



Infection report

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Immunisation

Pertussis Vaccination Programme for Pregnant Women: vaccine coverage estimates in England, September to December 2014

Background to the pertussis vaccination in pregnancy programme

In the UK the introduction of routine national immunisation against pertussis (whooping cough) in 1957 resulted in a marked reduction in pertussis notifications and deaths [1]. Despite a sustained period of high vaccine coverage since the early 1990s, pertussis has continued to display 3-4 yearly peaks in activity. In the five years prior to 2012, on average, there were nearly 800 confirmed cases of whooping cough, 270 babies admitted to hospital and four deaths in babies each year [Health Protection Agency (HPA) unpublished reconciled data]. The highest disease incidence occurs in infants under three months of age who are too young to have completed the primary vaccine course and have the greatest risk of complications and death. In 2012, pertussis activity increased beyond levels reported in the previous 20 years and extended into all age groups, including infants less than three months of age. This young infant group is considered a key indicator of pertussis activity [2] and the primary aim of the pertussis vaccination programme is to minimise disease, hospitalisation and death in young infants.

A national outbreak (level 3 incident) was declared in April 2012 by the HPA to coordinate the response to increased pertussis activity [3]. In response to this on-going outbreak, the Department of Health announced that pertussis immunisation would be offered to pregnant women from 1 October 2012 to protect infants from birth whilst disease levels remain high [4]. This programme aims to passively protect infants from birth, through intra-uterine transfer of maternal antibodies, until they can be actively protected by the routine infant programme with the first dose of pertussis vaccine scheduled at eight weeks of age [5].

Pertussis activity in England persists at raised levels compared to the years preceding the outbreak in 2012 [6]. The greatest reduction in disease since the peak in 2012 has been in infants under six months of age who are targeted by the maternal pertussis vaccination programme. Disease incidence has, as expected, continued to be highest in this age group but case reports are now in line with those seen before the 2012 peak. Up to 31 October 2014, 10 deaths had been reported in young babies with confirmed pertussis who were born after the introduction of the pregnancy programme on 1 October 2012. Nine of these 10 babies were born to mothers who had not been vaccinated against pertussis, all of the 10 babies were too young to be fully protected by vaccination themselves and none had received their first dose of pertussis-containing vaccine [6].

A UK study examining the safety of pertussis vaccination in pregnancy found no evidence of an increased risk of any of an extensive predefined list of adverse events related to pregnancy for women given pertussis vaccination in the third trimester [7]. Two studies using different methods have each shown that babies born to mothers vaccinated at least seven days before delivery had a reduced risk of pertussis disease, of around 90%, in their first few weeks of life when compared with babies whose mothers had not been vaccinated [8, 9]. In June 2014 the Joint Committee on Vaccination and Immunisation (JCVI) considered available data relating to the coverage, effectiveness and safety of the programme, its impact on disease and current epidemiology and advised that the programme should continue for a further five years [10]. This includes the continuation of all surveillance activities introduced to monitor the programme.

Vaccine coverage collection

In England, monthly data on the uptake of pertussis vaccination in pregnancy are collected from GP records via the ImmForm website* and are monitored, validated and analysed by PHE. This data collection is vital to monitor the uptake of the programme, to identify areas of low coverage and inform public health actions.

Methods

Data from April 2014 onwards have been automatically uploaded from participating GP practices to the ImmForm website and analysed by Area Team. This method can collate data from more than 90% of GP practices in England, and replaces the manual system that was previously in use [11].

The monthly denominator for automated data is the number of women who delivered in the survey month at more than 28 weeks gestational age; the monthly numerator is the number of pregnant women who delivered after 28 weeks gestational age in the survey month that received a dose of pertussis-containing vaccine in the preceding fourteen weeks. During the summer of 2014 Boostrix-IPV® replaced Repevax® as the pertussis-containing vaccine used for pregnant women [12].

In addition to the numerator and denominator, the automated survey records the number and percentage of GP practices responding each month. For accurate denominators to be extracted from GP IT systems by the automated survey and precise coverage estimates to be calculated it is important that the medical records of all women who have given birth have the following fields completed:

- ▶ the date of delivery
- ▶ the date of receipt of a pertussis-containing vaccine at or after week 28 of pregnancy, regardless of the setting where the vaccine was administered
- ▶ where relevant, any record of a premature delivery occurring at less than 28 weeks gestational age

Continued support in the delivery of this important programme is being sought from service providers (GP practices and maternity units), Screening and Immunisation Teams and Health Protection Teams. Screening and Immunisation Teams should continue to update service providers on the current epidemiology of the disease, the effectiveness of the vaccination programme and the need to maintain and improve the high coverage achieved. Further information on the pertussis vaccination programme for pregnant women is available here: <https://www.gov.uk/government/collections/pertussis-guidance-data-and-analysis>

This report updates the previous summary of the pertussis vaccination programme for pregnant women for the five months ending 31 August 2014 [11], presenting data collected using the automated reporting system for the four months ending 31 December 2014.

Results

Pertussis vaccine coverage in pregnant women increased from 55.6% in September to 62.3% in December 2014. Monthly pre-natal pertussis vaccine coverage followed a very similar pattern in 2014 to that observed in 2013 with coverage dipping in the summer months and slowly increasing to a peak in December (figure 1). Vaccine coverage in 2013 and 2014 differed by only 0.2-2.2% each month with the exception of May and June when coverage was 3.6% and 3.9% higher in 2014.

When the automated reporting system was first introduced in April 2014 a drop in coverage was observed but this has picked up and the coverage recorded in December 2014 is the highest since the start of the programme in October 2012. There has also been a steady increase in the proportion of GP practices in England participating in the survey each month (ranging from 91.7% in September to 96.6% in December, see figure 2). In September, all Area Teams had at least 79% of GP practices reporting and by December 2014 this had increased to >91%, with 18 Area Teams reporting data from >95% of GP practices.

* ImmForm is the system used by Public Health England to record vaccine coverage data for some immunisation programmes and to provide vaccine ordering facilities for the NHS. <https://www.immform.dh.gov.uk/SignIn.aspx?ReturnUrl=%2f>

Despite the increase in the proportion of GP practices reporting, the number of women recorded as having delivered in each survey month was, at its maximum (in October 2014), only 70% of the average live births (2004-2013) in England for that month (figure 2). Monthly variations in the denominator closely mirror the seasonal variation observed in national deliveries, providing reassurance on the quality of this data collection (figure 2).

Vaccine coverage by Area Team for the period October 2012 to December 2014 is presented in an Appendix associated with this report. In September 2014 only two Area Teams (Birmingham and the Black Country, and London) reported coverage below 50%; London continued to report coverage below 50% for October and November 2014, rising to 51.0% by the end of the year. Ten Area Teams reported $\geq 60\%$ coverage in September, increasing to 20 Area Teams achieving $\geq 60\%$ in December (12 of these over 65%).

Discussion

Pertussis vaccine coverage in pregnant women reached 62.6% in December 2014, the highest recorded since the start of the programme in October 2012. Comparison of the monthly coverage figures in 2013 and 2014 reveals a seasonal pattern to vaccine uptake with a peak in December and a trough between April and July. The increase in coverage from September 2013 to the early months of 2014, and from September to December 2014 coincides with the delivery of the seasonal influenza vaccination programme which also targets pregnant women. Pregnancy has been included as a clinical risk category for routine seasonal influenza vaccination since 2010 [14]. Unlike pertussis vaccination which is offered ideally between weeks 28 and 32 of the pregnancy (but can be up to week 38), inactivated influenza vaccine can be safely and effectively administered during any point of the pregnancy during the flu season, with the bulk of vaccination occurring between October and December every year. During the flu campaign GP practices actively call and recall eligible patients, which should include pregnant women, and this may be having a positive knock-on effect on pregnant women being offered pertussis vaccine at the same time.

Prenatal pertussis vaccine coverage data should be interpreted with caution for several reasons. Coverage may be over-estimated if women who have received the vaccine are more likely to have their delivery date recorded. In addition, this is a sentinel system which does not cover all GP practices in England, however the proportion of GP practices reporting went up to 96% in December. There may also be variation between the reporting practices with respect to the completeness of the recording of delivery dates in the mother's medical records and as demonstrated by comparison with national data on live births (figure 2), these returns are incomplete and represent about 70% of the population of pregnant women, however, monthly variations in the denominator closely mirror the seasonal variation observed in national deliveries, providing reassurance on the quality of this data collection. Furthermore, women not registered with a GP (and therefore less likely to be having regular contact with the health service prior to delivery) will not be captured by this reporting system.

However, despite these factors contributing to potential over-estimation of coverage, comparison with other data sources examined to estimate the vaccine coverage of this programme suggests that this methodology may be under-estimating coverage [11]. If coverage, and ultimately the impact of the programme itself, is to be accurately monitored, it is essential that GPs and practice nurses ensure that vaccination and date of delivery are recorded in the patient's GP record. GPs and midwives should continue to encourage pregnant women to book an appointment to receive the pertussis vaccine, ideally between weeks 28 and 32 of their pregnancy (but up to week 38) [16], to further reduce the incidence of pertussis disease in young infants. It would be helpful to look at examples of good practice in areas achieving consistently high coverage for pertussis vaccination during pregnancy and to consider the potential benefits of an ongoing call and recall system.

Figure 1. Prenatal pertussis vaccine coverage in England, January to December 2014, with 2013 data for comparison

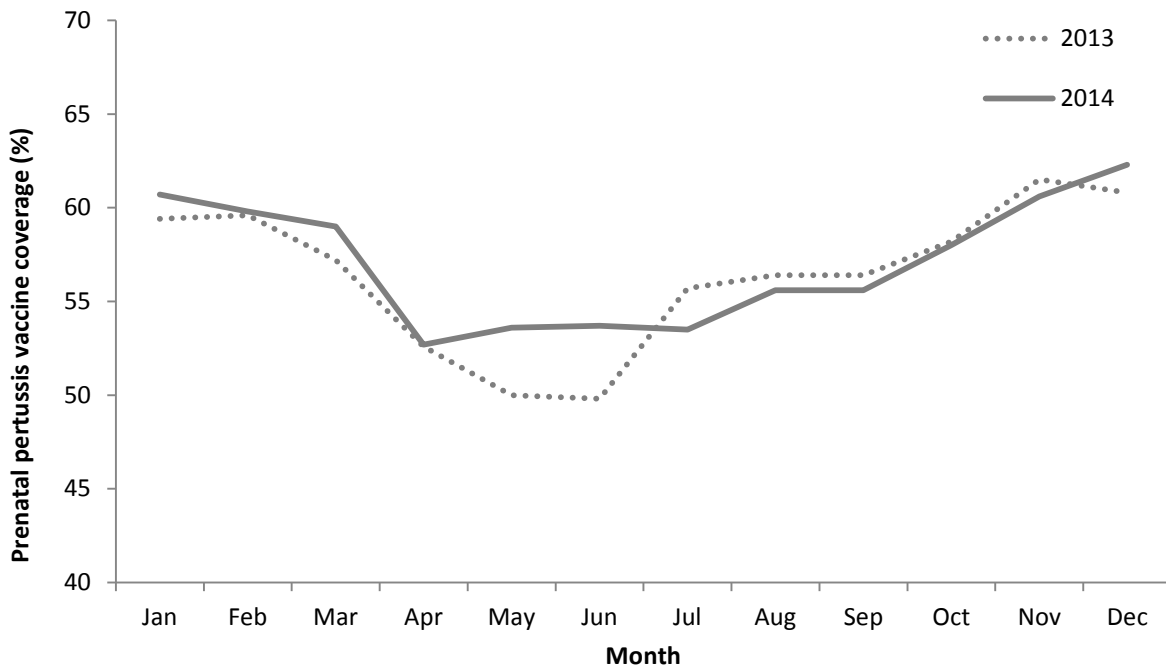
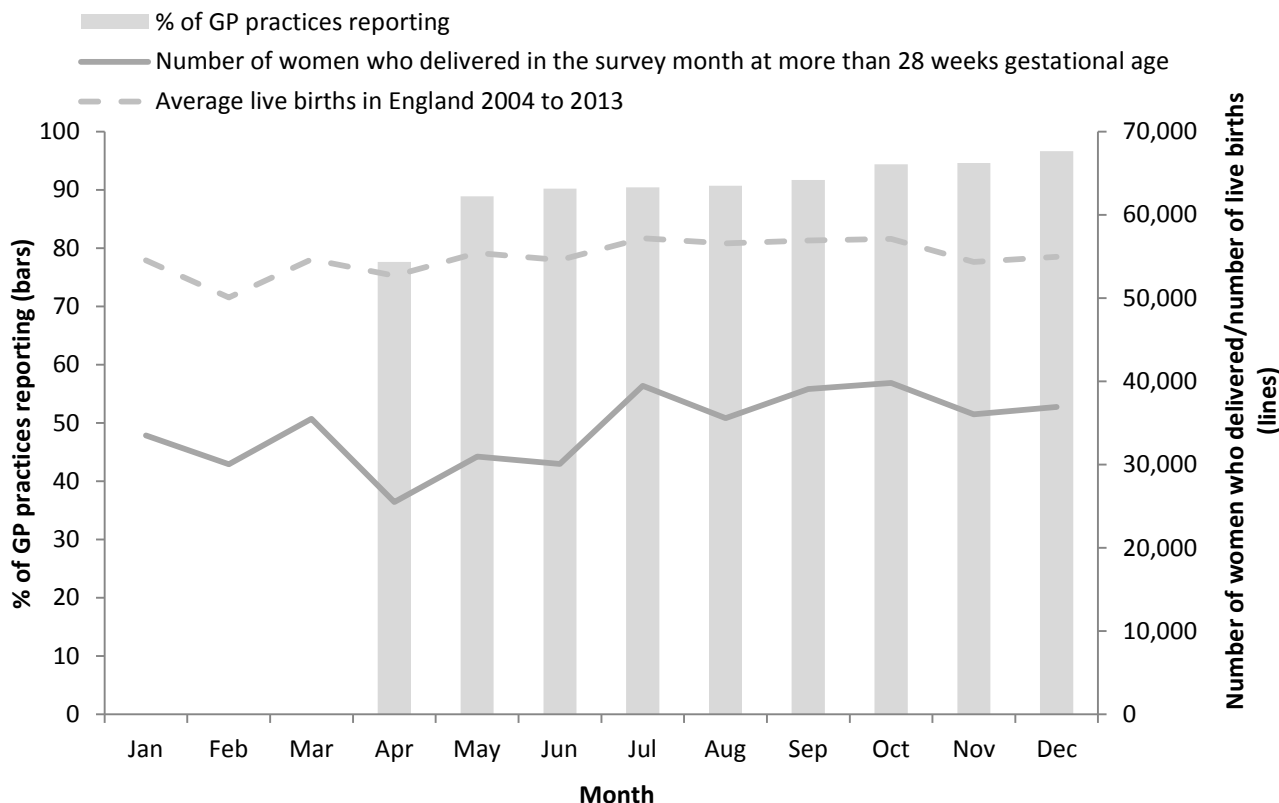


Figure 2. Percentage of GP practices reporting (April to December 2014), and number of women who delivered in the survey month at more than 28 weeks gestational age in 2014 compared with Office for National Statistics (ONS) average live births 2004 to 2013, England



Note: The ONS live births data displayed in figure 2 are derived from England and Wales monthly statistics. They have been adjusted by a factor of 0.95 to represent live births in England only (total live births recorded in England 2008-2013 represented 95% of total live births in England and Wales) [13]. The total number of maternities recorded in England between 2008 and 2010-2013 represented 99% of total live births in England for the same period (data have not been adjusted in this respect) [13].

References

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Appendix

"Prenatal pertussis Vaccine Coverage Monitoring Programme, England, monthly surveys Oct 2012 to Dec 2014" is available on the PHE website at: [Pertussis immunisation in pregnancy: vaccine coverage estimates \(England\)](#).