



Public Health
England

Health Protection Report

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Group A streptococcal infections: fourth update on seasonal activity, 2013/14

Surveillance of scarlet fever continues to show high levels of notified cases in England but with early signs of a possible reduction in incidence [1-4]. GP consultations for pharyngitis/scarlet fever via the GP sentinel (syndromic) surveillance also indicate a slight reduction in disease incidence [5]. Routine laboratory reports and isolate referrals of invasive group A streptococcal (iGAS) disease remain within the usual seasonal levels.

Investigations continue in an attempt to identify the reasons for the unusual escalation in scarlet fever this season including microbiological investigation of scarlet fever isolates sampled from across the country. Interim guidelines to assist local health protection staff in managing outbreaks of scarlet fever in schools and nurseries have been issued [6].

Due to rare but potentially severe complications associated with GAS infections, continued vigilance is recommended.

Scarlet fever

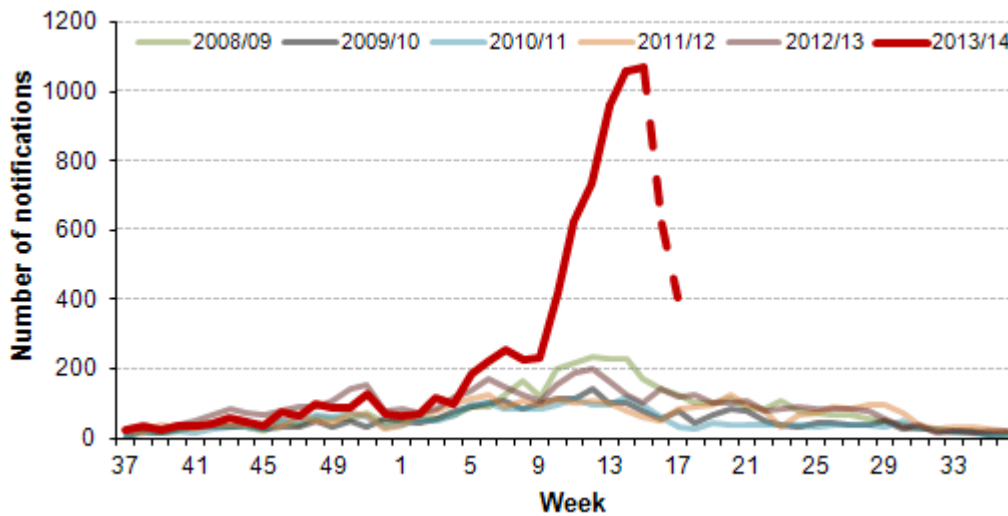
A total of 8305 scarlet fever cases have been notified so far this season (week 37 2013 to week 17 2014; figure 1), with week 15 of 2014 seeing the highest number of scarlet fever notifications received in one week (1069) in England. Numbers of notifications dropped subsequent to week 15, with 405 notified for week 17, although further notifications may still be received for the most recent weeks. The time series follows a similar pattern when assessed according to date of onset, with week 14 having the highest number of cases.

Assessment of the most recent four-week period (weeks 14 to 17) continues to indicate substantial elevation across all areas in England compared to the same period last year. In the Greater Manchester area the number of scarlet fever notifications are twice as high as those reported for the same four week period last year (101 compared to 44), with all other areas in England notifying between 4 and 15 times more cases.

Cumulative rates of notification this season are shown in figure 2. Highest rates of notified cases have been seen in the East Midlands (35.2), Avon, Gloucestershire and Wiltshire (27.7), Thames Valley (21.6), North East (20.2), and Cumbria and Lancashire (18.4).

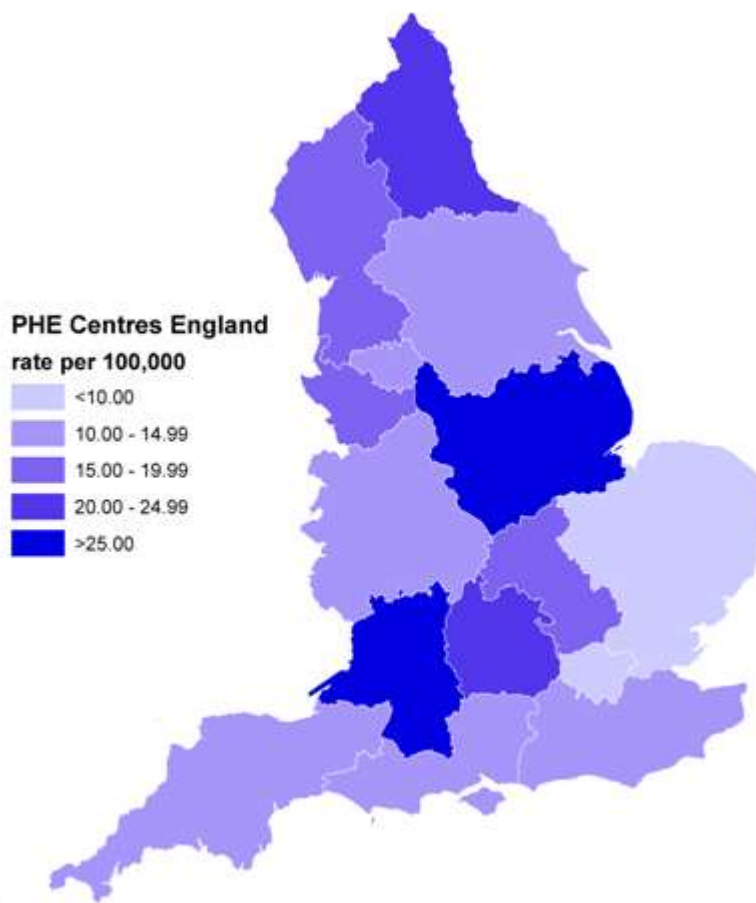
Eighty seven per cent of notifications received this season have been in children aged less than 10 years, the median age remains four years (range <1y to 90y). The proportion of notifications seen in males (49%) and females remains similar.

Figure 1. Weekly scarlet fever notifications in England, 2008/09 onwards*



* Dashed line indicates that numbers may increase as further notifications expected.

Figure 2. Rate per 100,000 population scarlet fever notifications in England, week 37 2013 to week 17 2014



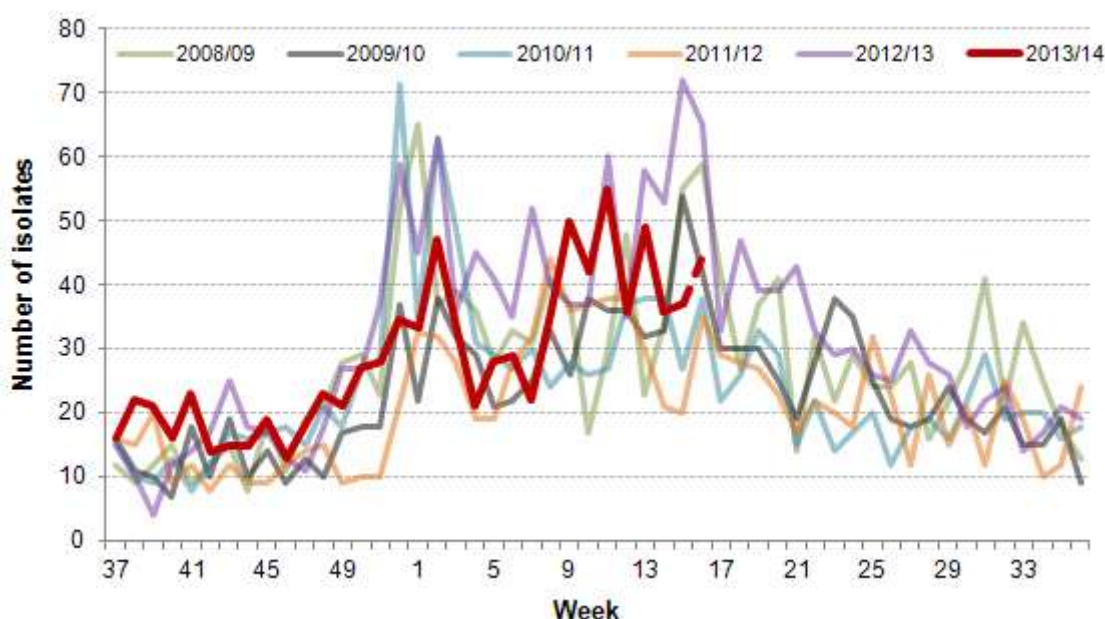
Invasive Group A Streptococcus

The number of iGAS isolate referrals, defined as isolation of GAS from a normally sterile site, to the Respiratory and Vaccine Preventable Bacteria Reference Unit at Colindale PHE from laboratories in England, Wales and Northern Ireland so far this season (week 37 2013 to week 16 2014) continues to remain within normal levels, with a total of 924 isolates referred (range 691 to 1098 for the same period in the previous five years; figure 3). Only laboratories in London (73), East Midlands (52) and the South East (113) have referred numbers of isolates above average for January to April this season compared with the previous five years (59, 45 and 107 respectively). Isolates are still being received for specimens taken in April and as such, these numbers may increase.

Currently the iGAS strain type diversity remains similar to what is normally seen; emm1 remains the most common type identified so far in 2014 (26%; January to April). The proportion of referred isolates which have been identified as emm3 type is slightly high this season compared to last season (23% compared with 14%), and given the increased severity of disease associated with emm3 strains this warrants close monitoring.

No changes have been identified in iGAS isolate antimicrobial susceptibility patterns from routine laboratory reporting this season (weeks 37 2013 to 16 2014), with 5% of those tested being non-susceptible to erythromycin, 9% tetracycline and 3% clindamycin, all similar to previous years [7]. There have been no reports of penicillin resistance in iGAS isolates in England to date.

Figure 3. Weekly count of sterile site GAS isolates referred to the national reference laboratory, England, 2008/09 onwards*



* Dashed line indicates that numbers may increase as further isolates expected.

Whilst the early suggestions of a drop in incidence are welcome, we maintain a cautious optimism and continue to closely monitor the situation over the coming weeks. The Easter school holidays may have facilitated a reduction in transmission but they will also affect timeliness of notification and access to GPs. Surveillance systems based on out-of-hours GP consultations for week 17 (last week) also showed a drop in consultations for pharyngitis and persistent sore throat [8].

Investigations are underway to explore the possible reasons behind the exceptional increase in scarlet fever. Microbiological investigations are being conducted through a sentinel sampling scheme being undertaken in collaboration with PHE Regional Microbiology laboratories and selected NHS laboratories. New guidelines on the public health management of scarlet fever outbreaks were developed to support Health Protection Teams, working closely with schools, nurseries and colleagues in local authorities, to control outbreaks in child care settings and protect vulnerable children and adults [6].

Clinicians, microbiologists and HPTs should continue to be mindful of potential increases in invasive disease and maintain a high index of suspicion in relevant patients as early recognition and prompt initiation of specific and supportive therapy for patients with iGAS infection can be life-saving. Invasive disease isolates and those from suspected clusters or outbreaks should be submitted to the Respiratory and Vaccine Preventable Bacteria Reference Unit at Public Health England, 61 Colindale Avenue, London NW9 5HT.

Relevant guidelines/FAQs are available on the PHE health protection website, as follows:

- Guidelines on infection control in schools and other childcare settings, including recommended exclusion periods for scarlet fever and new guidelines on management of scarlet fever outbreaks: <http://www.hpa.org.uk/Topics/InfectiousDiseases/InfectionsAZ/SchoolsGuidanceOnInfectionControl/>
- FAQs on scarlet fever at: <http://www.hpa.org.uk/Topics/InfectiousDiseases/InfectionsAZ/ScarletFever/>
- Guidelines for the management of close community contacts of invasive GAS cases [9] and prevention and control of GAS transmission in acute healthcare and maternity settings [10] at: <http://www.hpa.org.uk/Topics/InfectiousDiseases/InfectionsAZ/StreptococcalInfections/Guidelines>
- Interim guidelines for management of scarlet fever outbreaks in schools and nurseries: www.hpa.org.uk/Topics/InfectiousDiseases/InfectionsAZ/StreptococcalInfections/Guidelines.

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Pertussis Vaccination Programme for Pregnant Women: vaccine coverage estimates in England, October 2013 to March 2014

Laboratory confirmed cases of pertussis reported to the enhanced pertussis surveillance programme in England: annual report for 2013

In England there were 4623 laboratory confirmed cases of pertussis (culture, PCR, serology or oral fluid) reported to the Public Health England pertussis enhanced surveillance programme in 2013 (table1) and 212 cases reported in Wales. Over a third (35%; 1625/4623) of all confirmed cases in England in 2013 were reported in the first quarter (January to March).

Numbers of confirmed cases in England in 2013 were 51% lower than the 9367 cases reported in 2012. While the number of confirmed cases decreased in 2013 in comparison to 2012, confirmed cases were more than four-fold higher than the 1053 reported in 2011. In infants under a year, however, pertussis cases were lower in 2013 (116) than in 2012 (407) and 2011 (207). The national incidence for all age groups, based on laboratory confirmations in England and 2011 population estimates [1], was two cases of pertussis per 100,000 population in 2011, 18 per 100,000 in 2012 and nine per 100,000 in 2013.

Pertussis is a cyclical disease with increases occurring every 3-4 years. Typically pertussis activity peaks in quarter 3 and then declines, as observed in previous years (figure 1). The continued increase observed in each successive quarter between the first quarter of 2011 and third quarter of 2012 was unusual and was largely due to the increase in the numbers of confirmed cases in individuals aged 15 years and older. A changing epidemiological pattern continued in 2013 with peak disease levels in the first quarter followed by an overall decrease in pertussis cases through the year after the exceptional activity observed in 2012.

A national outbreak of pertussis (level 3 incident [2]) was declared by the HPA in April 2012 and, as a response to the ongoing outbreak, the Department of Health announced the introduction of a temporary immunisation programme for pregnant women on 28 September 2012 [3]. The most recent PHE figures report that the proportion of mothers due to give birth between January 2013 and December 2013 who had been immunised with a pertussis containing vaccine in pregnancy in England ranged from 49.8% - 61.5% [4,5].

As was seen in 2012 the majority (85%; 3912/4623) of laboratory confirmed cases in England in 2013 occurred in individuals aged 15 years and older. Confirmed cases in this age group decreased by 50% between 2012 and 2013; from 7775 in 2012 (incidence of 18/100,000) to 3912 in 2013 (incidence of 9/100,000) (figure 2). Whilst disease incidence continued to be highest in infants <3 months, confirmed cases in this age group were 79% lower in 2013 (85 cases) than in 2012 (407 cases) and 49% lower than the 166 cases in 2011. The incidence of

laboratory confirmed cases in infants less than three months, who are at most risk of serious disease and too young to be fully vaccinated, was 50 per 100,000 in 2013 compared with 240 per 100,000 in 2012 (figure 2). Three pertussis related infant deaths were reported for infants with pertussis confirmed in 2013 compared to 14 deaths in 2012. All infants were too young to be protected by the vaccine and none of the infants' mothers were vaccinated during pregnancy. No pertussis related infant deaths were reported in Wales in 2013.

These early data in young infants following the introduction of a programme to immunise pregnant women are encouraging. It is important to be aware, however, that raised levels of pertussis persist in older age groups. Women should continue to be encouraged to be immunised against pertussis during pregnancy in order to protect their babies from birth.

Since mid-2006 there has been greater use of serology testing compared to previous years due to increasing clinical awareness of pertussis in older children and adults [6] and increased awareness of the availability of this diagnostic method [7]. In 2013, serology confirmed cases accounted for the greatest proportion (94%; 4364/4623) of total laboratory confirmations, and account for 99% of all confirmed cases of pertussis in older age groups (table 2). All but two infants under one year of age with confirmed pertussis in 2013 were tested using culture and PCR methods. From January 2013 oral fluid (OF) testing was offered for children aged eight to <17 years and for children aged five to <17 years from October 2013. In 2013, 97 cases (2.1%) tested positive for a recent pertussis infection by OF testing only.

The choice of laboratory testing method is dependent on the age of the patient and the stage of the illness; this is reflected in the distribution of testing methods summarised in table 2. Culture has high specificity but loses sensitivity with increasing time from the onset of illness. PCR testing is offered for acutely ill infants aged less than one year old hospitalised with respiratory illness compatible with pertussis [8]. In contrast, serology testing is routinely offered for older children/adults who have been unwell with a cough for more than two weeks. However, as recent pertussis vaccination (primary and pre-school booster vaccination) can confound the serology and OF results, these investigations are not usually recommended for infants or children within one year of receiving the pertussis vaccine (primary or pre-school booster).

PCR, serology and OF testing services are provided by the Respiratory and Vaccine Preventable Bacteria Reference Unit (RVPBRU) at Public Health England Microbiology Services Division Colindale. For the PCR service for hospitalised infants under one year, either a pernasal swab or nasopharyngeal aspirate should be sent as soon as possible after onset; for the pertussis serology service for older children and adults it is advised that not less than 400 µl of separated serum at least 2-3 weeks post-onset of cough should be sent. OF testing kits are

available from local health protection teams for children aged between five and 16. Further information is available in the PHE Bacteriology Reference Department user manual at: <http://www.hpa.org.uk/cfi/rsil/bordetella.htm>.

Table 1. Laboratory-confirmed cases of pertussis by quarter and test method in England: 2013

Quarter	Culture	PCR	Serology	OF only	Total
Jan-Mar	18	21	1553	33	1625
Apr-Jun	27	21	1047	25	1120
Jul-Sep	23	31	1050	25	1129
Oct-Dec	12	9	714	14	749
Total	80	82	4364	97	4623

Figure 1. Total number of laboratory-confirmed pertussis cases per evaluation quarter in England: 2005 to 2013

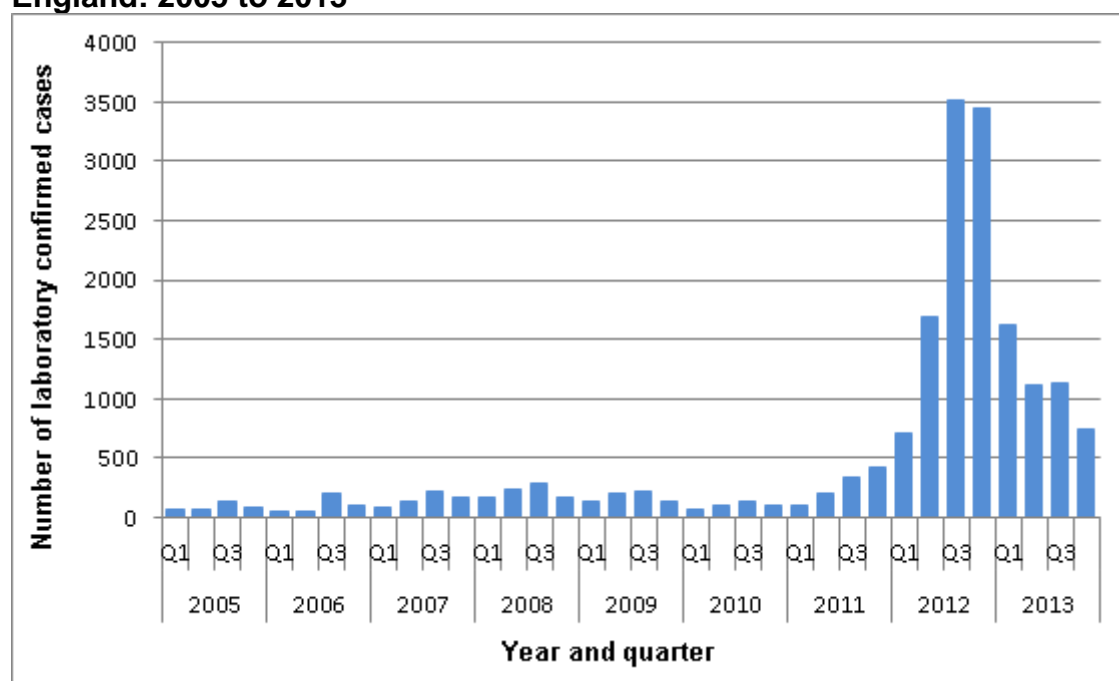


Figure 2. Incidence of laboratory-confirmed pertussis cases by age group in England: 1998-2013

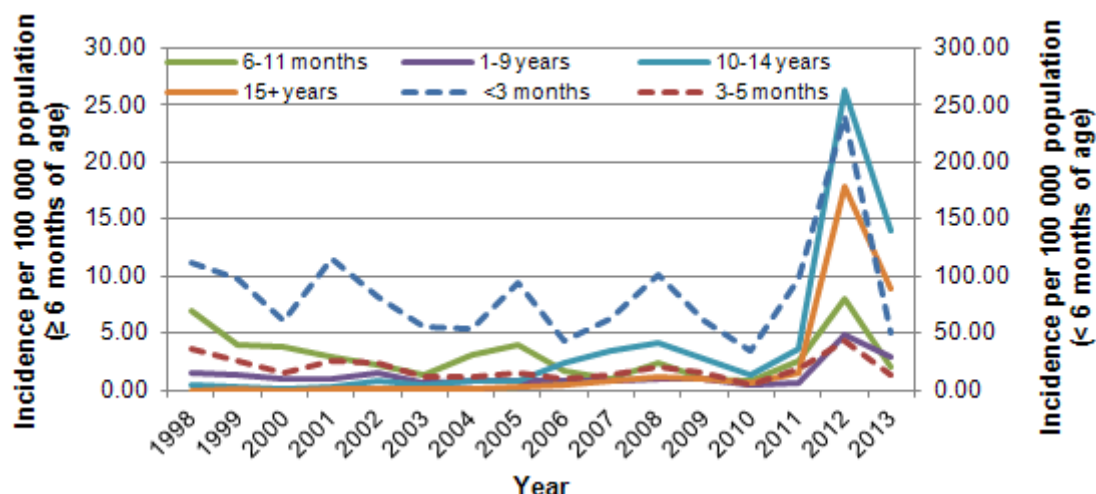


Table 2. Age distribution of laboratory-confirmed cases of pertussis in England: 2013

Age group	Culture*	PCR	Serology	OF	Total
<3 months	39	46	–	–	85
3-5 months	10	13	1	–	24
6-11 months	2	4	1	–	7
1-4 years	5	4	55	2	66
5-9 years	–	–	86	14	100
10-14 years	7	1	361	60	429
15+ years	17	14	3860	21	3912
Total	80	82	4364	97	4623

* Culture confirmed cases may additionally have tested positive using other methods. Submission of all presumptive *B. pertussis* isolates is encouraged for confirmation of identity and to allow further characterisation for epidemiological purposes.

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Pertussis Vaccination Programme for Pregnant Women: vaccine coverage estimates in England, October 2013 to March 2014

Background to the pertussis vaccination in pregnancy programme

In the UK the introduction of routine national immunisation against pertussis 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, however, pertussis continues to display 3-4 yearly peaks in activity with a yearly average of 800 confirmed cases of whooping cough, over 300 babies admitted to hospital and four deaths in babies each year [HPA unpublished reconciled data]. The highest disease incidence occurs in infants under 3 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 Health Protection Agency to coordinate the response to the increased pertussis activity [3]. In response to this on-going outbreak, the Department of Health announced on 28 September [4] that pertussis immunisation would be offered to pregnant women from 1 October 2012 to protect infants from birth whilst disease levels remain high. 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. It has been confirmed that this programme will be continued in 2013/2014 until further notice [5]. The Joint Committee on Vaccination and Immunisation is expected to issue further advice about the programme after the June 2014 meeting. Early epidemiological data are encouraging and consistent with a protective programme effect on infants therefore immunisation of pregnant women continues to be important in the face of persisting raised levels of pertussis in non-infant age groups [6,7].

Vaccine coverage collection

In England, monthly data on the uptake of pertussis immunisation in pregnancy are collected through 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

GPs would have identified those women in their practice that were eligible for vaccination on their GP systems. The monthly denominator reported was the number of pregnant women with an estimated date of delivery (EDD) in that month. GPs should record the EDD through the patient's electronic health record. The monthly numerator was the number of women identified in the denominator defined above who received a dose of Repevax® at or after the 28th week of their pregnancy and before the EDD.

At the start of the programme in October 2012, until March 2013, PCT Immunisation Co-ordinators were responsible for collating coverage data from GP practices and manually entering it on the ImmForm website. Since 1 April 2013 Area Team Screening and Immunisation teams have been responsible for the timely submission and accuracy of vaccine coverage data.

To aid data collection from practices and reduce the burden on Area Teams, a data entry collection tool is available on ImmForm for GPs and other vaccinating organisations to use.

All submitted GP data were reviewed and collated by the Area Team before submission to the monthly survey. Data collections were requested at different organisational levels; for the October 2012 to March 2013 surveys data were submitted at PCT level and from April 2013 data were provided at Area Team level. To allow direct comparison of monthly coverage estimates PCT data were aggregated to Area Team level (table).

This report updates the previous summary for the first year of the pertussis vaccination programme for pregnant women [8], presenting data for the six months ending 31 March 2014.

Results

The figure below shows the national monthly estimates of pertussis vaccine coverage in pregnant women since the programme started in October 2012 increasing during the first five monthly surveys from 43.7% in October 2012 to 59.4% in February 2013. Between March and June 2013 coverage declined progressively to 50%, but subsequently increased and stabilised at around 56% in the three months July to September 2013. In the six months to March 2014 national coverage increased between 2 to 5% on levels reported in the summer with a minimum of 58.1% reported in October 2013 and a maximum of 61.5% in November 2013 (average 59.9%).

The table gives vaccine coverage by Area Team for the period October 2013 to March 2014 (data for previous months by Area Team are available at <https://www.gov.uk/government/collections/vaccine-uptake#pertussis-vaccine-uptake>). During

the six months to March 2014 only one Area Team reported coverage below 50% (London Area Team, range 44.5% to 49.9%).

Based on a total of 679,100 live births in England (2011), the number of pregnant women with an EDD in any one month is estimated to be around 56,600. The total number of women reported in each survey varied considerably, both by month of report and by Area Team. The highest number of pregnant women reported in the denominator in the six month period was for March 2014 when 35,484 pregnant women with an EDD in that month were reported, approximately 63% of the expected England total; the smallest number of pregnant women reported was for February, 30,029 representing only 53% of the expected (table). As was observed during the first year of the programme, there was considerable variation between the number of pregnant women reported by Area Teams within a month, and between different months for the same Area Teams during these six months [8].

Discussion

The national coverage estimates reported between October 2013 and March 2014 show improvement on those reported in the first year of this immunisation programme [8], averaging at around 60% (table, figure). These data are encouraging but should be interpreted with caution, particularly at the Area Team level as denominators reported vary considerably month-on-month, and continued monitoring is important.

Change to an automated data collection

Pertussis coverage data are currently collected at Area Team level on the ImmForm website. A collection tool is provided for Area Teams to use if they wish, which allows GP practices to enter their data, which are then aggregated and entered manually by the Area Team. There is a strong desire from the field to move to an automated ImmForm data collection, similar to automated uptake collections for flu, PPV, rotavirus and shingles. From May 2014, PHE will implement an automated monthly collection of data from GPs via the ImmForm website, starting with data for April, which will reduce the burden on the NHS. This method has the potential to collate data from up to 90% of GP practices in England. Following discussions with the GP system suppliers, it was felt that EDD was not a universally reliable data item to be used in this survey. In view of this the numerator and denominator for future surveys will be based on the recorded date of delivery (i.e. monthly denominator will be the number of women who delivered in the survey month at more than 28 weeks gestational age; monthly numerator will be 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).

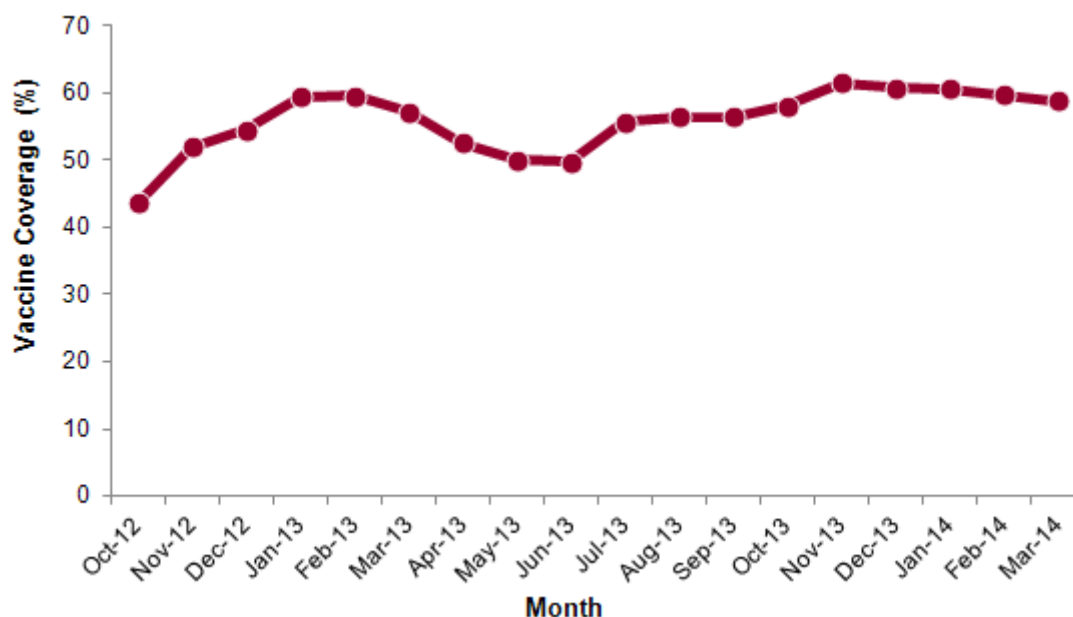
For the automated surveys to capture all eligible pregnant women it is important that the medical records of all pregnant women have the following fields completed:

- ▶ the date of delivery
- ▶ 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. Service providers should continue to be updated 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 at

<http://www.hpa.org.uk/Topics/InfectiousDiseases/InfectionsAZ/WhoopingCough/ImmunisationForPregnantWomen/>

Monthly pertussis vaccine coverage (%) estimates for pregnant women: England, October 2012 to March 2014



Monthly pertussis vaccine coverage (%) for pregnant women by Area Team: England, October 2013 to March 2014

Area Team	October 2013	November 2013	December 2013	January 2014	February 2014	March 2014
Cheshire, Warrington and Wirral (Q44)	53.1	61.4	61.7	72.7	69.5	55.1
Durham, Darlington and Tees (Q45)	60.1	67.6	66.9	67.0	62.0	62.2
Greater Manchester (Q46)	62.7	62.6	62.8	58.6	59.3	59.4
Lancashire (Q47)	51.9	58.1	56.8	55.8	51.5	51.1
Merseyside (Q48)	52.5	53.7	53.6	73.5	55.0	60.4
Cumbria, Northumberland, Tyne and Wear (Q49)	67.2	67.3	69.2	68.7	58.1	56.2
North Yorkshire and Humber (Q50)	75.0	77.8	81.1	64.4	67.9	73.6
South Yorkshire and Bassetlaw (Q51)	66.6	69.8	68.6	69.1	65.8	66.0
West Yorkshire (Q52)	59.5	58.5	60.5	62.4	57.8	56.5
Arden, Herefordshire and Worcestershire (Q53)	62.6	65.5	56.5	57.2	65.4	53.1
Birmingham and the Black Country (Q54)	56.4	60.1	63.4	62.9	57.9	65.0
Derbyshire and Nottinghamshire (Q55)	74.4	76.9	77.8	78.8	73.4	71.3
East Anglia (Q56)	64.4	68.1	70.3	70.5	68.7	69.4
Essex (Q57)	64.4	65.1	65.5	63.7	69.0	57.6
Hertfordshire and the South Midlands (Q58)	49.3	55.0	60.7	61.7	57.6	62.0
Leicestershire and Lincolnshire (Q59)	72.8	69.0	69.0	70.1	64.7	70.6
Shropshire and Staffordshire (Q60)	68.9	74.1	73.1	76.7	72.7	72.6
Bath, Gloucestershire, Swindon and Wiltshire (Q64)	69.1	75.2	70.4	72.1	67.9	65.7
Bristol, North Somerset, Somerset and South Gloucestershire (Q65)	62.5	65.8	57.5	61.5	63.2	63.5
Devon, Cornwall and Isles of Scilly (Q66)	65.4	68.0	55.4	66.5	65.7	58.0
Kent and Medway (Q67)	58.5	60.4	64.2	54.6	55.6	57.3
Surrey and Sussex (Q68)	66.6	68.9	64.4	60.8	63.5	62.1
Thames Valley (Q69)	57.0	58.4	55.7	56.7	55.1	55.2
Wessex (Q70)	58.9	64.1	60.7	61.4	61.6	62.3
London (Q71)	44.5	47.8	47.7	45.9	48.8	49.9
England	58.1	61.5	60.8	60.7	59.7	58.9
Monthly reported denominator	34,359	30,882	32,161	33,479	30,029	35,484

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