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News

Volume 8 Number 41 Published on: 24 October 2014

New vaccine coverage data updates for pertussis and rotavirus programmes published

The latest vaccine coverage estimates for the pertussis in pregnancy vaccination programme, up to August 2014, and for the childhood rotavirus vaccination programme, up to September 2014, are published in the Infection Reports section of this issue of the *Health Protection Report* [1,2].

The pertussis in pregnancy vaccine coverage report includes new monthly estimates of the proportion of women vaccinated during pregnancy who gave birth in the period April through to August 2014, and compares these data with estimates from the beginning of 2014. Average coverage between April and August 2014 was around 54%, a decline on the 60% reported earlier in the year, but coverage appears to be gradually increasing.

The rotavirus vaccine coverage report shows that high coverage was rapidly achieved for the first cohorts of children offered this vaccine routinely in England: 92.6% of the children evaluated at 25 weeks of age between February and September 2014 had received the first rotavirus vaccine dose and 87.5% had completed the two-dose course, according to data from 90% of all GP practices in England.

References

1. "Pertussis Vaccination Programme for Pregnant Women: vaccine coverage estimates in England, April to August 2014, *HPR* 8(41): infection reports, 24 October 2014.
2. "National rotavirus immunisation programme: preliminary data for England, October 2013 to September 2014", *HPR* 8(41): infection reports, 24 October 2014.

Increase in endemic Meningococcal group W (MenW) ST-11 complex associated with severe invasive disease in England and Wales

England and Wales is experiencing an upsurge in invasive capsular group W (MenW) disease. Historically, MenW incidence has been low, accounting for only 1-2% of invasive meningococcal disease (IMD) cases annually. An increase in 2000-2002 was associated with pilgrimage to Hajj. After the introduction of a mandatory meningococcal vaccination for pilgrims, MenW cases in England and Wales declined to pre-2000 levels. Since 2009/10, MenW cases have increased year-on-year such that there were 98 confirmed cases during June 2013 to July 2014 (2013/14), accounting for 15% of all invasive meningococcal cases. This increase has been observed across all English regions. Phenotypic characterisation of the MenW isolates revealed that the increase was nearly all caused by MenW strains phenotypically expressing PorB serotype 2a, associated with the cc11 clonal complex.

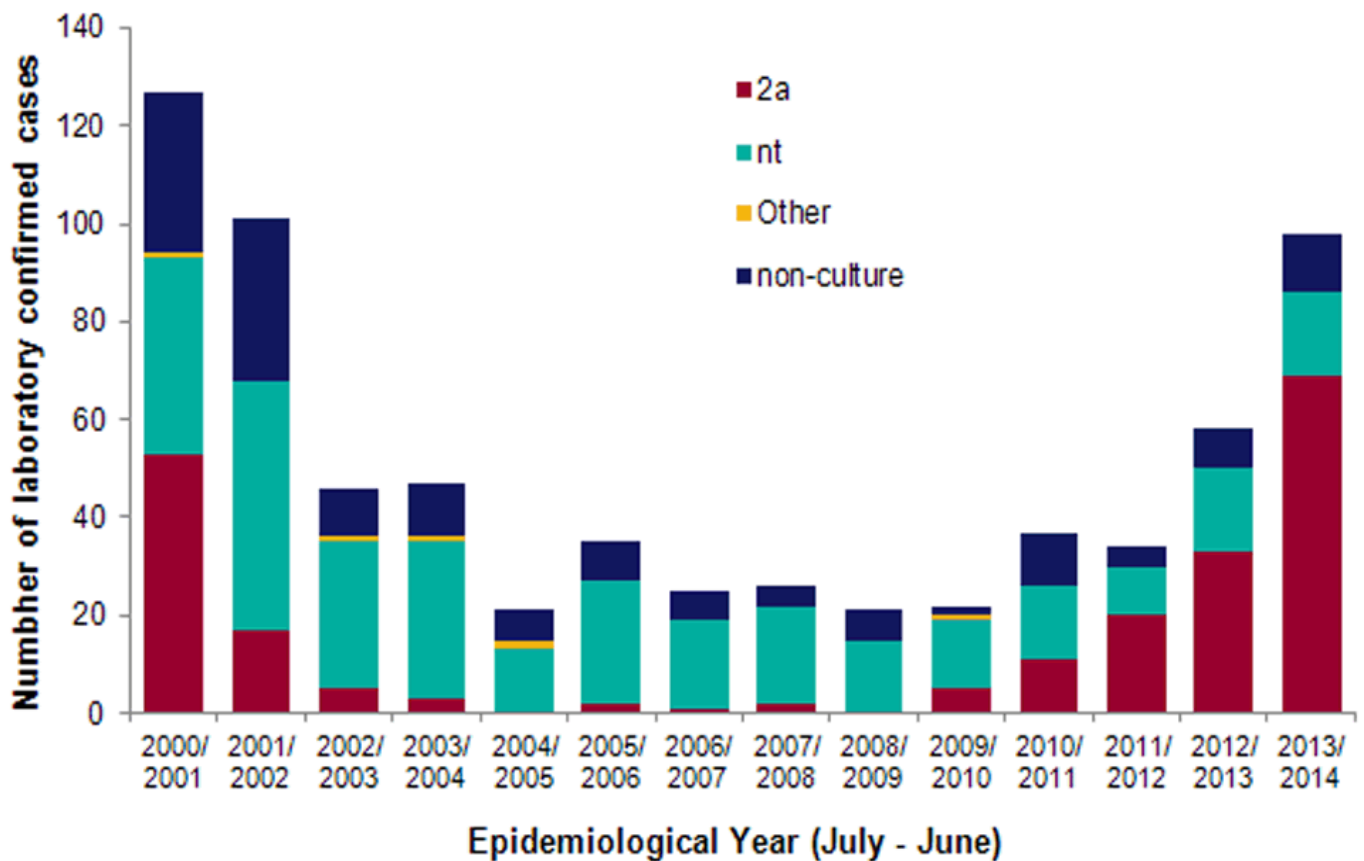
MenW:2a initially increased in older adults but, by 2012/13, had extended across all age groups. Epidemiological follow-up of cases did not identify any association with travel or recent entry into the UK, nor was there any evidence of clustering of cases within households. Detailed clinical follow-up of laboratory-confirmed MenW cases diagnosed during 2010/11-2012/13 did not identify any differences in MenW:2a and non-2a infections in terms of clinical presentation, disease severity or case fatality rate. However, for the first time since the Hajj outbreak, there were several deaths associated with MenW:2a in infants, young children, adolescents and

young adults during 2012/13 and 2013/14. Prior to this period, MenW-associated deaths occurred almost exclusively among ≥ 45 year-olds.

Since the Hajj-associated international outbreaks, a number of countries in Latin America, sub-Saharan Africa, South Africa and the Far East have reported increases in endemic MenW disease caused by strains belonging to cc11. In Europe, some countries such as France have observed an increase in MenW cases that were linked with travel to – or contact with someone who had travelled to – sub-Saharan Africa where MenW is epidemic.

So far, however, no European country other than the UK has reported an increase in endemic MenW disease. The emergence and rapid clonal expansion with continuing increase in endemic MenW:cc11 disease in the UK is concerning, particularly because natural immunity against this capsular group is low across all age-groups. MenW is potentially preventable through vaccination with the quadrivalent MenACWY conjugate vaccine and, if this trend continues, we may need to consider modifying the current immunisation programme to offer additional protection against MenW.

Laboratory-confirmed cases of invasive meningococcal disease group W, by type, during the 2000/01-2013/14 epidemiological years (provisional data).



National Poisons Information Service annual report 2013/14

The PHE-commissioned National Poisons Information Service (NPIS) has published its latest annual report, for 2013/14 [1]. NPIS is a clinical toxicology service for health care professionals working in the NHS with operational units in Birmingham, Cardiff, Newcastle and Edinburgh that provide expert advice on all aspects of acute and chronic poisoning, supporting best practice in the diagnosis and management of patients who may have been accidentally or deliberately poisoned, whether by ingestion, injection, inhalation or skin or eye contact.

NPIS encourages NHS staff seeking advice on the diagnosis, treatment and care of patients who may have been poisoned to use its online database, TOXBASE, as a first point of call for information, with its telephone enquiry service being devoted to the more complex cases. The most frequent TOXBASE users are hospital departments and NHS 111, NHS 24 and NHS Direct staff. The annual report is a statement of activity, accountability and governance and includes workload statistics, and the results of quality assurance exercises and of surveillance activities.

Online enquiries (“user sessions”) on TOXBASE continued the steady rise of recent years, totalling more than 576,000 during the period covered by the new report – an increase of circa 14% compared to the previous year. There was a 3.5% increase in telephone enquiries (including calls to the UK Teratology Information Service), to a total 55,669.

Areas of particular interest in 2013/14 included: drugs of misuse, including newer psychoactive substances; paracetamol; 2,4-dinitrophenol; radiation; pesticides; reed diffusers; and electronic cigarettes.

On drugs of misuse, as in its 2012/13 report, the NPIS notes a significant increase in enquiries related to novel psychoactive substances (so-called ‘legal highs’). This year enquiries about synthetic cannabis substitutes (synthetic cannabinoid receptor agonists, SCRAs) have increased 13-fold, so these now represent the second most common drug of misuse encountered in NPIS telephone enquiries after cocaine. TOXBASE accesses for SCRAs also more than doubled over the previous year, putting them among the top 10 drugs of misuse accessed [2].

Since 2012, NPIS has established a system of enhanced surveillance for “chemicals of interest for toxicosurveillance”, including chlorine, carbon monoxide, ammonia and hydrogen cyanide. Carbon monoxide was the most frequent subject of both TOXBASE accesses (more than a quarter of accesses) and case enquiries followed up by NPIS staff in 2013/14. The next most frequently accessed TOXBASE entries were those for chlorine, hydrogen cyanide, ammonia, hydrofluoric acid, paraquat, formaldehyde, CS gas, propane and alkalis, respectively.

References

1. [National Poisons Information Service annual report 2013/2014](#)(October 2014), ISBN 978-0-85951-761-4. Downloadable from the [NPIS website](#).
2. [“Legal high’ and e-cigarette poison queries climb”](#), PHE press release, 23 October 2014.

European syndromic surveillance guidelines

European guidelines on syndromic surveillance in human and animal health – aimed at increasing European capacity for real-time surveillance and monitoring of infectious disease outbreaks and other threats to public health or safety – have been published by the “Triple-S” project (Syndromic Surveillance Survey, Assessment toward Guidelines for Europe) [1,2].

Started in 2010, the European Commission-funded project involved 24 organisations from 13 European countries, including PHE’s Real-time Syndromic Surveillance Team, who are leading exponents of the discipline [3].

An early output of Triple-S was the development of a common European definition of syndromic surveillance [4], helping to improve understanding and to move towards harmonisation of national approaches. An inventory of European syndromic surveillance identified 33 systems in 15 countries concerned with human health, and 27 systems in 12 countries concerned with animal health.

The European guidelines, the main output of Triple-S, are intended for public health professionals and epidemiologists who would like to use or develop syndromic surveillance to support existing surveillance systems and public health monitoring. A final output of the project is a European strategy for syndromic surveillance which offers a number of proposed models for enhancing the use and integration of syndromic surveillance to support public health surveillance in Europe.

All outputs from Triple-S are available from the project website [2].

References

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 2. [“Triple-S – the syndromic surveillance project”](#).
 3. Public Health England. [“Syndromic Surveillance Systems and Analyses”](#).
 4. “Triple S. Assessment of syndromic surveillance in Europe”, *Lancet* 2011; **378**(9806): 1833-4.
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Public Health
England

Health Protection Report

weekly report

Infection reports

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Infection Reports

Immunisation

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Infection report

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Vaccine-preventable infections

Laboratory reports of hepatitis A and C (England and Wales): April to June 2014

Laboratory reports of hepatitis A in England and Wales (April-June 2014)

There were a total of 59 laboratory reports of hepatitis A reported to PHE Centre for Infectious Disease Surveillance and Control during the second quarter of 2014 (April-June). This was a 16.9% decrease on the number of reports during the first quarter of 2014 (n=69) and a 49.2% decrease on the same quarter in 2013 (n=88).

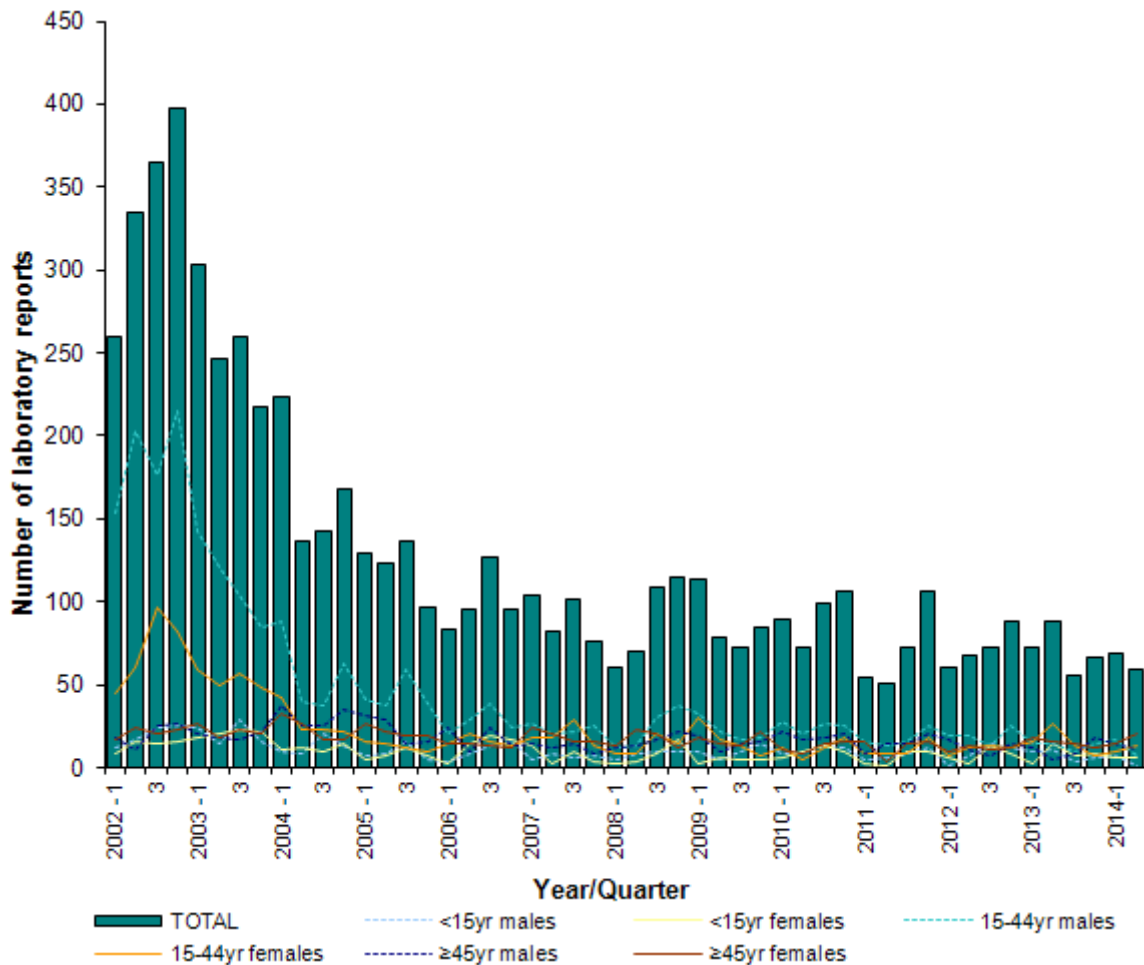
Age-group and sex were well reported (100% complete). Thirty-two (54.2%) reports were among those aged over 44 years, a further 20 (33.9%) reports were among the 15-44 year old age group and 7 (11.9%) reports were from the under 15 year age group.

Males accounted for 32.2% of all reports. A similar proportion of males and females were reported among those aged over 44 years old (34.4% males). More females than males were also reported in the under 15 years age group (85.7% females) and in the over 15 year age group (65.4% females).

Table 1. Laboratory reports of hepatitis A in England and Wales, April to June 2014

Age group	Male	Female	Unknown	Total
<1 year	0	0	0	0
1-4 years	0	1	0	1
5-9 years	0	3	0	3
10-14 years	1	2	0	3
15-24 years	2	4	0	6
25-34 years	3	3	0	6
35-44 years	2	6	0	8
45-54 years	4	4	0	8
55-64 years	4	5	0	9
>65 years	3	12	0	15
Unknown	0	0	0	0
Total	19	40	0	59

Figure 1. Laboratory reports of hepatitis A by age and sex (England and Wales): 2002-2014

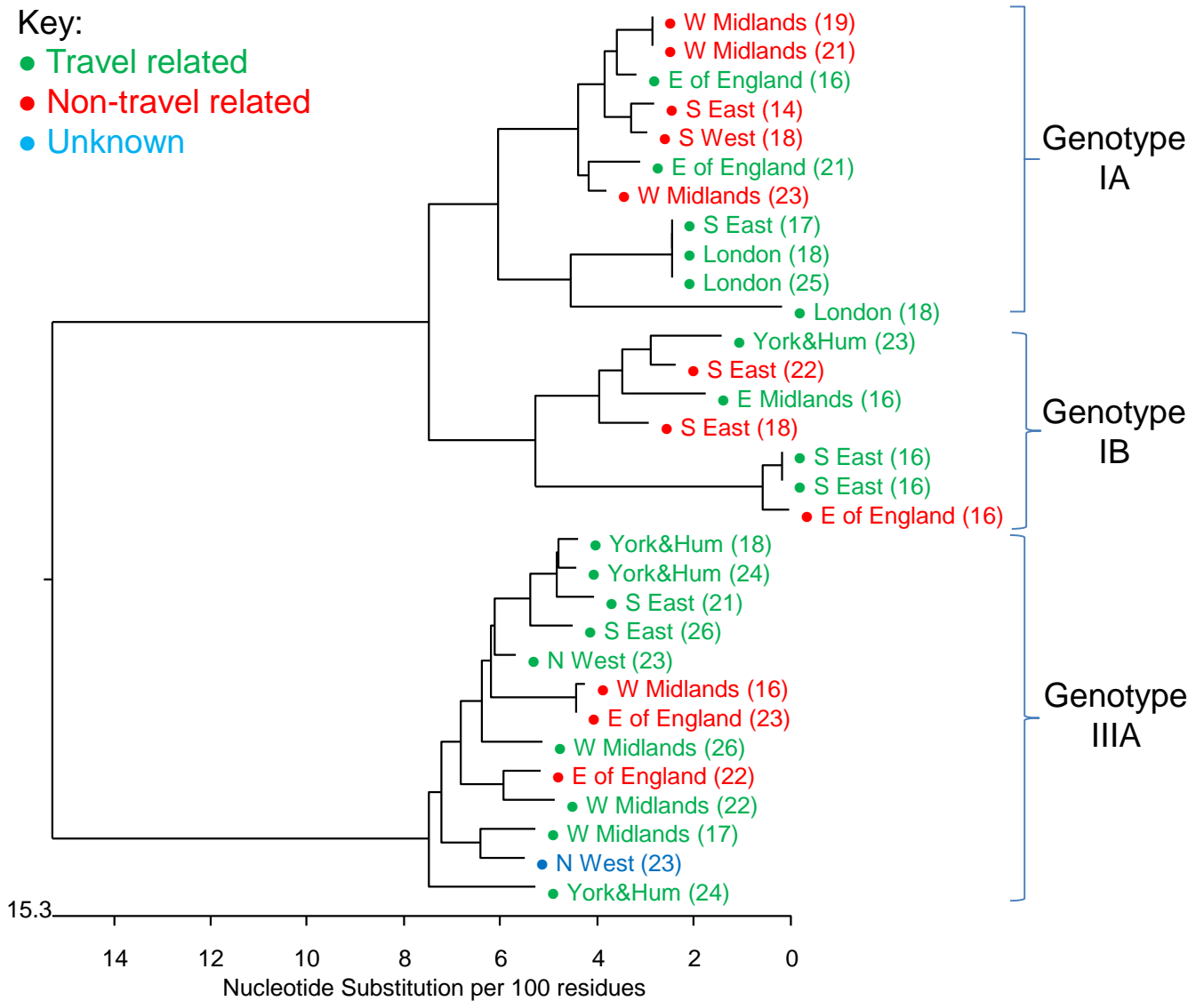


Reference laboratory confirmation and phylogeny of hepatitis A infection

Of 59 patients reported to PHE Colindale Centre for Infectious Disease Surveillance and Control as having acute HAV infection during the second quarter of 2014, 41 had samples forwarded to the Virus Reference Department for confirmation. Eighteen of the patients were not confirmed to have acute HAV infection. The remaining 23 patients were confirmed to have acute HAV infection. In addition 8 patients were confirmed to have acute HAV infection that had not been reported through the laboratory reporting system although they were recorded in HPzone.

A total of 31 patients were genotyped over this period; 11 (35.5%) were genotype IA, 7 (22.6%) were genotype IB and 13 (41.9%) were genotype IIIA. Of these samples 19 (61.3%) were associated with travel, 11(35.5%) had no travel history and 1(3.2%) had no information. This information is presented as a phylogenetic tree. Each sequence is represented by a dot with the patient region and the week of sampling in brackets.

Figure 2. Phylogenetic tree of genotype IA, IB, and IIIA sequences April to June 2014 (n=50)



Laboratory reports of hepatitis C in England and Wales (April-June 2014)

There were a total of 2,690 laboratory reports of hepatitis C reported to PHE Centre for Infectious Disease Surveillance and Control between April and June 2014. This was a similar number of reported compared to the first quarter of 2014 (n=2,782), and a 16.2% decrease on the same quarter in 2013 (n=3,126).

Age-group and sex were well reported (>99% complete). Where known males accounted for 66.7% of reports (1,777/2,665), which is consistent with previous quarters. Adults aged 25-44 years accounted for 52.4% of the total number of hepatitis C reports.

Table 1. Laboratory reports of hepatitis C in England and Wales, April-June 2014

Age group	Male	Female	Unknown	Total
<1 year	2	3	0	5
1-4 years	1	2	1	4
5-9 years	0	0	0	0
10-14 years	2	3	0	5
15-24 years	77	54	3	134
25-34 years	417	228	10	655
35-44 years	523	215	7	745
45-54 years	453	180	1	634
55-64 years	221	123	1	345
>65 years	69	77	0	146
Unknown	12	3	2	17
Total	1777	888	25	2690

Infection report

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Vaccine-preventable infections

Pertussis Vaccination Programme for Pregnant Women: vaccine coverage estimates in England, April to August 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, 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 [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 then Health Protection Agency to coordinate the response to increased pertussis activity [3]. In response to this ongoing 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 intrauterine 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.

Pertussis activity in England persists at raised levels compared to the years preceding the outbreak in 2012 [5]. 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. There have been six deaths reported in young babies (under 10 weeks) diagnosed with pertussis to the end of August this year: in total nine deaths have been reported in young babies with confirmed pertussis who were born after the introduction of the pregnancy programme on 1 October 2012. Eight of these nine babies were born to mothers who had not been vaccinated against pertussis, all of the nine babies were too young to be fully protected by vaccination themselves and none had received their first dose of pertussis-containing vaccine [5].

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 [6]. Effectiveness of maternal pertussis vaccination in preventing disease in infants younger than three months of age in England has been calculated at 91% (95% confidence interval 84 to 95%) [7]. This June 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 [8]. This includes the continuation of all surveillance activities introduced to monitor the programme.

Vaccine coverage data 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

Since May 2014, ie for data from April 2014 onwards, data have been automatically uploaded from participating GP practices to the ImmForm website and analysed by Area Team. This method has the potential to collate data from up to 90% of GP practices in England, and replaces the manual system that was previously in use [9].

The automated system uses the more accurate recorded-date-of-delivery as opposed to the estimated-date-of-delivery (EDD) that was used in the manual system. Hence 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 [10].

Unlike the manual system, in addition to the numerator and denominator, the automated system 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 it is important that the medical records of all women who have given birth 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. 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 continue to improve the current coverage levels. Further information on the pertussis vaccination programme for pregnant women is available at: <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 six months ending 31 March 2014 [9], when data was still collected using the manual reporting system.

Results

The figure shows a decrease in the overall monthly estimates of pertussis vaccine coverage in pregnant women since the introduction of the automated system (in the six months prior to April 2014 coverage had averaged at around 60%). However, despite an initial drop in coverage, between April and August 2014 coverage across England then increased from 52.7% to 55.6%, coinciding with a steady increase in the proportion of GP practices participating each month (from 77.6% to 90.7%).

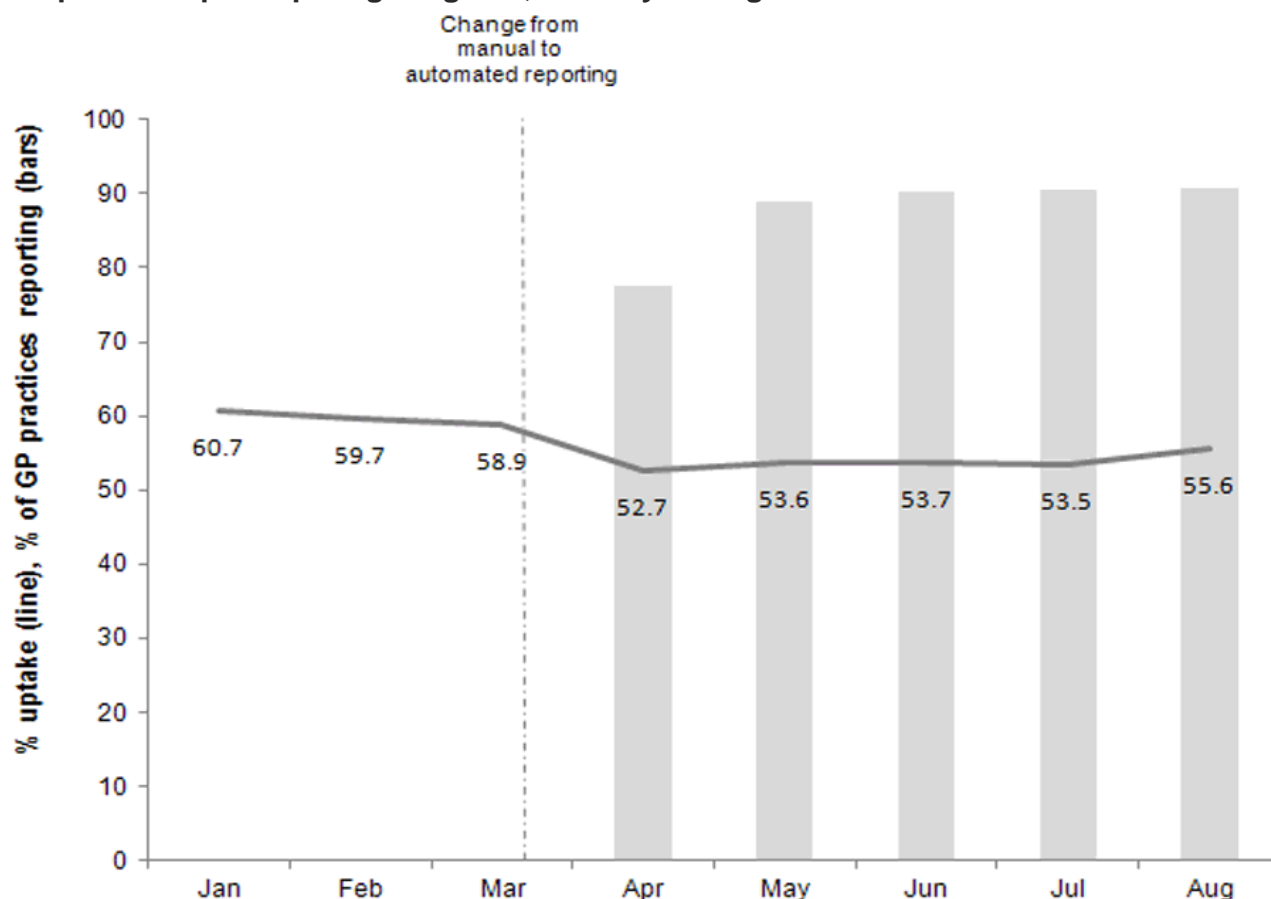
The table shows vaccine coverage by Area Team for the period April to August 2014 (data for previous months by Area Team are available at: <https://www.gov.uk/government/collections/vaccine-uptake#pertussis-vaccine-uptake-in-pregnant-women>). During the first month of automated reporting (data for April 2014) six of the 25 Area Teams recorded vaccine coverage below 50%. However, by August 2014 all Area Teams except two (Birmingham and the Black Country, and London) were reporting >50% coverage, with nine Area Teams reporting $\geq 60\%$ coverage. This compares with 14 Area Teams achieving $\geq 60\%$ in March 2014.

One GP IT supplier was unable to provide data for many of their practices in April. As a result two Area Teams with a high proportion of their GPs served by this supplier had less than half of their GP practices reporting in the first month of automated reporting. From May to August 2014 all Area Teams had at least 70% of GP practices reporting. By August 2014 all Area Teams except one (Greater Manchester) had >80% of GP practices reporting, with five Area Teams reporting data from >95% of GP practices.

There did not appear to be a clear relationship between the percentage of GP practices participating and the number of women included in each survey at the Area Team level. This may be due to variations in the sizes of GP practices reporting each month or there may be differences between the different GP IT suppliers in the completeness of recording the delivery data on the mother's medical record.

Based on a total of 657,177 maternities (a maternity is defined as a pregnancy resulting in the birth of one or more children, including stillbirths) in England each year (2013), the number of pregnant women with a delivery in any one month is on average 54,765 [11], though there is variation in the number of maternities by month across the year [12]. The total number of women reported in each survey continued to vary considerably, both by month of report and by Area Team, as well as within Area Teams each month. The highest number of women reported in the denominator in the five month period was for July 2014 when 39,438 women who delivered in the survey month at more than 28 weeks gestational age were included in the collection, approximately 72% of the expected England total; the smallest number of women reported was for April, with 25,498 women, representing only 47% of the expected maternities (table).

Monthly pertussis vaccine coverage (%) estimates for pregnant women and percentage of GP practices participating: England, January to August 2014.



Note: January to March data have previously been reported and are included here for comparison.

Discussion

The national coverage estimates reported between April and August 2014 average at around 54%, a decline on the 60% reported in the previous six months [9], but coverage appears to be gradually increasing.

Data should be interpreted with caution for several reasons. The methodology used for collecting coverage data changed from a manual to an automated collection in April 2014, and the definition of the denominator changed from the estimated delivery date to the recorded delivery date. 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 and at best, will represent data from around 90% of all GP practices in England. Data is not uploaded for all GP practices each month and there may be variation between the reporting practices in the completeness of the recording of delivery dates in the mother's medical records, hence, as demonstrated by comparison with national data on births and deliveries, these returns are incomplete. 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 uptake of this programme suggests that this methodology may be underestimating coverage. The Clinical Practice Research Datalink, a primary care dataset containing anonymised information for

patients registered at 520 English general practices representative of the population of England in terms of geographical distribution found that estimated coverage peaked at 78% with a low of 60% for women who had a live birth between 1 October 2012 and 3 September 2013 [7]. Over the same period national coverage peaked at 60% and fell to a low of 50% [13].

Monthly pertussis vaccine coverage (%) for pregnant women by Area Team: England, April to August 2014

Area Team	Apr 2014	May 2014	Jun 2014	Jul 2014	Aug 2014
Cheshire, Warrington & Wirral (Q44)	61.4	59.5	60.0	62.6	61.7
Durham, Darlington & Tees (Q45)	60.5	57.2	59.4	57.0	57.7
Greater Manchester (Q46)	47.7	50.8	50.8	52.1	52.8
Lancashire (Q47)	49.9	52.3	50.8	50.5	52.7
Merseyside (Q48)	51.9	54.7	57.2	55.5	55.3
Cumbria, Northumberland, Tyne & Wear (Q49)	52.9	58.6	57.5	57.9	60.0
North Yorkshire & Humber (Q50)	60.9	60.9	66.3	60.5	61.8
South Yorkshire & Bassetlaw (Q51)	59.8	62.1	64.2	59.5	64.0
West Yorkshire (Q52)	65.4	61.8	65.2	59.6	63.2
Arden, Herefordshire & Worcestershire (Q53)	49.3	53.2	51.3	51.3	52.3
Birmingham & the Black Country (Q54)	48.9	49.5	51.2	48.4	49.2
Derbyshire & Nottinghamshire (Q55)	66.7	65.8	65.9	62.7	63.9
East Anglia (Q56)	60.6	60.5	57.2	55.8	55.5
Essex (Q57)	50.2	58.8	55.0	50.0	56.8
Hertfordshire & the South Midlands (Q58)	60.7	59.7	61.0	54.9	56.9
Leicestershire & Lincolnshire (Q59)	60.4	58.8	61.5	53.0	57.6
Shropshire & Staffordshire (Q60)	58.7	54.4	59.2	55.9	56.2
Bath, Gloucestershire, Swindon & Wiltshire (Q64)	64.7	63.6	62.1	62.3	63.0
Bristol, North Somerset, Somerset & South Gloucestershire (Q65)	52.5	55.5	56.1	54.5	53.9
Devon, Cornwall & Isles of Scilly (Q66)	50.8	49.7	50.6	48.7	52.9
Kent & Medway (Q67)	49.1	51.2	47.9	54.0	54.6
Surrey & Sussex (Q68)	55.7	57.4	53.6	54.7	56.2
Thames Valley (Q69)	53.2	56.4	56.1	54.3	60.2
Wessex (Q70)	58.2	57.2	58.1	60.0	62.5
London (Q71)	41.4	42.9	42.8	45.0	46.4
England	52.7	53.6	53.7	53.5	55.6
Monthly reported denominator	25,498	30,958	30,087	39,438	35,587

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2. Campbell H, Amirthalingam G, Andrews N, Fry NK, George RC, Harrison TG, *et al* (2012). Accelerating control of pertussis in England and Wales. *Emerging Infectious Diseases* **18**(1): 38-47.
3. A level 3 incident is the third of five levels of alert under the PHE'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)*)
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Infection report

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Vaccine-preventable infections

National rotavirus immunisation programme: preliminary data for England, October 2013 to September 2014

This report presents (i) monthly vaccine coverage data for children routinely offered rotavirus vaccine through the vaccination programme that commenced in July 2013 and (ii) recent numbers of laboratory reports of rotavirus infection in England. Vaccine coverage levels for the first cohorts of children offered this vaccine routinely in England show that high coverage was rapidly achieved and has been maintained; 92.6% of the children evaluated at 25 weeks of age between February and September 2014 had received the first dose and 87.5% had completed the two dose course based on data from 90% of all GP practices in England. Laboratory reports of rotavirus for the period July 2013 to June 2014 were 67% lower than the ten-season average for the same period in the seasons 2003/2004 to 2012/2013. The high coverage reported here for the first cohort of children to be offered this vaccine routinely in England suggests that a rapid reduction in the burden of rotavirus is achievable.

Background

The national rotavirus vaccination programme started in July 2013 [1] following the advice and recommendation by the Joint Committee on Vaccination and Immunisation (JCVI) [2]. Rotavirus is a very common and potentially serious infection of the large bowel, mainly affecting young babies. Nearly every child will have at least one episode of rotavirus gastroenteritis by five years of age. People of any age can be affected but the illness is more severe in young infants. Symptoms of gastroenteritis include vomiting, diarrhoea, stomach cramps and mild fever, which usually last for three to eight days. Some children, however, may develop severe gastroenteritis and become dehydrated, and require hospitalisation for rehydration. The rotavirus immunisation programme in the UK is expected to prevent a significant number of young infants from developing this infection. A published study [3] estimated that vaccinating a birth cohort of infants in England and Wales may prevent around 90,000 infections, about 10,000 hospitalisations and around two deaths due to rotavirus in that cohort over the first five years of life. It may also provide some additional protection to the wider population through herd immunity.

There are two rotavirus vaccines authorised for use by the European Medicines Agency, Rotarix® (manufactured by GSK) and RotaTeq® (manufactured by Sanofi Pasteur MSD). Rotarix® is the vaccine being used in the UK and this is a live attenuated vaccine which is administered orally to young infants. The aim of the rotavirus immunisation programme is to provide two doses of Rotarix® vaccine to infants from six weeks of age and before 24 weeks of age. The first dose of Rotarix® vaccine is offered at two months (approximately eight weeks) of age and the second dose at least four weeks after the first dose. The Rotavirus Green Book chapter summarises the history and epidemiology of the disease and provides detailed recommendations on supply, storage and use of the vaccine, as well as guidance on contraindications, precautions and adverse reactions [4].

All PHE documents relating to the rotavirus vaccination programme for infants – including training slidesets, patient leaflets and factsheets – are accessible via the PHE Rotavirus Vaccination Programme for Infants series webpages [5].

Public Health England's Immunisation Information for Health Professionals home page can be found here: www.gov.uk/government/organisations/public-health-england/series/immunisation.

Vaccine coverage data collection

In order to rapidly assess rotavirus vaccine coverage a temporary sentinel surveillance programme was set up to extract monthly coverage data directly from GP systems for children who had just reached the upper age for receiving the vaccine (25 weeks) [1]. This early evaluation of vaccine coverage has provided assurance that the vaccine has been well accepted alongside the other childhood immunisations. This temporary surveillance programme for rotavirus coverage will eventually be replaced by data from the routine quarterly COVER (Cover of vaccination evaluated rapidly) reporting scheme which will assess vaccine coverage for all children in England aged 12 months using data extracted from Child Health Information Systems (CHIS) [1].

Vaccine coverage data for the rotavirus immunisation programme are submitted through the ImmForm website and are monitored, validated and analysed by PHE. Monthly automatic data uploads from sentinel GP practices with the appropriate extraction facilities allows collection with minimal or no burden to the NHS whilst providing quick and timely coverage figures [1]. Monthly data are collected on the following:

- ▶ *Denominator*: the number of infants in a GP practice who, in the survey month, reach 25 weeks of age;
- ▶ *Numerators*: number of infants in the denominator who received a) a first dose and b) a second dose of Rotarix® from six weeks of age up to 24 weeks of age, including vaccinations given by other healthcare providers.

GP practice participation has been high and ranged from 84% to 91% of all GP practices in England every month (each monthly survey represents between 44,000 and 50,500 children).

Vaccine coverage data

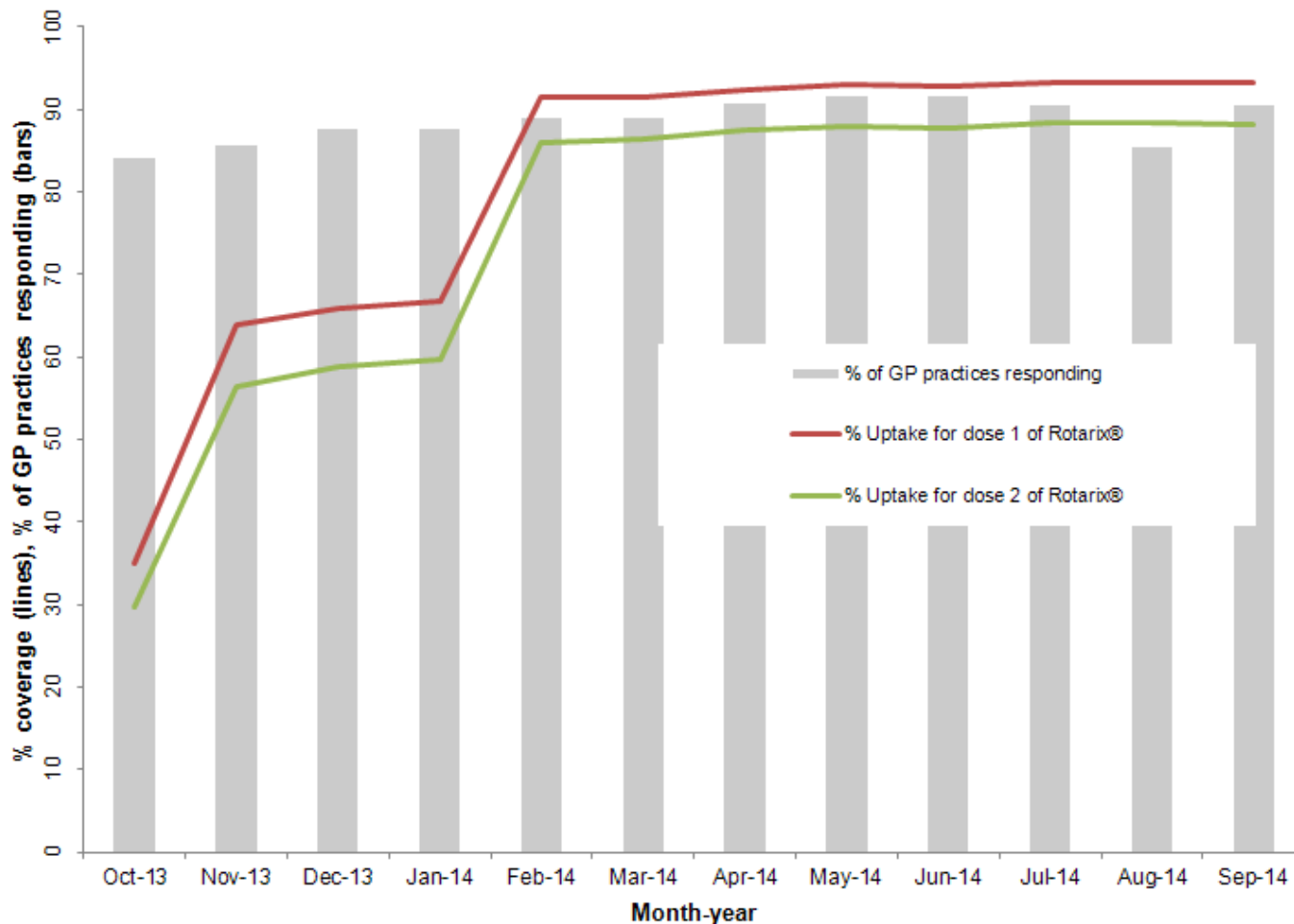
Figure 1 shows coverage between October 2013 and September 2014. Although the vaccine programme was introduced in July 2013 the first cohort of children aged 25 weeks to be routinely scheduled rotavirus vaccine alongside other primary vaccines at two and three months of age were evaluated from January 2014. Children evaluated in the monthly surveys before then may have been offered the rotavirus vaccine opportunistically alongside their two and three month immunisations, or via a separate specific appointment. Children evaluated in November 2013 were the first monthly cohort eligible by age for the vaccine, as they were aged less than 15 weeks on 1st July when the programme started, however not as part of the routine scheduling.

Rotavirus vaccine coverage data for children in the routine vaccination cohort (ie evaluated between February and September 2014) averaged 92.6% for one dose, and was above 93% from July through to September 2014 (table 1). Coverage for the two dose course averaged 87.5% between February and September 2014, and was above 88% from July through to September 2014 (table 2).

Seven of the 25 Area Teams (ATs) consistently reported coverage of the first dose above 80% from November 2013 onwards, but the majority of ATs reported lower coverage until February 2014, when coverage of the first dose was >85% for the first time across all ATs. Coverage was consistently above 84% for all ATs for the first dose from February to September 2014, with the majority of ATs reporting ≥90% coverage each month.

Ten ATs consistently reported coverage of the second dose above 70% from November 2013 onwards, but the majority of ATs reported lower coverage until February 2014; coverage of the second dose was then consistently >78% for all ATs between February to September 2014. Four Area Teams reported >90% coverage for the second dose from February to September 2014.

Figure 1. Monthly rotavirus vaccine coverage at 25 weeks of age for 1st and 2nd dose, and the percentage of GP practices reporting, England, October 2013 to September 2014

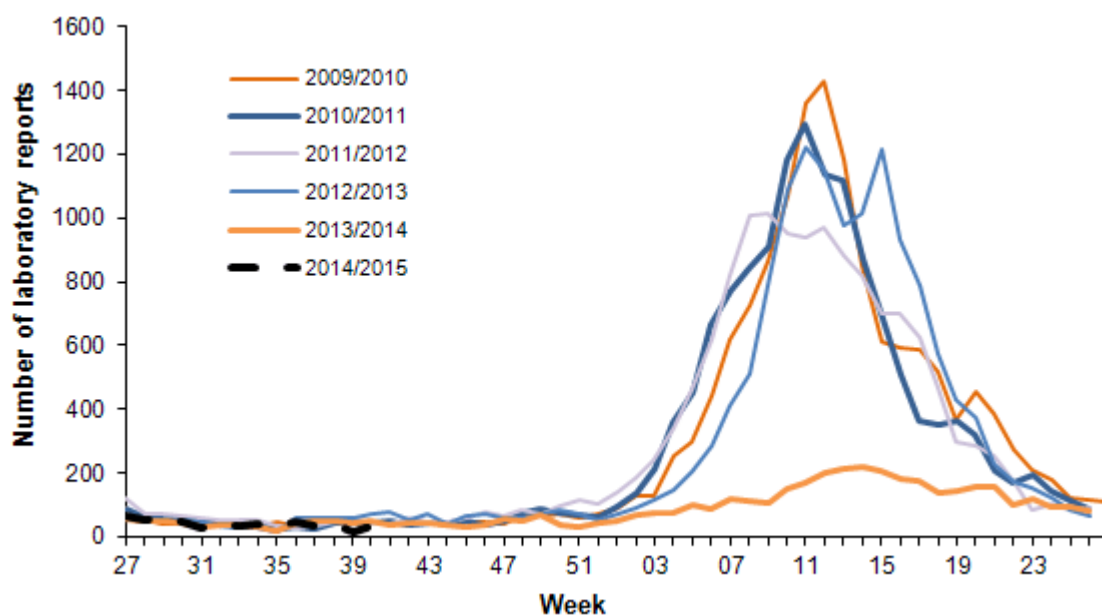


The percentage of GP practices in England included in the automated uploads increased from 84.1% in October 2013 to 89.0% in February 2014. It then fluctuated between 85.4% (August 2014) and 91.6% (May and June 2014) during the following seven months.

Laboratory reports of rotavirus infection

Rotavirus infection in the UK is seasonal occurring mostly in winter and early spring (January to March). Data on the number of laboratory reports of rotavirus in England have been collated for many years by PHE Gastrointestinal, Emerging and Zoonotic Infections Department (GEZI). For the 2014/15 season to date (week 27 2014 to week 40 2014) the number of rotavirus laboratory reports in England are similar to the ten-season average for the same period in the seasons 2003/2004 to 2012/2013 (figure)[6]. For the 2013/14 season (week 27 2013 to week 26 2014) the number of rotavirus laboratory reports in England was 67 per cent lower than the 10-season average for the seasons 2003/2004 to 2012/13. The observed decrease in rotavirus activity 2013/2014 season is likely to be associated with the introduction of the oral vaccine in July 2013.

Figure 2. Seasonal comparison of laboratory reports of rotavirus 2009/2010 to 2014/15: England



Source: PHE GEZI

Note: In order to capture the winter peak of norovirus activity in one season, for reporting purposes, the rotavirus season runs from week 27 in year 1 to week 26 in year 2, i.e. week 27 2009 to week 26 2010, July to June

Rotavirus vaccines are already used to routinely vaccinate children in the US and many other countries. In the US, studies have shown that rotavirus-related hospital admissions for young children have been cut by more than two-thirds since rotavirus vaccination was introduced. The high vaccine coverage reported for the first cohort of children to be offered this vaccine routinely in England suggests that the UK could rapidly achieve a similar reduction in the burden of rotavirus.

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Table 1. Monthly rotavirus vaccine coverage for one dose (%) at 25 weeks of age by Area Team: England, October 2013 to September 2014

Area Team	Oct 2013	Nov 2013	Dec 2013	Jan 2014	Feb 2014	Mar 2014	Apr 2014	May 2014	Jun 2014	Jul 2014	Aug 2014	Sep 2014
Cheshire, Warrington & Wirral (Q44)	37.9	78.4	77.7	77.8	93.2	91.7	91.5	90.8	91.4	92.0	92.9	94.5
Durham, Darlington & Tees (Q45)	21.3	39.3	41.3	39.5	93.7	94.5	96.1	95.1	95.5	95.4	95.9	96.4
Greater Manchester (Q46)	43.1	80.2	84.0	84.9	90.6	90.5	90.7	91.6	91.0	91.8	92.1	92.6
Lancashire (Q47)	45.8	92.4	91.5	93.2	90.9	93.1	93.9	94.6	95.3	94.6	95.2	96.1
Merseyside (Q48)	42.3	81.0	83.5	86.3	87.2	88.6	90.0	90.4	91.0	90.0	90.2	90.5
Cumbria, Northumb, Tyne/Wear (Q49)	30.8	78.9	81.9	82.7	95.0	94.3	94.7	95.6	95.4	96.2	96.2	96.5
North Yorkshire & Humber (Q50)	23.0	39.9	41.5	40.6	95.5	95.3	95.3	95.8	95.0	95.7	96.2	96.1
South Yorkshire & Bassetlaw (Q51)	25.4	54.9	48.8	52.0	94.9	95.0	94.7	95.9	95.1	96.8	95.0	96.6
West Yorkshire (Q52)	12.0	25.9	24.4	24.9	94.5	94.2	94.7	95.2	93.9	94.4	94.9	95.3
Arden, Herefordshire & Worcs. (Q53)	60.3	87.2	90.0	90.3	89.3	91.9	93.2	94.9	93.9	93.4	94.5	94.6
Birmingham & the Black Country (Q54)	28.7	67.0	71.4	72.2	90.0	89.7	90.9	91.4	92.8	92.9	93.3	93.6
Derbyshire & Nottinghamshire (Q55)	18.2	41.4	37.5	34.1	94.5	93.7	94.5	95.1	95.1	95.0	95.1	94.7
East Anglia (Q56)	22.9	43.0	41.8	41.1	94.5	93.2	95.8	94.3	94.6	95.1	95.6	95.5
Essex (Q57)	16.4	34.4	35.6	36.9	95.7	93.3	94.7	95.6	95.0	95.1	95.7	95.3
Herts & the South Midlands (Q58)	29.7	47.8	49.3	46.8	94.5	94.2	93.9	94.8	94.4	94.7	94.4	94.6
Leicestershire & Lincolnshire (Q59)	20.4	41.0	42.2	40.7	92.0	91.7	93.2	93.3	94.4	93.7	94.6	94.6
Shropshire & Staffordshire (Q60)	59.1	82.7	85.1	86.8	92.7	95.7	93.8	95.1	96.1	94.3	93.8	93.8
Bath, Glos., Swindon & Wiltshire (Q64)	25.4	43.2	42.8	45.2	92.9	93.9	94.1	93.4	93.3	94.8	94.4	94.7
Bristol, North Somerset, Somerset & South Gloucestershire (Q65)	50.7	85.3	86.8	87.5	89.9	88.4	88.7	92.2	92.3	91.5	92.4	92.4
Devon, Cornwall & Isles of Scilly (Q66)	38.1	66.8	67.2	67.5	85.8	88.1	89.3	90.9	88.1	90.8	89.5	84.3
Kent & Medway (Q67)	35.4	78.6	83.9	84.6	90.7	91.5	92.4	93.9	92.6	93.2	94.2	92.5
Surrey & Sussex (Q68)	42.0	66.5	68.3	70.2	91.3	90.5	92.7	93.2	93.0	93.1	92.4	92.8
Thames Valley (Q69)	40.3	86.4	90.4	90.2	92.7	92.2	92.5	94.2	93.5	93.4	92.9	93.7
Wessex (Q70)	44.7	71.1	70.2	74.3	93.3	93.2	93.8	95.0	94.6	95.2	95.6	93.5
London (Q71)	42.8	75.8	78.9	81.5	87.3	88.1	89.3	89.8	90.1	90.2	89.9	90.4
England	34.9	64.0	65.9	66.8	91.5	91.6	92.4	93.0	92.9	93.2	93.3	93.3
Monthly reported denominator	43,807	45,130	47,989	49,140	46,357	50,824	49,003	49,398	47,769	48,348	46,039	47,100

Table 2. Monthly rotavirus vaccine coverage for two doses (%) at 25 weeks of age by Area Team: England, October 2013 to September 2014

Area Team	Oct 2013	Nov 2013	Dec 2013	Jan 2014	Feb 2014	Mar 2014	Apr 2014	May 2014	Jun 2014	Jul 2014	Aug 2014	Sep 2014
Cheshire, Warrington & Wirral (Q44)	34.0	72.5	72.2	73.0	88.3	86.9	86.6	86.2	88.1	88.0	88.9	91.4
Durham, Darlington & Tees (Q45)	16.7	32.5	32.7	31.6	90.7	91.7	92.7	92.0	92.2	91.2	92.7	94.6
Greater Manchester (Q46)	37.6	73.1	76.9	77.9	84.2	84.3	84.9	85.6	84.2	86.2	86.0	86.9
Lancashire (Q47)	40.4	86.1	86.1	87.5	86.1	88.1	90.9	89.2	90.5	90.7	89.3	91.7
Merseyside (Q48)	36.0	73.4	76.7	78.0	78.4	82.0	82.5	83.1	85.1	82.5	83.1	82.8
Cumbria, Northumb, Tyne & Wear (Q49)	27.3	74.2	76.9	77.1	90.1	89.4	90.3	90.1	92.6	92.4	92.6	92.1
North Yorkshire & Humber (Q50)	17.8	34.3	34.7	34.8	90.2	92.0	91.9	92.1	91.7	91.5	93.0	90.8
South Yorkshire & Bassetlaw (Q51)	21.2	46.6	40.8	42.4	90.9	90.8	89.5	91.0	90.0	91.7	90.6	91.4
West Yorkshire (Q52)	7.8	18.3	18.8	19.9	90.3	90.2	91.1	91.6	89.5	91.6	91.8	91.1
Arden, Herefordshire & Worcs. (Q53)	53.8	80.2	84.5	85.7	83.9	87.7	88.9	90.5	89.4	88.5	88.7	89.8
Birmingham & the Black Country (Q54)	23.2	59.4	64.1	63.3	82.1	84.3	84.7	85.0	85.9	87.3	87.0	86.4
Derbyshire & Nottinghamshire (Q55)	13.1	31.8	29.2	26.5	89.8	89.2	90.3	91.0	91.1	91.2	91.3	89.5
East Anglia (Q56)	17.9	33.4	34.7	33.4	91.2	90.1	92.6	90.1	90.7	91.8	91.9	92.5
Essex (Q57)	12.0	27.3	29.3	29.8	91.5	89.2	90.9	91.4	91.4	92.0	92.8	91.6
Herts. & the South Midlands (Q58)	23.7	37.3	39.8	37.5	90.9	91.1	91.1	91.9	91.7	91.6	91.0	91.9
Leicestershire & Lincolnshire (Q59)	16.2	31.7	33.1	33.9	89.2	88.1	90.4	90.0	91.1	90.7	90.8	91.7
Shropshire & Staffordshire (Q60)	54.6	77.1	81.1	82.0	87.9	91.8	90.3	91.4	92.5	90.1	90.9	89.4
Bath, Glos., Swindon & Wiltshire (Q64)	20.8	35.9	35.0	38.9	89.8	89.3	89.5	89.5	88.8	90.0	90.5	90.4
Bristol, North Somerset, Somerset & South Gloucestershire (Q65)	45.1	79.2	80.8	80.3	83.0	83.2	84.1	87.5	87.4	85.9	87.1	88.0
Devon, Cornwall & Isles of Scilly (Q66)	33.9	59.3	59.8	60.6	80.6	82.2	84.0	85.9	83.7	85.2	84.5	79.8
Kent & Medway (Q67)	30.9	70.9	77.9	78.6	83.8	86.5	86.4	89.2	87.0	87.6	88.9	87.1
Surrey & Sussex (Q68)	36.0	59.0	62.2	64.0	86.4	85.8	89.2	88.5	88.3	88.0	88.4	88.0
Thames Valley (Q69)	36.4	80.4	84.5	84.4	86.6	87.4	87.0	88.6	88.0	88.9	88.8	88.8
Wessex (Q70)	39.6	65.3	64.9	68.9	88.5	89.2	89.8	91.1	90.3	91.7	91.6	89.3
London (Q71)	36.1	67.6	70.1	73.1	79.8	80.6	82.3	82.6	82.2	83.3	82.6	82.8
England	29.6	56.4	58.8	59.7	86.0	86.5	87.5	87.9	87.7	88.3	88.4	88.1
Monthly reported denominator	43,807	45,130	47,989	49,140	46,357	50,824	49,003	49,398	47,769	48,348	46,039	47,100