Proportion of mothers recorded as smokers at time of delivery or at first post-natal visit

Key messages

- Smoking during pregnancy is one of the most important modifiable risk factors for improving infant health.
- Despite moderate declines over the past 10 years in England and Scotland, rates of smoking during pregnancy in the UK are higher than in many European countries.
- Smoking during pregnancy is highest in deprived populations and in mothers under 20 years of age.
- Parental smoking increases offspring smoking initiation later in childhood and adolescence.
- Improved monitoring and management of smoking throughout pregnancy is essential, alongside the development of high-quality and comparable data across countries and reinforcement of smoking reduction efforts across the whole population.

What is this indicator showing us?

This indicator shows the number of pregnant mothers who reported smoking (at all) at the time when they delivered their baby (in England) or during their first health visitor appointment following the birth of their baby (in Scotland).

Data availability and comparability

Data are available for England\(^38\) and Scotland\(^39\) but not for Northern Ireland or Wales. Data presented for England are captured at delivery by the Health and Social Care Information Centre, and data presented for Scotland are captured by health visitors within 10 days of birth as part of the Child Health Systems Programme Pre-School (CHSP-PS). Both datasets rely on women to self-report smoking habits.

Proportion of mothers recorded as smokers at time of delivery in England and Scotland

![Graph showing proportion of women smoking at time of delivery in England and Scotland](image)

**Latest data:** 11.4% of women were smoking at time of delivery in 2014/2015.

**Trend:** There has been a moderate decline in the proportion of women recorded as smoking at time of delivery since 2006/2007.

**Source:** Health and Social Care Information Centre, Lifestyles Statistics

*Figure 2.1.1: Proportion of women recorded as smoking (any smoking) at time of delivery in England, 2006/2007 to 2014/2015*
Figure 2.1.2: Proportion of women reported as smokers (any smoking) at first health visitor review after birth in Scotland, 2006 to 2015

Why is this indicator important?

Maternal smoking during pregnancy is linked with an extremely wide range of problems during the pregnancy, for the birth and for the child later in life.

Smoking during pregnancy has been suggested to cause around 2,200 preterm births, 5,000 miscarriages and 300 perinatal deaths (babies who are stillborn or those who die before seven days of age) each year in the UK40.

Maternal smoking during pregnancy places unborn babies at an increased risk of:
- impaired fetal growth and development;
- being born small for gestational age;
- having reduced birth weight;
- reduced lung function; and
- developing some congenital abnormalities, including those of the heart, limb and face.

Passive smoking (exposure to the smoke of others) is likely to have similar adverse effects on the child’s growth and development, although to a lesser extent41.

Smoking during pregnancy also increases the risk of Sudden Infant Death Syndrome (SIDS) and a range of problems later in a child’s life, including obesity43 and asthma44. It affects the child’s growing brain, affecting overall intelligence and increasing the risk of mental health problems from attention deficit hyperactivity disorder (ADHD) to conduct problems and anxiety45. It also makes it more likely that children themselves will go on to smoke later in life.

Preconception and pregnancy are key opportunities for women to give up smoking, and important times to promote smoking cessation. However, it is estimated that 43% of UK women who quit smoking during pregnancy resume smoking within six months of giving birth46.

Where are we now in the UK?

Recent figures from England suggest that the proportion of pregnant women known to be smokers at the time of delivery is 11%. There has also been a steady decline in this figure over the past 10 years.

In Scotland, recent figures indicate that 15% of women in participating NHS Boards were recorded as smokers during their first health visitor review, with a steady decline over recent years also observed.

These figures are likely to be underestimates, as non-disclosure of smoking can be up to 25% in some studies47.

There are limited comparable international data on smoking during pregnancy, due to variation in collection methods. Researchers have previously estimated (using data from 2010) that rates of smoking late in pregnancy were as low as 5% in countries such as Lithuania and Sweden, and as high as 15% in Northern Ireland, 16% in Wales, 17% in France, and 19% in Scotland12.
**Spotlight on inequalities**

There are dramatic variations in smoking during pregnancy across different parts of the UK, associated strongly with levels of deprivation. In Scotland over a quarter (25.9%) of women in the most deprived areas were recorded as smokers at their first health visitor review following the birth of their baby, compared with only 3.3% in the least deprived areas in 2015. Additionally, around one-third (34.7%), or 7 in 20 pregnant women under 20 years of age were recorded as smokers, compared with around 9.5%, or 2 in 20 women aged between 30 and 34.

Variation is also seen in England, with rates of smoking at delivery in the North of England at almost 15%, compared with just over 10% in the South of England, again, this likely reflects deprivation.

There are strong associations between smoking in pregnancy and lower breastfeeding rates, with this link almost certainly due to deprivation.

![Figure 2.1.3: Proportion of mothers smoking at the first health visitor review, Scottish Index of Multiple Deprivation (SIMD) 2012 quintile (fifth of population), year ending 31 March 2015](image)

**What does good look like?**

There is no safe level of exposure to tobacco for an unborn baby. Therefore, we should strive to eliminate all exposure to tobacco in the womb.

The good news is that stopping smoking before or during pregnancy decreases the risk of outcomes such as infant mortality. Quitting early brings the greatest benefits for the child, but quitting at any time yields health improvements.

The marked variation in smoking rates associated with deprivation shows us what can be achieved. If smoking rates at the first health visitor review for all women in Scotland were to match those in the least deprived areas (3.3%), there would be over 6,000 fewer women smoking at their first health visitor review.
How can we improve?

Women smokers are more likely to quit or reduce during pregnancy than at any other time of life. SmOKing cessation programmes in pregnancy reduce the proportion of women who continue to smoke in late pregnancy, and reduce low birthweight and preterm birth.

A range of interventions are needed, including those targeted to pregnant women, reduction of their exposure to passive smoke, and continued efforts to reduce smoking across the population.

First, we need better data to accurately monitor smoking during pregnancy. Current self-report data are only collected after birth and almost certainly underestimate the problem. Carbon monoxide screening (a non-invasive breath test) can be used to objectively assess active smoking and passive smoke exposure in pregnancy; it is recommended by the National Institute for Health and Care Excellence (NICE) and should be in routine use from early pregnancy in all maternity services.

Second, all maternity services must implement the NICE Guidance, Smoking: Stopping in pregnancy and after childbirth, ensuring that smoking is addressed early in all pregnancies and that all women have access to equitable and tailored smoking cessation services. There is some evidence to suggest that incentive schemes can improve smoking cessation rates in pregnant women; however, further research into the efficacy of these programmes across the UK is required.

Key actions

- Strengthen data collection across the UK by ensuring accurate recording of smoking status supplemented with carbon monoxide screening at a woman’s initial booking visit, and at regular intervals throughout pregnancy, including at 36 weeks. Data should be recorded centrally to allow for local, regional and national comparisons.

- Commissioners and providers must ensure widespread implementation of the NICE Guideline, Smoking: Stopping in pregnancy and after childbirth, with a particular emphasis on routine carbon monoxide testing, training of health care staff and the setting of local targets to monitor implementation.

- Reinforce population level efforts to reduce smoking, particularly amongst deprived populations. This will be the most effective way of reducing smoking in adults with dependent children. Reducing adolescent smoking is the most effective way of reducing smoking amongst the next generation of parents.

Additional data note

There are no comparable data on smoking during pregnancy collected across the UK.

Data for England and Scotland are presented separately because they have been collected at different times and by different personnel, although in both cases smoking was self-reported.

Previously, comparison between the four nations was collected via the Infant Feeding Survey. However, this survey was cancelled in 2015, meaning the last dataset available is from 2010. In England, women whose smoking status at the time of delivery is unknown are currently included in the calculation of the proportion of women smoking at the time of delivery, but from April 2017 this will change and unknowns will no longer be included. This could result in figures increasing slightly. In 2016/2017 both sets of figures will be published so the impact of this change can be monitored.

The children and young people we consulted identified the following elements of a healthy pregnancy:

- no smoking, drugs or alcohol
- good nutrition
- healthy and balanced diet
- exercise as much as possible
- good weight
- healthy lifestyle
- lots of check-ups
- being happy

(RCPCH & Us® Voice Bank 2016)
2.2 Breastfeeding

Proportion of mothers recorded as breastfeeding at six to eight weeks post birth.

Key messages

- Breastfeeding is a natural process that is highly beneficial for infant and mother, and benefits the child across its lifespan.
- Breastfeeding rates in England and Scotland have shown minimal improvement since data collection commenced, and remain lower than in many other comparable high-income countries.
- New national strategies for infant nutrition are required, along with increased efforts to support women to initiate and maintain breastfeeding, with strengthened data collection across all four nations.

What is this indicator showing us?

This indicator shows the number of women recorded as breastfeeding at their six to eight week health visitor review following the birth of their baby. Breastfeeding is recorded as either exclusive (the infant is only receiving breastmilk) or mixed (the infant is receiving a combination of breastmilk and infant formula).

Data availability

Exclusive and mixed data are available for England and Scotland. Total breastfeeding data (not broken down by exclusive or mixed) are available for Northern Ireland (in 2013/2014, 27.6% of infants were breastfed at six weeks). UK-wide breastfeeding comparison data were previously collected via the Infant Feeding Survey, capturing self-reported data. This survey was cancelled in 2015, and the last available data were collected in 2010.

Breastfeeding rates in England, Scotland and Northern Ireland

England

<table>
<thead>
<tr>
<th>Year</th>
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<tr>
<td>2012/13</td>
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<td>2013/14</td>
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<tr>
<td>2014/15*</td>
<td>31%</td>
<td></td>
</tr>
<tr>
<td>2015/16*</td>
<td>30%</td>
<td></td>
</tr>
</tbody>
</table>

Latest data: 44% of mothers in England were recorded as breastfeeding at their 6 to 8 week health visitor review in 2014/2015 (either mixed or exclusive).

Trend: Although a slight increase in breastfeeding rates was observed from 2009 to 2011, this was not sustained.

Source: NHS England

(*) Note that methodology for data collection changed. Data coverage was 85% for these years and ≥90% for other years.

Figure 2.2.1: Proportion of women recorded as breastfeeding at 6 to 8 week review in England, 2010/2011 to 2015/2016
**Scotland**

Latest data: 27% of mothers in Scotland were recorded as breastfeeding at their 6 to 8 week health visitor review in 2014/2015.

Trend: There has been minimal increase in breastfeeding rates at 6 to 8 weeks since 2004/2005; a 2% increase over 10 years.

Source: CHSP-PS, ISD Scotland

![Figure 2.2.2: Proportion of women recorded as breastfeeding at 6 to 8 week review in Scotland, 2004/2005 to 2014/2015](image)

**Northern Ireland**

Latest data: 23% of mothers in Northern Ireland were recorded as breastfeeding at their 6 to 8 week health visitor review in 2014/2015.

Trend: There has been a steady, gradual increase in breastfeeding rates at 6 to 8 weeks since 2011/2012; a 2% increase over three years.

Source: Child Health System (Northern Ireland)

![Figure 2.2.3: Proportion of women recorded as breastfeeding at 6-8 week review in Northern Ireland, 2011/2012 to 2014/2015](image)

**Why is this indicator important?**

Breastfeeding is beneficial for the overall health and wellbeing of children across their lifetime. In the UK exclusive breastfeeding is recommended for around the first six months of a baby’s life, in line with recommendations from the World Health Organisation.

In early childhood, breastfeeding helps protect babies from gastro-intestinal, respiratory and ear infections, and hospitalisation for infections, and has additional benefits including increased intelligence; breastfeeding may result in reduced risk of later overweight and Type 2 diabetes, but the evidence for these effects is less certain.

For mothers, breastfeeding provides protection against breast cancer and improves birth spacing; breast-feeding may protect against ovarian cancer and Type 2 diabetes, but again the evidence for these benefits is less certain.

For infants born preterm, breastmilk is particularly important, reducing the risk of infections and potentially life-threatening conditions such as necrotising enterocolitis.
Breastfeeding is also protective against developing obesity in childhood and in later life. There is also growing evidence that longer duration of breastfeeding has further benefits, being associated with increased intelligence, along with reducing the risk of developing diabetes and being overweight later in life.

Where are we now in the UK?

With support and knowledge, the vast majority of women should be able to breastfeed. However, women's decisions about breastfeeding balance the best interests of the infant, maternal options and choices and the very real difficulties some infants and mothers have in breastfeeding. Some women are unable to or choose not to breastfeed for a range of appropriate reasons. There are also a small number of infants who cannot be breastfed for medical reasons related to either the mother or the child.

Less than half (43.8%) of new mothers were breastfeeding by the six to eight week review in England in 2014/2015: 30.1% breastfeed exclusively, and 13.7% feed a mixture of breastmilk and formula. This is substantially lower than the 74.3% of new mothers who were recorded as initiating breastfeeding during the same period following the birth of their baby.

In Scotland, 38% of babies were breastfed at the six to eight week review in 2014/2015: 27.3% exclusively and 10.7% fed a mixture of breastmilk and formula. This is again lower than the 48.3% of women who were recorded as initiating breastfeeding at their first health visitor review soon after birth.

Time trends show little reason for optimism in either country. There has been no change in England since data collection commenced and minimal improvement in Scotland.

What does good look like?

Much higher breastfeeding rates and persistence of breastfeeding in comparable wealthy countries suggests that the UK needs to take action to improve breastfeeding initiation, breastfeeding at six to eight weeks and continued breastfeeding throughout the first six months of an infant’s life.

There are limited data available to compare trends in breastfeeding internationally, particularly at six to eight weeks. An analysis of global breastfeeding prevalence at six months found that in the UK only 34% of babies are receiving some breastmilk compared with 49% in the US and 71% in Norway.

The children and young people we consulted had mixed views around the importance of breastfeeding. Those who thought it was important believed that breastfeeding was good for the baby, contained more nutrients, was healthier, and provided a better start for babies because they get the correct antibodies. Others felt that it depends if the baby is well, and that a bottle can be just as good.

How can we improve?

Reasons for the UK’s low breastfeeding rates are complex. They include low levels of education of mothers, particularly young mothers and those from deprived groups, as well as practical problems in establishing breastfeeding after birth and concern about whether the infant is growing adequately and receiving sufficient milk. Negative perceptions by mothers of how breastfeeding is viewed by family, peers and the public appear widespread, and undoubtedly influence breastfeeding initiation and continuation.

In order to improve breastfeeding rates across the UK, governments, health agencies and health services must ensure that the wider community is informed about the importance of breastfeeding, that women feel socially supported to breastfeed and that all women have equitable access to high-quality breastfeeding support services.

Maternity services need to be equipped to support women to make informed choices about breastfeeding. This can be achieved through the UNICEF Baby Friendly Initiative accreditation which provides an evidence-based framework for best practice. Education should begin antenatally and continue through birth and beyond. Universal midwifery and health visiting services must continue to be commissioned and improved to help support breastfeeding initiation soon after birth and its subsequent continuation.

Research indicates that 81% of mothers who breastfed for less than a week and 86% of mothers who breastfed for between one and two weeks said they would have liked to have breastfed for longer. Failing to initiate...
breastfeeding when it is highly desired is associated with post-natal depression.

Primary care and paediatric services also have a role and there should be improved education of paediatric and primary care teams to support breastfeeding.

National breastfeeding strategies should be developed or refreshed to strengthen efforts in this area, taking account of the lack of recent progress. Robust monitoring and evaluation of subsequent activities is essential\(^7\). Northern Ireland currently has a breastfeeding strategy in place for 2013 to 2023\(^2\), and Scotland launched their framework for improving maternal and infant nutrition in 2011\(^3\).

Data collection is imperative to monitor national and local breastfeeding rates and support evaluation of existing breastfeeding services in line with the NICE Postnatal Quality Service Statement 5: Breastfeeding\(^7\). This is particularly important given the recent cancellation of the Infant Feeding Survey.

**Spotlight on inequalities**

There is a strong impact of deprivation on breastfeeding (mixed or exclusive) at six weeks across the UK. Data from the 2010 Infant Feeding Survey showed that 46% of mothers in the most deprived areas were breastfeeding, compared with 65% in least deprived areas. This difference was greatest for exclusive breastfeeding (see Figure 2.2.4). Breastfeeding also increases with maternal age, with around a quarter (24%) of women under 20 years of age breastfeeding at six weeks compared with around two-thirds (67%) of women aged 35 and over\(^5\).

![Figure 2.2.4: Proportion of mothers breastfeeding at six weeks by deprivation quintile (fifth of population) in the UK, 2010\(^5\)](image-url)
**Key actions**

- National strategies for infant feeding should be developed or refreshed and evaluated.

- Robust and comparable data should be collected across the UK, measuring breastfeeding initiation, breastfeeding at six to eight weeks, and at suitable intervals up until 12 months of age. Data should be recorded centrally to allow for local, regional and national comparisons and monitoring of trends in different socioeconomic groups.

- All maternity services should achieve and maintain UNICEF Baby Friendly Initiative accreditation. All services should provide antenatal education and health promotion regarding breastfeeding to both parents.

- Local breastfeeding support should be planned and delivered to mothers in the form of evaluated, structured programmes, in line with NICE *Postnatal Quality Statement 5: Breastfeeding*.

- Ensure preservation of universal midwifery and health visiting services to all mothers.

- Healthy infant nutrition should be taught as part of statutory personal health and social education in secondary schools.

**Additional data note**

Data for England extend from 2008/2009 to 2014/2015 and were collected directly from maternity service providers and child health information system providers. Data for 2008/2009 did not pass data quality checks and are therefore not presented here.

Data for Scotland extend from 2004/2005 to 2014/2015 and were collected by a health visitor and recorded on the national Child Health Systems Programme Pre-School System.
2.3 Immunisation

Proportion of children who received the full course (three doses) of the 5-in-1 vaccination by 12 months

Key messages

- Vaccinations in early childhood protect children against serious and potentially fatal diseases. By 12 months of age, babies should have received several vaccinations, including three doses of the 5-in-1 vaccination.

- Since 2006/2007, the uptake rate of the 5-in-1 vaccine across the UK has increased modestly.

- Wales, Northern Ireland and Scotland meet the WHO target of having vaccination rates for the full course of the 5-in-1 vaccine at 12 months above 95%; England falls below this target at 94.2%.

What is this indicator showing us?

This indicator shows us the proportion of babies in the UK who, by 12 months of age, have received all three doses of the 5-in-1 vaccination to protect them against five communicable diseases: diphtheria, tetanus, whooping cough (pertussis), polio and *Haemophilus influenzae* type b (Hib). There are multiple potential vaccination indicators; this was chosen as the best proxy for system coverage.

Data availability and comparability

Data for England, NI, and Wales are collected via the COVER programme[^74-77]. Data for Scotland are collected by the Information Services Division Scotland[^78]. Data for England and Wales are presented in financial years; data for Wales and Northern Ireland are presented by calendar year (see additional data note).

Immunisation rates in England, Northern Ireland, Scotland and Wales

5-in-1 vaccination

![Figure 2.3.1: 5-in-1 vaccination (at 12 months) uptake rates in the UK 2005 to 2015, by country and calendar year](image)

**Latest data:** In 2015 England’s 5-in-1 immunisation rate was 93.6%, and Wales’ was 96.6% in 2014. In 2015, Northern Ireland’s 5-in-1 immunisation rate was 97.3%, and Scotland’s was 97.2%.

**Trend:** Since 2005, the uptake rate of the 5-in-1 vaccine across England and Wales has increased - both by 2.3%, with minor year-on-year fluctuations. The uptake rate of the 5-in-1 vaccine across Northern Ireland and Scotland also increased between 2005 and 2015: 2% and 1.4% respectively, with minor year-on-year fluctuations.

Most recent annual data coverage available for the 5-in-1 vaccination at 12 months in England 2015/2016 is 93.6% - slightly lower (0.6%) than in 2014/2015 at 94.2%.
MMR2 vaccination

![MMR2 Vaccination Chart](chart.png)

**Figure 2.3.2: MMR2 vaccination (at 5 years) uptake rates in the UK 2005 to 2014, by calendar year**

**Why is this indicator important?**

Immunisation across the life course is vital for the prevention of many communicable diseases and their associated morbidity and mortality. The World Health Organisation (WHO) reports that vaccinations prevent an estimated 2.5 million deaths globally each year, with the annual number of deaths in children under five years of age reducing from approximately 9.6 million to 7.6 million between 2000 and 2010\(^8\).

The 5-in-1 vaccine is a single injection administered on three separate occasions at 8, 12 and 16 weeks of age providing protection against five diseases\(^8\):

- Diphtheria
- Tetanus
- Pertussis (whooping cough)
- Polio
- Hib (Haemophilus influenzae type b)

Apart from tetanus (which is not passed from person-to-person), these diseases are generally highly contagious and can cause a range of debilitating symptoms which are, in some cases, fatal\(^81\)\(^84\).

In addition to the 5-in-1 vaccination, it is useful to examine uptake of the measles, mumps and rubella (MMR) vaccine later in early childhood. The first dose of the MMR vaccine is offered to children at one year of age with a second dose at three years four months, although this can be given earlier.

High rates of vaccination result in high levels of immunity to infections throughout the population (herd immunity), which is particularly important for protecting individuals who cannot be vaccinated and can also lead to the elimination of some diseases. Even when a disease is no longer common in the UK, without sustained high rates of vaccination it is possible for these diseases to return\(^85\), as we have seen with measles outbreaks.

**Where are we now in the UK?**

The WHO recommended immunisation rate against vaccine-preventable diseases is at least 95%. The 5-in-1 uptake rates from 2015 in the UK (excluding Wales) averaged 94.0%, ranging from 94.2% in England to 97.3% in Northern Ireland and 97.2% in Scotland (latest rate for Wales was 96.6% in 2014), meaning that only coverage in England is currently below this target\(^86\).

Coverage for the 5-in-1 for all four nations has increased overall since 2005, with England seeing the greatest increase at 2.3% over 11 years.

It is relevant to look at uptake rates for other vaccinations, such as MMR. Data from 2013 show that vaccination rates for two doses of the MMR vaccine by age five across the UK averaged 89.2%, ranging from 88.6% in England to 92.6% in Wales and Scotland and 92.1 in Northern Ireland all of which are below the WHO target of 95%.

**Latest data:** Most recent uptake data (2015) for both doses of the MMR vaccination in England was 88.2% (0.4% lower than 2014/2015 at 88.6%). For Northern Ireland and Scotland in 2014, the uptake rates were 93.0% and 92.9% respectively. For Wales in 2013, the uptake rate was 92.6%.

**Trend:** Since 2005 the uptake rate has increased significantly across all countries.

**Source:** Public Health England, Public Health Wales Health Protection Division, ISD Scotland, HSC Public Health Agency
Since its introduction in 1988 in place of the single-antigen measles vaccine\(^8\), the MMR vaccine had a relatively high uptake at 80–90% between 1988 and 2000\(^8\). A significant decrease in the uptake of MMR vaccine occurred during the early 2000s, resulting from much publicised concerns over a possible link between the vaccine and autism and bowel disease after a paper published in 1998 was interpreted as suggesting such a link. The paper was later retracted and in 2013 uptake of the first dose of MMR vaccine in England was reported to have recovered and to be at its highest levels since its introduction in 1988\(^8\). Subsequently, uptake of the first MMR dose has declined slightly in England to 91.9% in 2015/2016\(^7\), but it still remains higher than before the MMR controversy.

### What does good look like?

An effective vaccination programme should be taken up by as much of the target group as possible. This will ensure that the greatest number of infants, children and young people are protected from vaccine-preventable diseases and will also provide protection to unimmunised infants and children through herd immunity.

Immunisation rates of the 5-in-1 vaccine in England are currently below the WHO recommended level of at least 95%, although six out of nine regions are meeting this target\(^9\). We should therefore aim to increase vaccination coverage throughout the population, with a particular focus on areas where rates are below the WHO threshold.

### Spotlight on inequalities

A recent study of vaccination uptake at five years of age in England found that lower immunisation coverage of the 5-in-1 booster and second MMR dose at five years of age was associated with higher area-level socioeconomic deprivation, although the strength of association was weak\(^9\).

However, there is evidence that immunisation uptake rates may increase or decrease with deprivation. Some studies have found that mothers of unimmunised infants are older and more highly qualified than those of partially immunised infants\(^9\).

Geographic variation has also been shown to have an impact on vaccination uptake rates (see Figure 2.3.3), and many English regions meet the WHO target whilst others do not. Poor uptake of vaccinations in London may be due to a number of factors: greater fragmentation of services; high mobility of the population; children not registered with a GP, including vulnerable groups such as refugee children; non-participation in immunisation programmes as parents become more knowledgeable and are able to make informed decisions about vaccinating their children. These factors may also contribute to the inaccuracy of immunisation data and falsely lower immunisation coverage rates\(^9\).

![Figure 2.3.3: 5-in-1 coverage at 12 months, England by region 2014/2015\(^9\)](image-url)
How can we improve?

National strategies to raise awareness and promote the importance of immunisations throughout childhood are required to both maintain and improve current immunisation uptake, with strong clinical leadership among public health, primary care and secondary care health professionals\textsuperscript{94}.

Central to any strategy needs to be robust data collection systems which enable children who have missed immunisations to be followed-up locally, as outlined by the National Institute for Health and Care Excellence (NICE)\textsuperscript{86}.

There are a range of barriers which can impact on immunisation uptake, such as lack of access to services, perceived medical contraindications, and other competing pressures. Given this, care must be taken to better understand how to tailor interventions and increase uptake for different social and cultural groups\textsuperscript{95,96}.

To date there is limited evidence on ways to successfully address vaccine refusal\textsuperscript{97}. There needs to be continued research and evaluation of strategies to increase uptake in families where a conscious decision has been made to not immunise their child in the absence of a medical indication\textsuperscript{95}.

Key actions

- Maintain high awareness of the importance of immunisation across the UK through national strategies which ensure leadership across all health professional groups.

- Strengthen implementation of NICE guidance, \textit{Reducing differences in the uptake of immunisations (PH21)}, including, but not limited to, robust local monitoring of the vaccination status of children and young people and adopting multifaceted programmes across different settings\textsuperscript{86}.

- Recognise the impact of various social factors, including deprivation, on vaccine uptake, developing and evaluating methods to increase uptake within these groups.

- Further research into methods to improve vaccination uptake amongst families who make a conscious decision not to vaccinate their child.

- All child health professionals to improve vaccination rates, and, if necessary, to signpost families to register their children with a general practitioner.

Additional data note

England: Primary 5-in-1 coverage figures are only published from 2006/2007 onwards; figures for 2005/2006 cover the primary diphtheria vaccine only.

Scotland: Primary 5-in-1 coverage figures are only published from year ending December 2011; figures for 2006–2010 cover the primary diphtheria vaccine only.

Comparison of UK 5-in-1 and MMR2 vaccine uptake rates are based on 2013 figures as complete data for all four nations were available in 2013 only.

Lower uptake rates of immunisations in London have been exacerbated by high levels of social mobility. There are a large number of ethnic groups living in London and the population is transient, with some areas experiencing a 20–40% turnover on GP lists\textsuperscript{93}. As a result, it can prove difficult for localities and GP practices to maintain an accurate record of immunisation figures.