Immunisation


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of whooping cough, 270 babies admitted to hospital and four deaths in babies each year [Health Protection Agency (HPA) unpublished reconciled data].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 March 2015, 11 deaths have been reported in young babies with confirmed pertussis who were born after the introduction of the pregnancy programme on 1 October 2012. Ten of these 11 babies were born to mothers who had not been vaccinated against pertussis [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**

Since April 2014, monthly data on the uptake of pertussis vaccination in pregnancy in England are collected from GP records via the ImmForm website* and are monitored, validated and analysed by PHE. The ImmForm web-based system automatically extracts vaccine coverage data from participating General Practice (GP) clinical systems with minimal or no burden to the NHS. This method replaced the manual system which was previously in use [11].

The monthly surveys capture data on number of women who delivered in the survey month at more than 28 weeks gestational age (denominator), and 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 (numerator).

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

This report updates the previous summary of the pertussis vaccination programme for pregnant women for the three months ending 31 December 2014 [13], presenting data collected for five months ending 31 May 2015.

**Results**

Pertussis vaccine coverage in pregnant women decreased over the five months from 59.3% in January to 55.2% in May 2015 (figure 1). This decline followed a similar seasonal pattern to that observed in 2013 and 2014 (figure 1), with coverage dropping in the first quarter and starting to plateau at the end of spring, although the decline has been less pronounced in 2015, with coverage at 55.2% in May 2015 compared to 50% and 53.6% in the same month in 2013 and 2014 respectively.

The proportion of GP practices participating nationally in the survey each month remains very high at 96.6% with 18 out of 24 ATs having at least 95% of GP practices participating.

Vaccine coverage by Area Team (AT) for the period January 2015 to May 2015 is presented in an Appendix associated with this report. There was significant variation in coverage by AT, and in May 2015 there was a 20.6% difference in uptake between the AT with the highest coverage (66.4% in Cheshire, Warrington and Wirral) and the AT with the lowest coverage (45.8% in London). From January 2015 to May 2015 only the London AT reported coverage below 50%. Seventeen ATs reported ≥60% coverage in January (four of these over 65%), and eight of those ATs maintained coverage ≥60% up to May 2015.

* ImmForm is the system used by PHE 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).

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Discussion

Comparison of the monthly vaccine coverage figures in the years 2013 to 2015 (to date), reveals a seasonal pattern to vaccine uptake with a peak in December and a trough between April and July. In April and May 2015 however, coverage has been sustained at a higher level than in previous years at 55.2% nationally. The increase in coverage between September and December coincides with the delivery of the seasonal influenza vaccination programme which also targets pregnant women [14]. 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.

Pertussis continues to persist at heightened levels in the population and so 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. This data collection is vital to monitor the uptake of the programme, to identify areas of low coverage and inform public health actions. Considerable variation in coverage between AT’s has consistently been reported, with around a 20% difference between those with the highest coverage and those with the lowest coverage. It would be helpful to share examples of good practice from areas achieving consistently high coverage for pertussis vaccination during pregnancy.

Prenatal pertussis vaccine coverage data should be interpreted with caution for several reasons. Completeness of data is reliant on the recording of delivery dates in the mothers’ medical records and comparison of this data with national data on live births, indicates these data are incomplete and represent about 70% of the population of pregnant women [13],
however, monthly variations in the denominator closely mirror the seasonal variation observed in national live births.

The survey is sentinel and does not cover all GP practices in England, although 96% of GP practices participated, and there may be variation between the reporting practices with respect to the completeness of the recording of delivery dates. Coverage may be over-estimated if women who have received the vaccine are more likely to have their delivery date recorded. 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.

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 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.

References
3. A level 3 incident is the third of five levels of alert under the HPA's Incident Reporting and Information System (IERP) according to which public health threats are classified and information flow to the relevant outbreak control team is coordinated. A level 3 incident is defined as one where the public health impact is significant across regional boundaries or nationally. An IERP level 3 incident was declared in April 2012 in response to the ongoing increased pertussis activity (*HPR 6*(15))
6. PHE (2015). Laboratory confirmed cases of pertussis reported to the enhanced pertussis surveillance programme in England during January to March 2015 (Q1/2015). *HPR 9*(22)

10. Joint Committee on Vaccination and Immunisation minutes. Available at: https://www.gov.uk/government/groups/joint-committee-on-vaccination-and-immunisation#minutes


**Appendix**

“Prenatal pertussis Vaccine Coverage Monitoring Programme, England, monthly surveys January 2015 to May 2015” is available on the GOV.UK website page “Pertussis immunisation in pregnancy: vaccine coverage estimates (England)”