}

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