Childhood Immunisation Statistics
Quarter and Year ending 31 December 2012
Publication date – 22 March 2013
Introduction

Children in Scotland are protected through immunisation against many serious infectious diseases. Vaccination programmes aim both to protect the individual and to prevent the spread of these illnesses within the population. As a public health measure, immunisations have been hugely effective in reducing the burden of disease.

The UK Childhood Immunisation Schedule covers the recommended immunisations for children and young people (aged 0 to 18 years). The schedule comprises the recommended universal or routine immunisations which are offered to all children and young people at specified ages, as well as selective or non-routine immunisations which are targeted to children at higher risk from certain diseases. The immunisation schedule is continually reviewed and updated. Changes in the schedule such as the introduction of new vaccines, changes to the number of doses required and/or the timing of vaccines need to be considered when interpreting uptake rates. Further details can be found in the Changes in the UK Immunisation Schedule section in this report.

UK Childhood Immunisation Schedule

Routine childhood immunisations from January 2012

<table>
<thead>
<tr>
<th>When to immunise</th>
<th>What vaccine is given</th>
<th>How it is given</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two months old</td>
<td>Diphtheria, tetanus, pertussis (whooping cough), polio and <em>Haemophilus influenzae</em> type b (DTaP/IPV/Hib)</td>
<td>One injection</td>
</tr>
<tr>
<td></td>
<td>Pneumococcal (PCV)</td>
<td>One injection</td>
</tr>
<tr>
<td>Three months old</td>
<td>Diphtheria, tetanus, pertussis (whooping cough), polio and <em>Haemophilus influenzae</em> type b (DTaP/IPV/Hib)</td>
<td>One injection</td>
</tr>
<tr>
<td></td>
<td>Meningococcal C (MenC)</td>
<td>One injection</td>
</tr>
<tr>
<td>Four months old</td>
<td>Diphtheria, tetanus, pertussis (whooping cough), polio and <em>Haemophilus influenzae</em> type b (DTaP/IPV/Hib)</td>
<td>One injection</td>
</tr>
<tr>
<td></td>
<td>Pneumococcal (PCV)</td>
<td>One injection</td>
</tr>
<tr>
<td></td>
<td>Meningococcal C (MenC)</td>
<td>One injection</td>
</tr>
<tr>
<td>12 to 13 months old</td>
<td><em>Haemophilus influenzae</em> type b and meningococcal C (Hib/MenC)</td>
<td>One injection</td>
</tr>
<tr>
<td></td>
<td>Pneumococcal (PCV)</td>
<td>One Injection</td>
</tr>
<tr>
<td></td>
<td>Measles, mumps and rubella (MMR)</td>
<td>One injection</td>
</tr>
<tr>
<td>Three years four months to five years old</td>
<td>Diphtheria, tetanus, pertussis and polio (DTaP/IPV or dTaP/IPV)</td>
<td>One injection</td>
</tr>
<tr>
<td></td>
<td>Measles, mumps and rubella (MMR)</td>
<td>One injection</td>
</tr>
<tr>
<td>12 to 13 years old (Girls only)</td>
<td>Human Papilloma Virus (HPV)</td>
<td>Three injections over six months</td>
</tr>
<tr>
<td>13 to 18 years old</td>
<td>Tetanus, diphtheria and polio (Td/IPV)</td>
<td>One injection</td>
</tr>
</tbody>
</table>
Non-routine immunisations for at-risk babies

<table>
<thead>
<tr>
<th>When to immunise</th>
<th>What vaccine is given</th>
<th>How it is given</th>
</tr>
</thead>
<tbody>
<tr>
<td>At birth (for babies more likely to come into contact with TB than the general population)</td>
<td>BCG (against tuberculosis)</td>
<td>One injection</td>
</tr>
<tr>
<td>At birth (for babies whose mothers or close family members are hepatitis B positive)</td>
<td>Hepatitis B</td>
<td>Three injections, with a month in between each, followed by a booster dose at 12 months</td>
</tr>
</tbody>
</table>

Monitoring Immunisation Uptake Rates

Immunisation uptake (sometimes referred to as coverage) refers to the proportion of the eligible population who have received the recommended doses of the relevant vaccines. Monitoring the proportion of the eligible population vaccinated is a key measure of the immunisation programme performance. It is of public health concern should immunisation rates decrease, as this makes the possibility of disease transmission more likely.

In Scotland the target of the national immunisation programme is for 95% of children to complete courses of the following childhood immunisations by 24 months of age: diphtheria, tetanus, pertussis (whooping cough), polio, *Haemophilus influenzae* type b (Hib), Meningococcal group C (MenC) and Pneumococcal Conjugate Vaccine (PCV). An additional national target of 95% uptake of one dose of the Measles, Mumps and Rubella (MMR) vaccine by five years of age (with a supplementary measure at 24 months) was introduced in 2006 to focus efforts on reducing the number of susceptible children entering primary school.

This publication provides information on uptake of routine immunisations for children in Scotland up to six years of age. Uptake rates by calendar year at Scotland level, by NHS Board, Community Health Partnership (CHP) and Scottish Index of Multiple Deprivation (SIMD) are presented. This release includes data to 31 December 2012. Trend information is available from 1995. Figures for the quarter ending 31 December 2012 are also included. The data are derived from the Scottish Immunisation and Recall System (SIRS), which covers all NHS boards in Scotland. For information on data collection and quality see Appendix A1.

This annual report, covering calendar year uptake rates, is published in March each year. In addition, each quarter ISD publish updated tables presenting the latest quarterly uptake rates for children at 12 months, 24 months, five years and six years, by NHS Board and CHP.

Statistics on Human Papilloma Virus (HPV) immunisation uptake are published separately by ISD annually in September. National statistics on uptake rates of the school leaving booster vaccine (the reinforcing doses of diphtheria, tetanus and polio given to 13 to 18 year olds) and of non-routine immunisations in Scotland are not currently available. ISD
plan to publish uptake rates for the school leaving booster in autumn 2013 subject to the data being of sufficient quality. For further information on data developments regarding uptake figures for these vaccines see Appendix A1.

Changes in the UK Immunisation Schedule

Summary of recent changes for children under six years of age:

January 2011
Previously the Hib/MenC booster vaccine was given at 12 months of age, and the PCV booster and first dose of MMR at 13 months of age. These immunisations should now be given at the same appointment between 12 and 13 months of age.

September 2006
- Introduction of Pneumococcal Conjugate Vaccine (PCV) to the routine schedule (at two, four and 13 months).
- Children were previously given a dose of MenC and Hib at two, three and four months. The number of MenC doses given under 12 months was reduced, with doses now given at age three and four months. A booster dose of Hib and MenC vaccine (given as the combined Hib/MenC vaccine) at 12 months of age was added, introducing a new vaccination appointment to the schedule.

Autumn 1999
MenC vaccine was added to the schedule of primary immunisations offered in three doses to babies at ages two, three and four months.

Other initiatives
In November 2007 in Scotland, the age at which the pre-school immunisation (the booster dose of diphtheria, tetanus, pertussis and polio) is offered was reduced - in areas where this was not already the case - to three years following completion of primary immunisation, i.e. normally between three years four months and three years six months of age. Some NHS Boards previously offered these vaccines at a slightly later age. This initiative standardised the timing across Scotland when children should be routinely invited for these immunisations.

Catch-up programmes
- On 4 September 2006, Pneumococcal Conjugate Vaccine (PCV) was introduced to the routine childhood immunisation programme to protect children from pneumococcal infection. A catch up campaign started on 4 September 2006 to offer PCV vaccine to children aged two to 24 months (born 05/09/2004 to 03/07/2006). These children were too old to receive the vaccine at their regular scheduled appointments.
- A Hib catch-up programme ran from 5 November 2007 to 3 March 2009 to offer a booster dose of Hib vaccine to a defined cohort of young children (born 04/04/2003 to 03/09/2005). These children were too young to have had a booster as part of the 2003 Hib catch-up programme and too old to have received the new Hib/MenC booster vaccine at 12 months of age as part of the routine programme.
In June 2003 a Hib catch-up programme started for children who were aged six months to four years old (born between 02/04/1999 and 03/04/2003).

In the autumn of 1999 the MenC vaccine was added to the schedule of primary immunisations offered in three doses to babies at ages two, three and four months. A catch-up programme was also set up around this time to offer the vaccine to everyone of school age and, from January 2000, to pre-school children too old to be included in the programme of primary immunisations. The MenC vaccine was also offered to everyone under the age of 18 by December 2000.


**Definitions**

**Immunisation:** the process whereby a person is made immune or resistant to an infectious disease, typically by the administration of a vaccine. Vaccines stimulate the immune system to protect a person against subsequent infection or disease.

**Immunised:** To be fully immunised against a particular disease an individual must have received all required doses of the relevant vaccine. Detailed information about the current immunisation programmes in Scotland, the vaccines available, and the diseases they protect against, can be found via the [NHS Health Scotland Immunisation website](http://www.isdscotland.org/Health-Topics/Child-Health/Immunisation/Reports-on-immunisation-catch-up-programmes.asp).

**Uptake rates:** Uptake rates, sometimes referred to as coverage, relates to the number of children immunised against a particular disease as a proportion of the children eligible to have received the appropriate vaccine.

Uptake is calculated as follows:

\[
\frac{\text{Total number of eligible children immunised}}{\text{Total number of eligible children in the population}} \times 100
\]
Key points

- In Scotland immunisation uptake rates for children aged up to six years remain high and stable.

- At Scotland level, annual uptake rates by 24 months of age for primary courses of immunisation against diphtheria, tetanus, pertussis, polio & Hib (DTP/Pol/Hib), MenC and PCV remain high and stable at around 96% to 98%. Uptake rates have exceeded the 95% target for the last decade.

- Annual uptake of the first dose of MMR vaccine by 24 months of age reached 95.0% for the first time (the previous annual figure was 94.0%). Uptake rates by 24 months of age have continued to be above 90% since calendar year 2006. Annual uptake of the first dose of MMR by five years of age is 96.9% (the previous annual figure was 96.4%). MMR uptake rates by five years have remained above the 95% target since calendar year 2009.

- Uptake of the PCV booster vaccine by 24 months of age increased to 95.4% in 2012 (94.1% in 2011). This is the first time uptake of the PCV booster has reached and exceeded 95% since its introduction to the routine immunisation schedule in September 2006.
Results and Commentary

Recommended immunisations for children under 24 months of age

The UK Childhood Immunisation Schedule recommends children should receive three doses of diphtheria, tetanus, pertussis, polio and Hib vaccine (the ‘five-in-one’ vaccine) at two, three and four months of age, two doses of MenC vaccine at three and four months of age, and two doses of PCV at two and four months of age. Children should then receive a further dose of Hib and MenC (given as the Hib/MenC booster vaccine), the PCV booster, and one dose of MMR at 12 to 13 months of age.

Annual uptake rates by 12 months of age (calendar year figures)

In Scotland, uptake rates by 12 months of age for primary courses of immunisation against diphtheria, tetanus, pertussis, polio & Hib (DTP/Pol/Hib), MenC and PCV remain high, exceeding 95%.

Uptake rates by 12 months of age for 2012 are very similar to 2011 figures (rates for previous year shown in brackets):

- 97.5% of children had completed primary courses of immunisation against diphtheria, tetanus, pertussis, polio & Hib (DTP/Pol/Hib) (97.3%)
- 97.0% completed the primary course of MenC (96.7%)
- 97.5% completed the primary course of PCV (97.2%)

Since 1995, the first year included in this report, uptake rates for all primary immunisations have risen from just below 95% to around 97% (see Figure 1). With the exception of MenC, uptake rates have exceeded 95% since 2002. MenC was introduced to the immunisation schedule in 1999. Immunisation uptake rates for newly introduced vaccines are often lower than for other vaccines given around the same age when they are first introduced to the immunisation programme. Uptake of MenC under 12 months of age has exceeded 95% since 2006 when the number of doses required under 12 months was reduced to two in the immunisation schedule (previously it was three doses under 12 months).
Figure 1 - Primary Immunisation Uptake Rates, by 12 months of age, by calendar year, Scotland

Source: SIRS, Feb 2013
Table 1 - Primary Immunisation Uptake Rates by 12 months of age, by NHS Board, year ending 31 December 2012

<table>
<thead>
<tr>
<th>NHS Board of residence</th>
<th>Number in Cohort</th>
<th>% completed primary course by 12 months</th>
<th>DTP/Pol/Hib</th>
<th>MenC</th>
<th>PCV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ayrshire &amp; Arran</td>
<td>3,914</td>
<td>98.3</td>
<td>98.2</td>
<td>98.4</td>
<td></td>
</tr>
<tr>
<td>Borders</td>
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<td>97.5</td>
<td>96.8</td>
<td>97.4</td>
<td></td>
</tr>
<tr>
<td>Dumfries &amp; Galloway</td>
<td>1,428</td>
<td>97.9</td>
<td>97.7</td>
<td>97.9</td>
<td></td>
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<tr>
<td>Fife</td>
<td>4,203</td>
<td>97.6</td>
<td>97.2</td>
<td>97.6</td>
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</tr>
<tr>
<td>Forth Valley</td>
<td>3,275</td>
<td>97.4</td>
<td>96.9</td>
<td>97.2</td>
<td></td>
</tr>
<tr>
<td>Grampian</td>
<td>6,374</td>
<td>97.3</td>
<td>96.3</td>
<td>96.7</td>
<td></td>
</tr>
<tr>
<td>Greater Glasgow &amp; Clyde</td>
<td>13,980</td>
<td>97.0</td>
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<td>97.3</td>
<td></td>
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<tr>
<td>Highland</td>
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<tr>
<td>Lanarkshire</td>
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<td>Lothian</td>
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<td>97.8</td>
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<tr>
<td>Orkney</td>
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<td>93.7</td>
<td>94.2</td>
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<tr>
<td>Shetland</td>
<td>244</td>
<td>97.5</td>
<td>97.5</td>
<td>97.5</td>
<td></td>
</tr>
<tr>
<td>Tayside</td>
<td>4,381</td>
<td>97.9</td>
<td>97.0</td>
<td>97.6</td>
<td></td>
</tr>
<tr>
<td>Western Isles</td>
<td>233</td>
<td>97.9</td>
<td>97.4</td>
<td>97.4</td>
<td></td>
</tr>
<tr>
<td>NHS Board unknown</td>
<td>14</td>
<td>..</td>
<td>..</td>
<td>..</td>
<td></td>
</tr>
<tr>
<td>Scotland</td>
<td>58,644</td>
<td>97.5</td>
<td>97.0</td>
<td>97.5</td>
<td></td>
</tr>
</tbody>
</table>

Source: SIRS, Feb 2013

1. NHS board of residence as recorded on SIRS.
2. Children reaching 12 months of age during the evaluation period 1 January to 31 December 2012 (i.e. born 1 January to 31 December 2011).
3. The 5 in 1 vaccine (comprising DTP/Pol/Hib) was introduced in September 2004. For children vaccinated in Scotland this is now recorded as a single vaccine. For children who received primary immunisations outwith Scotland, where the vaccination may not have been given as one injection, only those who have received 3 doses of each vaccine (Diphtheria, Tetanus, Pertussis, Polio and Hib) are counted as completing the primary course.
4. NHS Orkney have identified data recording issues which have resulted in their uptake rates being under reported. NHS Orkney are working to rectify these recording issues.
5. For records recorded on SIRS under the former NHS Argyll & Clyde (which was dissolved on 31 March 2006), NHS board of residence is derived from the child’s home postcode. There are a small number of records which do not have a postcode recorded and therefore the NHS board is unknown.
   .. Not Applicable.

Key:
DTP/Pol/Hib = Diphtheria, Tetanus, Pertussis, Polio and Hib (3 doses).
MenC = Meningococcal serogroup C conjugate vaccine (2 doses).
PCV = Pneumococcal conjugate vaccine (2 doses).
Annual uptake rates by 24 months of age (calendar year figures)

At Scotland level, uptake rates by 24 months of age for primary courses of immunisation against diphtheria, tetanus, pertussis, polio & Hib (DTP/Pol/Hib), MenC and PCV remain high and stable at around 96% to 98%. Uptake rates have exceeded the 95% target for the last decade. In 2012, uptake rates are (rates for previous year shown in brackets):

- 98.2% of children had completed primary courses of immunisation against diphtheria, tetanus, pertussis, polio & Hib (DTP/Pol/Hib) (98.1%)
- 96.2% completed the primary course of MenC (96.1%)
- 96.9% completed the primary course of PCV (96.8%)

Figure 2 shows uptake of the first dose of MMR fell in the late 1990’s from 94.6% in 1997 to a low of 86.8% in 2003. Uptake rates have since been increasing, have exceeded 90% since 2006, and now exceed previous high levels. In 2012, uptake of one dose of MMR reached 95.0% for the first time (the rate was 94.0% in 2011). The fall and subsequent rise in uptake rates reflects the controversy about the MMR vaccine following a study published in the Lancet by Wakefield et al. in 1998 that suggested there was a link between MMR, bowel disease and autism. At the request of the Chief Medical Officer for England, the Medical Research Council convened an expert group to look at the evidence. In Scotland, the MMR Expert Group was convened in 2001 to investigate a number of the issues surrounding the MMR vaccine, taking into account the work of the Medical Research Council. These groups, as well as subsequent scientific studies, found no evidence to support the claim. The Lancet subsequently retracted the study due to ongoing doubt about its scientific validity.

Children are offered Hib/MenC and PCV booster vaccines at 12 to 13 months of age. These vaccines were introduced to the routine childhood immunisation schedule in September 2006. In 2012, uptake rates for the Hib/MenC booster rose to 95.5%, (95.1% in 2011). Uptake of the PCV booster by 24 months of age also increased to 95.4% in 2012 (94.1% in 2011). Following a change in the immunisation schedule, such as the introduction of new vaccines and/or changes in the recommended ages when appointments are offered, uptake rates for these particular vaccines are often lower initially. Figure 2 shows uptake rates for Hib/MenC and PCV booster vaccines were lower when first introduced to the schedule in September 2006 and have since increased to current levels. This is the first time uptake of the PCV booster vaccine has reached and exceeded 95%.
Figure 2 - Primary and Booster Immunisation Uptake Rates, by 24 months of age, by calendar year, Scotland

Source: SIRS, Feb 2013
Table 2 - Primary and Booster Immunisation Uptake Rates by 24 months of age, by NHS Board, year ending 31 December 2012

<table>
<thead>
<tr>
<th>NHS Board of residence¹</th>
<th>Number in Cohort²</th>
<th>% completed primary course by 24 months</th>
<th>% completed booster course by 24 months</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>DTP/Pol/Hib³</td>
<td>MenC</td>
</tr>
<tr>
<td>Ayrshire &amp; Arran</td>
<td>3,952</td>
<td>99.0</td>
<td>97.7</td>
</tr>
<tr>
<td>Borders</td>
<td>1,135</td>
<td>98.8</td>
<td>97.4</td>
</tr>
<tr>
<td>Dumfries &amp; Galloway</td>
<td>1,487</td>
<td>98.7</td>
<td>97.6</td>
</tr>
<tr>
<td>Fife</td>
<td>4,255</td>
<td>98.1</td>
<td>96.3</td>
</tr>
<tr>
<td>Forth Valley</td>
<td>3,320</td>
<td>98.5</td>
<td>97.2</td>
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<tr>
<td>Grampian</td>
<td>6,287</td>
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<td>95.6</td>
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<tr>
<td>Greater Glasgow &amp; Clyde</td>
<td>13,890</td>
<td>98.0</td>
<td>95.8</td>
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<tr>
<td>Highland</td>
<td>3,231</td>
<td>97.2</td>
<td>95.3</td>
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<tr>
<td>Lanarkshire</td>
<td>6,519</td>
<td>98.3</td>
<td>97.3</td>
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<tr>
<td>Lothian</td>
<td>9,798</td>
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<tr>
<td>Orkney⁴</td>
<td>214</td>
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<td>Shetland</td>
<td>264</td>
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<td>Tayside</td>
<td>4,339</td>
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<td>Western Isles</td>
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</tr>
<tr>
<td>NHS Board unknown⁵</td>
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</tr>
<tr>
<td>Scotland</td>
<td>58,971</td>
<td>98.2</td>
<td>96.2</td>
</tr>
</tbody>
</table>

Source: SIRS, Feb 2013

1. NHS board of residence as recorded on SIRS.
2. Children reaching 24 months of age during the evaluation period 1 January to 31 December 2012 (i.e. born 1 January to 31 December 2010).
3. The 5 in 1 vaccine (comprising DTP/Pol/Hib) was introduced in September 2004. For children vaccinated in Scotland this is now recorded as a single vaccine. For children who received primary immunisations outwith Scotland, where the vaccination may not have been given as one injection, only those who have received 3 doses of each vaccine (Diphtheria, Tetanus, Pertussis, Polio and Hib) are counted as completing the primary course.
4. NHS Orkney have identified data recording issues which have resulted in their uptake rates being under reported. NHS Orkney are working to rectify these recording issues.
5. For records recorded on SIRS under the former NHS Argyll & Clyde (which was dissolved on 31 March 2006), NHS board of residence is derived from the child’s home postcode. There are a small number of records which do not have a postcode recorded and therefore the NHS board is unknown.

.. Not Applicable.

Key:
- DTP/Pol/Hib = Diphtheria, Tetanus, Pertussis, Polio and Hib (3 doses).
- MenC = Meningococcal serogroup C conjugate vaccine (2 doses under 12 months).
- PCV = Pneumococcal conjugate vaccine (2 doses under 12 months).
- MMR1 = Measles, mumps, and rubella vaccine (1 dose over 12 months).
- Hib/MenC = Hib/MenC Booster (1 dose over 12 months).
- PCVB = Pneumococcal conjugate vaccine booster (1 dose over 12 months).
Recommended immunisations for children by five years of age

Protection against diphtheria, tetanus, pertussis (whooping cough) and polio can fade over time. Also, immunity to measles, mumps and rubella may not develop after a single dose of the MMR vaccine. From the age of three years four months, children should be invited to receive booster doses of diphtheria, tetanus, pertussis and polio (given as one injection and often referred to as the pre-school booster) and a second dose of MMR vaccine.

Annual uptake rates by five years of age (calendar year figures)

In 2012, 93.1% of children had received the ‘pre-school’ diphtheria, tetanus, pertussis, and polio booster immunisation by five years of age (91.5% in 2011). Figure 3 shows a slight dip in uptake of this immunisation around 2007. This was a result of the previously outlined changes to the immunisation schedule in 2006 for younger children, which meant each child needed more appointments. This temporarily led to some older children receiving their booster immunisations slightly later than scheduled due to prioritisation of younger children for additional primary immunisation appointments. This reduced the reported uptake rates for this vaccine by five years of age to around 87% in 2007. Uptake rates rebounded and have subsequently continued to increase, mainly as a result of the initiative to reduce the age of the pre-school booster appointment in some Boards. Uptake rates by six years of age have remained high throughout. In 2012, 94.9% of children had received this vaccine by six years of age, suggesting that some children are immunised beyond the standard reporting age.

At the start of 2006, an initiative to increase MMR vaccine uptake was put in place. The message behind this approach was ‘It’s never too late’ and one of the aims was to improve vaccine uptake before school-starting age. A target of reaching at least 95% uptake of one dose of MMR by five years of age was set. This was achieved in 2009 and uptake rates have since remained above the 95% target. In 2012 uptake reached 96.9% (96.4% in 2011). Since 2006 uptake of the second dose of MMR by the age of five has also increased from 83.9% to 91.8%. This increase is also due to the 2007 initiative which reduced the age of the pre-school immunisation appointment, when the second dose of MMR is routinely given. By six years of age, uptake of two doses was 93.0% in 2012 (92.8% in 2011). MMR vaccine uptake has been relatively high in Scotland compared to the UK overall for some years.

Uptake rates by five years of age for the Hib/MenC and PCV booster vaccines (normally given around 12 to 13 months) are also presented in Table 3 and Figure 3. Children reaching the age of five in 2011 (i.e. born during 2006) were the first calendar year cohort of children to be offered these vaccines as part of the routine immunisation schedule. The latest figures, for children reaching the age of five in 2012 (i.e. born during 2007), show that 95.8% had received the Hib/MenC booster and 94.4% had received the PCV booster by the age of five. By 24 months the reported uptake for these children was 93.9% and 94.1% respectively showing that a significant number of these children were immunised beyond the standard age.

In Scotland uptake rates for these vaccines have historically been reported by six years of age. To achieve consistency with figures for the rest of the UK, from 2006 uptake rates for these vaccines are now reported by five years of age. For trend purposes, uptake rates by six years of age are also available.
Figure 3 - MMR1 and Booster Immunisation Uptake Rates, by 5 years of age, by calendar year, Scotland

![Figure 3 - MMR1 and Booster Immunisation Uptake Rates, by 5 years of age, by calendar year, Scotland](chart)

Source: SIRS, Feb 2013

Note: Diphtheria, tetanus, pertussis and polio vaccines are given as one injection for the majority of children; therefore the lines representing these vaccines on the chart will overlap.
Table 3 - MMR1 and Booster Immunisation Uptake Rates by 5 years of age, by NHS Board, year ending 31 December 2012

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</table>

Source: SIRS, Feb 2013

1. NHS board of residence as recorded on SIRS.
2. Children reaching 5 years of age during the evaluation period 1 January to 31 December 2012 (i.e. born 1 January to 31 December 2007).
3. NHS Orkney have identified data recording issues which have resulted in their uptake rates being under reported. NHS Orkney are working to rectify these recording issues.
4. For records recorded on SIRS under the former NHS Argyll & Clyde (which was dissolved on 31 March 2006), NHS board of residence is derived from the child’s home postcode. There are a small number of records which do not have a postcode recorded and therefore the NHS board is unknown.

.. Not Applicable.

Key:
- MMR1 = Measles, mumps, and rubella vaccine (1 dose)
- Hib/MenC = Hib/MenC Booster (1 dose over 11 months)
- PCVB = Pneumococcal Conjugate Vaccine Booster (1 dose over 12 months)
- D = Diphtheria vaccine (4th dose).
- T = Tetanus vaccine (4th dose).
- P = Pertussis vaccine (4th dose)
- Pol = Polio vaccine (4th dose).
- MMR2 = Measles, mumps, and rubella vaccine (2nd dose).
Further Information on calendar year uptake rates

For excel tables presenting 2012 uptake rates by 12 and 24 months, and five and six years by NHS Board and CHP, see:

Uptake rates by NHS Board and calendar year
Uptake rates by CHP and calendar year

For trend information at Scotland and NHS Board level please see List of Tables within this report.

Uptake rates in groups of children as they age, by calendar year birth cohort

In addition to tracking snapshots of immunisation uptake rates in children by 12 months and 24 months it is also possible to follow immunisation uptake in groups of children as they age.

The first dose of MMR was previously given with the PCV booster at 13 months of age. From January 2011 (i.e. for children born from January 2010 onwards) the first dose of MMR should now be given with the PCV and Hib/MenC booster vaccines at the same appointment between 12 and 13 months of age.

Data show that a significant number of children are immunised beyond the standard reporting age, which may increase overall uptake as time progresses. For example, for children born January to December 2009, 93.8% of children had received one dose of MMR by 24 months of age. Now, at 36 months, this has increased to 96.4%. These figures include a small number of children vaccinated under 12 months of age, and therefore differ from uptake rates of one dose of MMR by 24 months of age reported elsewhere in this publication. The first dose of MMR vaccine is routinely offered at 12 to 13 months of age, so children immunised before their first birthday are not regarded as immunised and are therefore excluded from uptake rates reported at 24 months of age.

For more information see:

Tracking MMR1 immunisation uptake rates in cohorts of children as they age

Annual uptake rates by deprivation (calendar year figures)

Personal, social and cultural issues including deprivation are all factors which may influence a parent’s decision as to whether or not to immunise their child. In order to explore the effect of deprivation, uptake rates have been calculated by Scottish Index of Multiple Deprivation category (SIMD 2012) for each of the childhood primary immunisations, and for the Hib/MenC and PCV boosters, for Scotland and by NHS Board. Deprivation has some effect on uptake rates, which can be seen in uptake levels at both 12 and 24 months of age.
Primary Immunisation Uptake by 12 months, by SIMD 2012 category

Figure 4 shows that in 2012 uptake of the DTP/Pol/Hib vaccine for those children living in the most deprived areas is 97.0%, while for those in the least deprived areas the rate is 97.8%. A marginal difference in uptake rates by deprivation is also observed for PCV uptake. However, even in the most deprived areas (i.e. SIMD Quintile 1), uptake rates for all primary immunisations by 12 months are high and exceed the target of 95%. In 2012, MenC uptake rates in the most and least deprived areas are the same.

Figure 4 - DTP/Pol/Hib uptake by 12 months, by SIMD 2012 category, Scotland
Evaluation period: January to December 2012

Source: SIRS, February 2013

1. Aged 12 months: Born 1 January to 31 December 2011

Uptake of one dose of MMR and Booster Uptake by 24 months, by SIMD 2012 category

The annual uptake of the PCV booster, the Hib/MenC booster and the first dose of MMR (MMR1), is between 0.3 and 1.2 percentage points lower in the most deprived areas than in the least deprived. Figure 5 shows MMR1 uptake in 2012, by SIMD 2012 category; the rate for those children living in the most deprived areas is 94.6% while for those in the least deprived areas the rate is 95.8%.
Figure 5 - MMR1 uptake by 24 months of age, by SIMD 2012 category, Scotland
Evaluation period: January to December 2012

![Bar chart showing MMR1 uptake by SIMD 2012 category.]

SIMD 2012 Quintile, 5 = Least deprived, 1 = Most deprived

Source: SIRS, February 2013

1. Aged 24 months: Born 1 January to 31 December 2010

For excel tables and charts presenting 2012 uptake rates by 12 and 24 months of age by NHS Board and deprivation see:

Uptake by deprivation (SIMD 2012) by NHS Board and calendar year

Uptake rates as children age, by SIMD 2012 category

It is also interesting to look at the variation in immunisation uptake rates as children age by SIMD 2012 category. Figure 6 shows that, although deprivation has a limited effect on the first dose of MMR uptake by 24 months of age, there are more noticeable deprivation related differences in the level of increase in uptake as children age. Children in the more deprived areas are more likely to be vaccinated later in their second year than children in less deprived areas. For example, 89.2% of children had received their first dose of MMR by 15 months of age in the least deprived areas (SIMD 5) compared to only 85.7% in the most deprived areas (SIMD 1).
Figure 6 - MMR1 uptake as at 31.12.12 by SIMD 2012 category and age, Scotland

![Graph showing MMR1 uptake by SIMD category and age]

Source: SIRS, February 2013

1. Children born 1 January to 31 December 2010.

For more information see:
Variation in immunisation uptake rates as children age by SIMD category at Scotland level

Uptake rates by quarter ending 31 December 2012

This release also includes figures for the quarter ending 31 December 2012. The key points are as follows:

- Quarterly uptake rates by 24 months of age for primary courses of immunisation against diphtheria, tetanus, pertussis, polio & Hib (DTP/Pol/Hib), MenC and PCV remain high and stable at around 96% to 98%.
- Quarterly uptake of one dose of MMR vaccine (MMR1) by 24 months is 95.4% (the previous quarterly figure was 94.8%). Quarterly uptake of MMR1 by five years of age is 97.1% (the previous quarterly figure was 97.3%).

For more information on the latest quarterly uptake rates by 12 and 24 months, and five and six years, by NHS Board and CHP see:

Uptake rates by NHS Board and quarter
Uptake rates by CHP and quarter
Uptake rates by financial year

Uptake rates by financial year are published in June each year; the latest June publication includes information for year ending 31 March 2012.

Immunisation Uptake Rates in the UK

Comparable statistics for the UK published by the Health Protection Agency (HPA) show that uptake rates in Scotland compare favourably with UK uptake rates. Uptake in Scotland tends to be similar to rates observed in Wales and Northern Ireland, which are above rates observed in England.

UK vaccine uptake rates (referred to as coverage by HPA) are published by country by HPA in their Quarterly Health Protection Reports and Communicable Disease Reports on the COVER programme for childhood immunisation.

Relevant links for country-specific uptake data are as follows:

England
As well as UK and country level data, HPA also publish data for Strategic Health Authorities in England in their Quarterly Health Protection Reports and Communicable Disease Reports on the COVER programme for childhood immunisation.


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

Wales
http://www.wales.nhs.uk/sitesplus/888/page/43510
### Glossary

| **Diphtheria** | Diphtheria is an acute infectious disease caused by the bacterium *Corynebacteria diphtheriae* affecting the upper respiratory tract and occasionally the skin. Spread is by droplet infections and through contact with articles soiled by infected persons. An effective vaccine against the disease was introduced in 1940. A combined Diphtheria, Tetanus and Pertussis vaccine has been in use in the UK since the 1950s. Since October 2005, Diphtheria is now part of the combined 'five-in-one' vaccine, consisting of Diphtheria, Tetanus, Pertussis, Polio and Hib. A booster dose is also given to children at around three years four months of age. The school leaving booster vaccine, the reinforcing doses of Diphtheria, Tetanus and Polio, is given to 13 to 18 year olds. |
| DTP/Pol/Hib | A 'five-in-one' injection which combines vaccines to protect against Diphtheria, Tetanus, Pertussis, Polio and Hib. |
| **Hib (Haemophilus influenzae type b)** | *Haemophilus influenzae type b* (Hib) is a gram-negative bacterium that causes meningitis and acute respiratory infections, mainly in children. A Hib vaccine was introduced in 1992 and led to a reduction in confirmed cases of Hib disease. Since October 2005, Hib is now part of the combined 'five-in-one' vaccine, consisting of Diphtheria, Tetanus, Pertussis, Polio and Hib. A booster of Hib is also given as part of the combined Hib/MenC vaccination given at 12 to 13 months. |
| **Measles, Mumps and Rubella (MMR)** | **Measles** is an acute viral illness spread by infected respiratory droplets. Symptoms, after a ten-day incubation period, can include corzya, conjunctivitis, bronchitis, Koplik spots, rash and fever. **Mumps** is an acute viral illness characterised by swelling of the parotid glands, which may be unilateral or bilateral. It can cause permanent unilateral deafness at any age. The incubation period is 14-21 days. Before vaccination, mumps was a common cause of viral meningitis. **Rubella**, or German measles, is a mild infectious disease with an incubation period of 14-21 days. Maternal rubella infection in the first eight to ten weeks of pregnancy results in foetal damage in up to 90% of infants. Multiple defects are common, and are collectively known as Congenital Rubella Syndrome. A vaccine against Measles, Mumps and Rubella exists and since 1998 has been administered as part of the combined MMR (measles, mumps and rubella) vaccine. |
| **MenC** | Meningitis is an inflammation of the meninges, the lining that protects the brain and spinal cord. It is almost always caused by an infection, usually by a bacteria (bacterial meningitis) or a virus (viral meningitis). In rare cases it can be triggered by a fungus or parasite. The UK was the first country to introduce the meningococcal C conjugate (MenC) vaccine. Since 1999, the MenC vaccine has been part of the routine childhood immunisation programme. A booster of |
| **MenC** is also given as part of the combined Hib/MenC vaccination given at 12 to 13 months. |
| **Pertussis** |
Pertussis, or whooping cough, is a highly infectious bacterial disease caused by *Bordetella pertussis*. It is spread by droplet infection, and has an incubation period of seven to ten days. The most recognisable symptom is an irritating cough that develops into coughing fits. In young infants, the characteristic 'whoop' may never develop and coughing spasms may be followed by periods of apnoea (stopping breathing for a time).

Immunisation for pertussis was introduced in the 1950s. Since October 2005, Pertussis is now part of the combined ‘five-in-one’ vaccine, consisting of Diphtheria, Tetanus, Pertussis, Polio and Hib. A booster dose is also given to children at around three years four months of age.

| **Pneumococcal conjugate vaccine (PCV)** |
Invasive pneumococcal disease (pneumonia, bacteraemia and meningitis), caused by infection with *Streptococcus pneumoniae* is a major cause of morbidity and mortality, especially among the very young, the elderly, those with an absent or non-functioning spleen and those with other causes of impaired immunity. Pneumococci cause middle ear infections, exacerbations of bronchitis, and pneumonia, of which they are the most common bacterial cause. As with most infectious respiratory diseases, the numbers of cases of pneumococcal infection peak in winter. Many people (up to 50%) carry pneumococci in their nose and throat without developing serious infection. There are about 90 different types of pneumococci about a quarter of which cause serious illness.

PCV (Pneumococcal conjugate vaccine) provides some protection against one of the commonest causes of meningitis and also against other conditions such as severe ear infections (otitis media), and pneumonia caused by pneumococcal bacteria. This vaccine does not protect against all types of pneumococcal infection and does not protect against meningitis caused by other bacteria or viruses.

The PCV vaccine was introduced to the routine childhood vaccination schedule in September 2006.

| **Polio** |
Polio, or poliomyelitis, is an acute illness brought on when one of three types of polio virus invades the gastro-intestinal tract. The virus has an affinity for nervous tissue, and can cause paralysis if it reaches the central nervous system.

Routine immunisation was introduced in 1956. Since October 2005, Polio is now part of the combined ‘five-in-one’ vaccine, consisting of Diphtheria, Tetanus, Pertussis, Polio and Hib. A booster dose is also given to children at around three years four months of age. The school leaving booster vaccine, the reinforcing doses of Diphtheria, Tetanus and Polio, is given to 13 to 18 year olds.
| **Tetanus** | A toxin released from a bacteria called *Clostridium tetani* causes tetanus. Spores from these bacteria are present in soil and manure. The spores can be picked up quite easily through minor scratches, puncture wounds, burns or more serious injury. An effective vaccine against the disease was introduced, nationally in 1961 and a fall in the incidence of tetanus followed. Since October 2005, Tetanus is now part of the combined ‘five-in-one’ vaccine, consisting of Diphtheria, Tetanus, Pertussis, Polio and Hib. A booster dose is also given to children at around three years four months of age. The school leaving booster vaccine, the reinforcing doses of Diphtheria, Tetanus and Polio, is given to 13 to 18 year olds. |
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**Contact**

**Judith Tait**
Principal Information Analyst  
NSS.isdchildhealth@nhs.net  
0131 275 6833

**Daniel Adams**
Senior Information Analyst  
NSS.isdchildhealth@nhs.net  
0131 275 6868

**Lynne Jarvis**
Senior Information Analyst  
NSS.isdchildhealth@nhs.net  
0131 275 6424

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Appendix

A1 – Background Information

Data Sources

The data for this publication is derived from the Scottish Immunisation and Recall System (SIRS). This is an electronic system used by all NHS Boards in Scotland. The system facilitates the invitation of children when a scheduled immunisation is due and allows recording of immunisation data. After an immunisation contact has taken place the immunisation details are keyed into the system by administrative staff in NHS Boards. A primary aim of SIRS is to ensure that children in Scotland under the age of six years receive the appropriate immunisations according to the UK childhood immunisation schedule.

SIRS began in 1987 and has been used by all NHS boards since 2002 when it incorporated the Grampian Immunisation and Recall System (GIRS).

ISD receive quarterly data extracts from SIRS for the purpose of producing and publishing immunisation uptake rates.

Accuracy and reliability

The data covers the entire child population in Scotland up to 6 years of age i.e. it is not a sample. As the data are recorded on SIRS for the primary purpose of facilitating the invitation of children for immunisation, a high degree of accuracy of data recording by NHS Boards is required.

ISD undertake further data quality assurance checks prior to publication. In addition, NHS Board Immunisation Co-ordinators have the opportunity to review figures for their area prior to publication, so that any issues affecting the reported rates can be highlighted to users as appropriate.

Timeliness

Data for the year and quarter ending 31 December are extracted from SIRS in mid-February and published by ISD in March.

Methods

The uptake rates are based on all children reaching a specified age who were alive and registered on SIRS at the end of the reporting period. Direct comparison between an annual rate and rates for the corresponding quarters within the year is not possible due to movements of children in and out of NHS board areas, and any deaths that may have occurred during the year. In addition, annual rates may include vaccinations given that were recorded on the system after the time when each of the quarterly rates were calculated and reported.
Revisions statement

These data are not subject to planned revisions. The rates reported reflect immunisation uptake at those particular points in time, based on the data recorded. Information for previous years and quarters remain unchanged in subsequent publications.

Revisions History

ISD identified a minor issue with the MenC primary immunisation uptake rates for the period June 2008 to March 2010 due to a change on the Scottish Immunisation and Recall System (SIRS) impacting on the ISD calculations. ISD decided not to revise the figures as the impact on the reported rates was marginal (0.1 to 0.4 percentage points) and the resource required to revise the figures was considerable.

Further metadata details are available in Appendix A2.

Data developments – uptake rates for other vaccines

National statistics on uptake rates of the school leaving booster vaccine (the reinforcing doses of diphtheria, tetanus and polio given to 13 to 18 year olds) and of non-routine immunisations in Scotland are not currently available.

Recent improvements in the recording of this data nationally mean that ISD plan to publish uptake rates for the school leaving booster in autumn 2013 subject to the data being of sufficient quality.

The Scottish Immunisation and Recall System (SIRS) has recently been developed to facilitate the invitation of children in Scotland at risk from Hepatitis B for immunisation. In addition to supporting the delivery of these immunisations, these developments allow data on these immunisations to be recorded more consistently across Scotland. When data become available, and are of sufficient quality, ISD plan to publish uptake rates for these immunisations in 2014 (when uptake data is available for the first calendar year cohort of children to have reached 12 months of age since implementation of the system changes). System developments are also planned to support the delivery of BCG immunisations in Scotland, leading to improvements in data recording and the publication of uptake rates for this vaccine in the future.

A2 – Publication Metadata (including revisions details)

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<tr>
<th>Metadata Indicator</th>
<th>Description</th>
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<tr>
<td>Publication title</td>
<td>Childhood Immunisation Statistics</td>
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<tr>
<td>Description</td>
<td>Uptake rates of the routine childhood immunisations, by 12 months, 24 months, five years and six years. The data are presented at NHS Board and CHP level.</td>
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<td>Theme</td>
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<td>Topic</td>
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<td>Format</td>
<td>Excel workbooks, PDF</td>
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<tr>
<td>Data source(s)</td>
<td>Scottish Immunisation and Recall System (SIRS)</td>
</tr>
<tr>
<td>Date that data are acquired</td>
<td>11 February 2013</td>
</tr>
<tr>
<td>Release date</td>
<td>22 March 2013</td>
</tr>
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</table>
Quarterly. Following a consultation with users, from June 2012, ISD will produce an annual report each March (calendar year figures) and tables presenting uptake rates will be published quarterly.

Data up to 31 December 2012. No delays between receipt and processing of data for publication.

Data back to 1995

These data are not subject to planned revisions.

No revisions were applied to this release. See Appendix A1 for revisions history.

Further information about the current immunisation programmes in Scotland, the vaccines available, and the diseases they protect against, can be found via the NHS Health Scotland Immunisation website.

Making information publicly available for planning, epidemiology, provision of services and providing comparative information.

Quality checks are conducted at data entry by NHS Boards. Figures are compared to previous years’ figures and expected trends by ISD.

The data covers the entire child population in Scotland up to six years of age i.e. it is not a sample.

Data are comparable with data for the rest of the UK which are published by the Health Protection Agency

It is the policy of ISD Scotland to make its web sites and products accessible according to published guidelines.

Data are available as a PDF and tables on the Childhood Immunisation area of the ISD website.

Numbers and percentages (uptake rates). See Definitions

The ISD protocol on Statistical Disclosure Protocol is followed.

National Statistics

Awaiting assessment by UK Statistics Authority

14 December 2012


March 1995

NSS.isdchildhealth@nhs.net

March 2013
A3 – Early Access details (including Pre-Release Access)

Pre-Release Access

Under terms of the "Pre-Release Access to Official Statistics (Scotland) Order 2008", ISD are obliged to publish information on those receiving Pre-Release Access ("Pre-Release Access" refers to statistics in their final form prior to publication). The standard maximum Pre-Release Access is five working days. Shown below are details of those receiving standard Pre-Release Access and, separately, those receiving extended Pre-Release Access.

Standard Pre-Release Access:

- Scottish Government Health Department
- NHS Board Chief Executives
- NHS Board Communication leads
- Health Protection Scotland
- Health Protection Agency

Extended Pre-Release Access

Extended Pre-Release Access of 8 working days is given to a small number of named individuals in the Scottish Government Health Department (Analytical Services Division). This Pre-Release Access is for the sole purpose of enabling that department to gain an understanding of the statistics prior to briefing others in Scottish Government (during the period of standard Pre-Release Access).

- Scottish Government Health Department (Analytical Services Division)

Early Access for Management Information

These statistics will also have been made available to those who needed access to ‘management information’, i.e. as part of the delivery of health and care:

- NHS Board Immunisation Co-ordinators
- Health Protection Scotland
- Chair of National Immunisation Co-ordinators Group
- Chair of Scottish Immunisation and Recall System National User Group
Information Services Division

A4 – ISD and Official Statistics

About ISD

Scotland has some of the best health service data in the world combining high quality, consistency, national coverage and the ability to link data to allow patient based analysis and follow up.

Information Services Division (ISD) is a business operating unit of NHS National Services Scotland and has been in existence for over 40 years. We are an essential support service to NHSScotland and the Scottish Government and others, responsive to the needs of NHSScotland as the delivery of health and social care evolves.

**Purpose:** To deliver effective national and specialist intelligence services to improve the health and wellbeing of people in Scotland.

**Mission:** Better Information, Better Decisions, Better Health

**Vision:** To be a valued partner in improving health and wellbeing in Scotland by providing a world class intelligence service.

Official Statistics

Information Services Division (ISD) is the principal and authoritative source of statistics on health and care services in Scotland. ISD is designated by legislation as a producer of ‘Official Statistics’. Our official statistics publications are produced to a high professional standard and comply with the Code of Practice for Official Statistics. The Code of Practice is produced and monitored by the UK Statistics Authority which is independent of Government. Under the Code of Practice, the format, content and timing of statistics publications are the responsibility of professional staff working within ISD.

ISD’s statistical publications are currently classified as one of the following:

- National Statistics (ie assessed by the UK Statistics Authority as complying with the Code of Practice)
- National Statistics (ie legacy, still to be assessed by the UK Statistics Authority)
- Official Statistics (ie still to be assessed by the UK Statistics Authority)
- other (not Official Statistics)

Further information on ISD’s statistics, including compliance with the Code of Practice for Official Statistics, and on the UK Statistics Authority, is available on the [ISD website](#).

The United Kingdom Statistics Authority has designated these statistics as National Statistics, in accordance with the Statistics and Registration Service Act 2007 and signifying compliance with the Code of Practice for Official Statistics. Designation can be broadly interpreted to mean that the statistics:

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

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