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Immunisation

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Tetanus in England and Wales: 2013

Tetanus is a life-threatening but preventable infection. From January to December 2013 only seven cases were reported in England and Wales. This article updates the 2012 HPR report on surveillance data covering that period [1] and reiterates current recommendations on diagnosis and clinical management of cases. Data sources for the enhanced surveillance of tetanus include notifications, reference and NHS laboratory reports, death registrations, and individual case details such as vaccination history, source of infection, and severity of disease obtained from hospital records and general practitioners.

Seven cases of tetanus were reported in England and Wales between January and December 2013; six in England and one in Wales. All of the cases were among adults aged 35 to 82 years old. Three cases, two male and one female, were born after 1961 and therefore eligible for routine childhood vaccination [2]. Of the four cases born prior to 1961, three were identified in individuals (two women and one man) aged over 64 years, the age group which historically has been the most affected by tetanus [3], and one case was identified in a 45-64 year old man.

Six of the cases had a history of injury. Two cases were identified among people who inject drugs (PWIDs), both were males aged 25-44 years old [4]. There was no known epidemiological link between the cases. Three cases sustained lacerations in the home or garden, and one was injured on a farm. None of the cases sought treatment at the time of exposure.

None of the cases were confirmed as having received the recommended five doses of tetanus toxoid vaccine. Among the three cases born after 1961, two were partially immunised, having received three and four doses respectively, and in one case no vaccination history was available. Among the four cases born prior to 1961 two were known to be unimmunised and no vaccination history was available for the remaining two cases.

All seven cases received tetanus immunoglobulin (TIG) or human normal immunoglobulin (HNIG) during their admission to hospital. Two presented with mild symptoms (grade 1), two presented with moderate symptoms (grade 2), and three cases had severe symptoms (grade 3). Of the two partially immunised cases one had mild symptoms, which is consistent with previous reports [1]; the other, who was a person who injects drugs, had severe symptoms (grade 3b).

No deaths due to tetanus were reported during this period.

During 2013, a further 12 suspected cases of tetanus were investigated by the Respiratory and Vaccine Preventable Bacteria Reference Unit (RVPBRU) [5]; all 12 cases were found to have protective levels of antibodies against tetanus (>0.1IU/ml). In each case tetanus was excluded from the diagnosis by the attending clinician. Eleven suspected cases adults aged 16 to 83 years and a further potential case was in an age appropriately vaccinated child who was later confirmed as having a viral infection.

Tetanus is a notifiable disease in accordance with the amended *Public Health (Control of Disease) Act 1984* and accompanying regulations [6]. During 2013, notifications were not received for six of the cases. Of the two notified cases one was subsequently reclassified as not being due to tetanus.

Background, diagnosis and clinical management

Tetanus is a life-threatening but preventable disease caused by a neurotoxin (tetanospasmin, TS) produced by *Clostridium tetani*, an anaerobic spore-forming bacterium. Tetanus spores are widespread in the environment, including in soil, and can survive hostile conditions for long periods of time. Transmission occurs when spores are introduced into the body, often through a puncture wound but also through trivial, unnoticed wounds, chronic ulcers, injecting drug use, and occasionally through abdominal surgery. Neonatal tetanus is still common in the developing world where the portal of entry is usually the umbilical stump, particularly if there is a cultural practice of applying animal dung to the umbilicus. Tetanus is not transmitted from person to person. The incubation period of the disease is usually between three and 21 days, although it may range from one day to several months, depending on the character, extent and localisation of the wound.

Tetanus immunisation was introduced in the 1950s and became part of the national routine childhood programme in 1961. Since then, vaccine coverage at two years of age has always exceeded 70% in England and Wales and since 2001 has been around or above 95%, the target coverage set by the World Health Organization (WHO). The objective of the immunisation programme in the UK is to provide a minimum of five doses of tetanus-containing vaccine at appropriate intervals for all individuals. As there is no herd immunity effect, individual protection through vaccination is essential. In most circumstances, a total of five doses of vaccine at the appropriate intervals are

considered to give satisfactory long-term protection, and routine boosters every 10 years are no longer recommended [2].

Tetanus is usually confirmed by a clinical diagnosis alone, although three diagnostic laboratory tests are available: detection of tetanus toxin in a serum sample, isolation of *C. tetani* from the infection site, and demonstrating low levels or undetectable antibody to tetanus toxoid in serum. The first two tests provide microbiological confirmation, whereas the third can only support the diagnosis [5].

Clinical management of tetanus includes administration of TIG, wound debridement, antimicrobials including agents reliably active against anaerobes such as metronidazole, and vaccination with tetanus toxoid following recovery. Early treatment with TIG can be lifesaving. When the supply of TIG has been limited the use of TIG has been restricted to patients requiring treatment for suspected tetanus. Where a suitable TIG stock cannot be sourced, Public Health England recommends that HNIG for intravenous use may be used as an alternative for treatment of clinical tetanus. For tetanus prone wounds requiring prophylactic TIG, HNIG for subcutaneous use may be given intramuscularly as an alternative if stocks of TIG are not available [7]. It is most important that a blood sample for the detection of tetanus toxin or the determination of anti-tetanus antibodies is collected BEFORE the administration of TIG or normal human immunoglobulin [7] and to maximise toxin detection is collected as close to onset of neurological symptoms as possible.

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Diphtheria in England and Wales: 2011–2013 *

Diphtheria became rare in England following the introduction of mass immunisation in 1942, when the average annual number of cases was about 60,000 with 4,000 deaths. Primary vaccine coverage (three doses) in the United Kingdom (UK) for children aged two has been at least 94% since 2001 and is currently 96%, above the World Health Organisation (WHO) target of 95% [1]. Diphtheria vaccine is made from inactivated diphtheria toxin and protects individuals from the effects of toxin-producing corynebacteria. Three *Corynebacterium* spp. can potentially produce toxin; *C. diphtheriae* (associated with epidemic person-to-person spread via respiratory droplets and close contact), *C. ulcerans* and *C. pseudotuberculosis* (both less common globally and traditionally associated with farm animal contact and dairy products) [2]. Classic respiratory diphtheria is characterised by a swollen ‘bull neck' and strongly adherent pseudomembrane which obstructs the airways; a milder respiratory form of the disease where patients present with sore throat or pharyngitis is reported in immunised or partially immunised individuals [2]. Cutaneous presentations, characterised by ‘rolled edge' ulcers, are usually associated with travel to tropical areas of the world. A recent review of diphtheria in the UK between 1986 and 2008 emphasises the changing epidemiology of the disease with the majority of toxigenic isolates in recent years associated more often with *C. ulcerans* than *C. diphtheriae* [2].

The normal reservoir of *C. ulcerans* is cattle and human cases traditionally have been associated with the consumption of raw dairy products, however, recent studies have suggested that cats and dogs could also be potential reservoirs for this organism [3,4] . Travel and close contact with cattle, other farm animals and horses are other potential risk factors for infection. Although there is no direct evidence of person-to-person transmission of *C. ulcerans* infection there have been incidents that suggest this mode of transmission is possible. The guidelines for consultants in communicable disease control (CCDCs) on the control of diphtheria recommend that anyone who has been in close contact in the previous seven days with a case of infection caused by toxigenic *C. diphtheriae* or

* This report was republished on 27/6/2014 with omitted text re-inserted.

C. ulcerans should be considered at risk [5]. These guidelines have recently been reviewed and are going through a consultation process, however, the above recommendation remains largely unchanged.

As a disease becomes rare, the completeness and accuracy of surveillance information become more important and each clinical diagnosis (ie notification) needs to be confirmed by laboratory diagnosis. In addition to notifications, enhanced surveillance for diphtheria incorporates data from reference and NHS laboratories, death registration, and individual case details such as vaccination history, source of infection and severity of disease obtained from hospital records, general practitioners and local incident team reports. Linkage of notified cases of diphtheria and confirmatory laboratory data shows that most notifications are cases of pharyngitis associated with isolation of non-toxigenic strains of *C. diphtheriae,* and therefore interpretation of notification data should be undertaken with caution. This report for the period 2011 to 2013 updates a previous four-year review of diphtheria cases in England and Wales for 2007-2010 [6].

During the period 2011 to 2013, six toxigenic strains of corynebacteria, three *C. diphtheriae* and three *C. ulcerans*, were identified by the PHE Respiratory and Vaccine Preventable Bacteria Reference Unit (RVPBRU), which is the National Reference Laboratory for diphtheria; all were from patients in England.

Laboratory testing of samples from 11 of the 12 notified cases in this period confirmed that only three were toxigenic strains; two *C. diphtheriae* and one *C. ulcerans,* and seven were non-toxigenic *C. diphtheriae* infections. *Corynebacterium* spp. were not isolated from one sample, and one was notified in error and therefore no sample was received . In the same period, RVPBRU identified a further three toxigenic isolates from samples referred from patients not formally notified as diphtheria; two *C. ulcerans* and one *C. diphtheriae* strains (table 1).

Table 1. Diphtheria notifications and isolates of toxigenic corynebacteria, England 2011–2013

	Year			
	2011	**2012**	**2013**	**Total**
Total notifications	**2**	**1**	**9***	**12**
Number due to non-toxigenic *C. diphtheriae*	1	1	5*	7
Number due to toxigenic *C. diphtheriae*	0	0	2	2
Number due to toxigenic *C. ulcerans*	1	0	0	1
All toxigenic *corynebacteria isolates*	**2**	**1**	**3**	**6**
Toxigenic *C. diphtheriae*	0	0	3	**3**
Toxigenic *C. ulcerans*	2	1	0	**3**

* One notification was made in error, no sample was received.
** *Corynebacterium* spp. not isolated from a one sample.

C. diphtheriae

Three *C. diphtheriae* var. mitis strains were isolated in 2013. All three were isolated from tissue samples (cutaneous diphtheria) (table 2). The patients were aged 48 to 65 years, two were male and one was female. Two patients were reported as immunised but full vaccination histories were not available; the immunisation history of the third patient was unknown.

All of the patients had a recent history of travel. The first patient had recently returned from India, where they had sustained a laceration. The second had visited the Democratic Republic of Congo and sustained a burn the day after they returned home which resulted in a large non-healing ulcer. The third had recently returned from Thailand and reported having been bitten by an insect at the site of the ulcer. All three patients were treated with antibiotics; none experienced systemic complications and all recovered from their illness.

In total, 26 close contacts of the patients were identified, including household contacts, healthcare workers, and travelling companions. Where possible the contacts were offered chemoprophylaxis, vaccination as appropriate, and swabbed. None exhibited symptoms of respiratory or cutaneous diphtheria and no swabs yielded *C. diphtheriae*.

C. ulcerans

Two *C. ulcerans* strains were isolated in 2011. The patients were aged between 10 and 67 years, two were female, and none had a recent history of travel. One had a possible history of consuming raw dairy products; the others did not. All reported contact with companion animals (cats, dogs, guinea pigs, rabbits), one also had contact with foxes and one also had contact with horses [7]. Swabs were not taken from any animals. Throat swabs from close contacts of these patients were all negative for corynebacteria.

In 2011, a post-mortem sputum sample tested positive for toxigenic *C. ulcerans* [8]. The patient had presented with a sore throat and stridor, but did not have the classical diphtheria presentation of ‘bull neck’ nor obvious

pseudomembrane. The patient's immunisation status was unknown, however, a serum sample did not have detectable levels of antibodies against diphtheria. Although the patient was treated with antibiotics they developed multiple organ failure and subsequently died. Also in 2011, a patient presented with a necrotising skin lesion on their finger, with no systemic symptoms of diphtheria [9]. The patient was started on antibiotics for suspected necrotising fasciitis, however, three successive tissue samples taken during surgical wound debridement failed to yield *Streptococcus* spp. (the usual causative agent in cases of necrotising fasciitis). All three samples yielded diphtherioids and one sample sent to RVPBRU for tested positive for toxigenic *C. ulcerans*. The patient reported having received diphtheria vaccine but could not remember the date of their most recent immunisation. A serum sample was found to have below protective levels of antibodies. The patient responded to treatment and fully recovered.

In 2012, a child presented with a sore throat and fever without pseudomembrane or 'bull neck', the presumptive clinical diagnosis was scarlet fever. The child responded to antibiotic therapy and recovered from their infection. A throat swab subsequently yielded Lancefield Group A streptococcus and a toxigenic strain of *C. ulcerans* which resulted in a diagnosis of mild respiratory diphtheria. As the child was well at the time of diagnosis no further action was taken. The child was age appropriately immunised and was not known to have any underlying conditions.

Table 2. Clinical presentation of diphtheria cases and causative organism, England 2011–2013

	Causative organism		Total
Clinical presentation of cases	Toxigenic *C. diphtheriae*	Toxigenic *C. ulcerans*	
Classic respiratory diphtheria (with pseudomembrane)	0	0	**0**
Mild respiratory diphtheria (sore throat/pharyngitis)	0	2	**2**
Cutaneous diphtheria	3	1	**4**

Microbiological laboratories are encouraged to submit all suspect isolates of *C. diphtheriae* and other potentially toxigenic corynebacteria to PHE RVPBRU. RVPBRU also provides advice on all aspects of laboratory diagnostics and testing for diphtheria and related infections. Advice on immunisation against diphtheria, provision of vaccine and provision of diphtheria antitoxin for therapeutic use is available from the PHE Colindale Immunisation Department.

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Laboratory confirmed cases of pertussis reported to the enhanced pertussis surveillance programme in England: Q4/2013

In England there were 750 laboratory confirmed cases of pertussis (culture, PCR, serology or oral fluid) reported to the Public Health England (PHE, formally the Health Protection Agency [HPA]) pertussis enhanced surveillance programme in the fourth quarter of 2013, from October to December (table 1). This was a 34% decrease in the number of cases reported during the previous quarter (1129 in July to September 2013) and a 78% decrease on cases reported in the same quarter of 2012 (3450 cases between October and December 2012). There were 27 laboratory confirmed cases reported in Wales between October and December 2013, a 50% decrease in the 54 cases reported in the third quarter in 2013.

Typically pertussis activity peaks in quarter 3 and then declines, as observed in 2013 (figure 1). The continued increase observed in each successive quarter between the first quarter of 2011 and third quarter of 2012 was unusual. The HPA declared a national outbreak of pertussis (level 3 incident [1]) 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 [2]. The most recent PHE figures report that of the mothers due to give birth in July, August and September 2013, 55.7%, 56.4% and 56.4% respectively had been immunised with a pertussis containing vaccine in pregnancy in England [3].

Following the high levels of activity, confirmed cases of pertussis first fell in the fourth quarter of 2012 and this decrease continued in the first and second quarter of 2013 with a slight increase in the third quarter followed by a further decrease in the fourth quarter in line with the usual seasonal pattern. The highest number of laboratory confirmed cases in England continued to occur in individuals aged 15 years and over who accounted for 85% of cases (640/750); this compares with 88% (3019/3450) of cases in this age group reported in the fourth quarter of 2012. Whilst disease incidence continued to be highest in infants <3 months, the proportion of cases in this age group remained stable at 2% (12/750) in the fourth quarter of 2013. Confirmed cases in infants less than 3 months were 83% lower in the fourth quarter of 2013 (12 cases) than the equivalent quarter in 2012 (72 cases). One pertussis related infant death was reported for infants tested between October and December 2013 compared to 4 deaths in the same quarter in 2012.

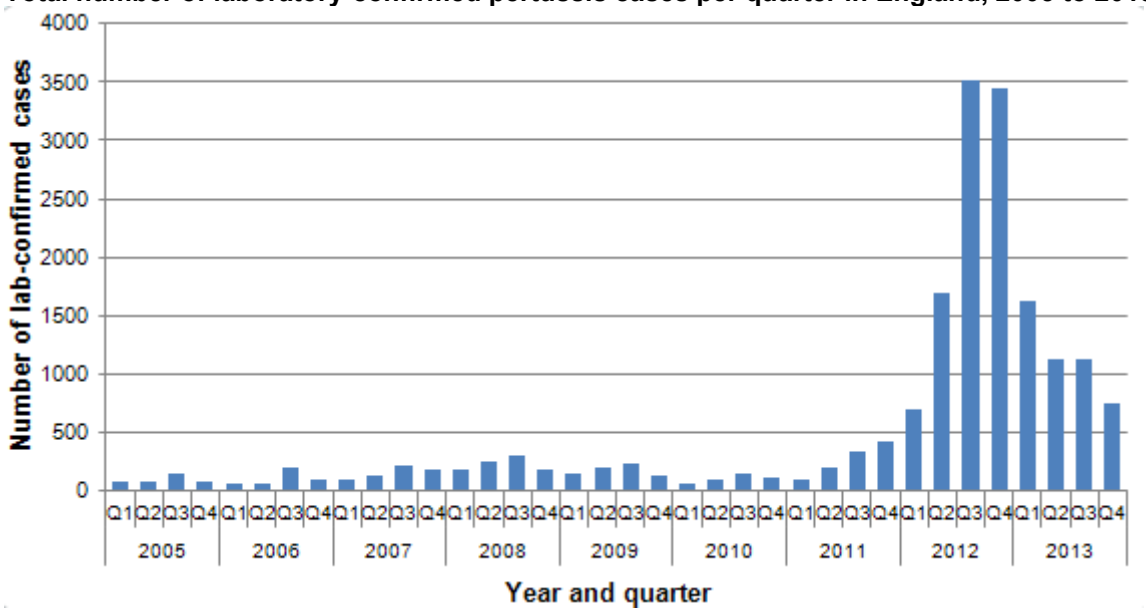
These early data in young infants following the introduction of a programme to immunise pregnant women are encouraging. It is important to be aware, however, that raised levels of pertussis persist in older age groups. Women should continue to be encouraged to be immunised against pertussis during pregnancy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

Laboratory-confirmed cases of pertussis by age and testing method in England, October to December 2013

Age group	Culture	PCR	Serology	Oral fluid only	Total
<3 months	7	5	–	–	12
3-5 months	1*	–	–	–	1
6-11 months	–	–	–	–	–
1-4 years	2	2	20	1	25
5-9 years	–	–	18	7	25
10-14 years	–	–	44	3	47
15+ years	16	2	619	3*	640
Total	**26**	**9**	**701**	**14**	**750**

* Figures corrected on 3/4/2014.

Total number of laboratory-confirmed pertussis cases per quarter in England, 2005 to 2013



Laboratory investigation

Bordetella pertussis PCR (for hospitalised cases <1 year old) and serological investigation by estimation of anti-pertussis toxin (PT) IgG antibody levels for older children and adults are provided by the Respiratory and Vaccine Preventable Bacteria Reference Unit (RVPBRU) at the Public Health England (PHE) Microbiology Services Division Colindale. The PCR service for hospitalised infants under one year requires either a pernasal swab or nasopharyngeal aspirate to be sent as soon as possible post-onset; for the pertussis serology service for older children and adults not less than 400 µl of separated serum should be sent at least 2-3 weeks post-onset. Serology testing is not suitable for any individual who has been immunised against pertussis in the last year. The laboratory also encourages submission of all *Bordetella pertussis* isolates for confirmation and national surveillance purposes. Since January 2013, the RVPBRU is offering an oral fluid (OF) testing service for clinically suspected cases reported to the local Health Protection Team, who are aged between 5-16 years (<17yrs) and for children aged five to <17 years from 14 October 2013 who have been coughing for more than more weeks and have not been immunised against pertussis in the previous year. A new PCR community testing pilot for all age groups began at the end May 2013 and requires a pernasal and OF swab to be sent to RVPBRU for testing.

Further information is available on the HPA legacy website at http://www.hpa.org.uk/cfi/rsil/bordetella.htm.

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Invasive meningococcal infections laboratory reports in England: Q4/2013

In England between October and December 2013, a total of 182 cases of invasive meningococcal disease (IMD) were reported to Public Health England [1]. This was a 90% increase from the 96 cases reported in the third quarter of 2013 [2], in line with seasonal patterns, and a 4% decrease from the 190 cases reported in the fourth quarter of 2012. Five cases of IMD were reported in the fourth quarter of 2013 in Wales.

Of the 182 cases of IMD reported in England; 65% (118) were capsular group B, 16% (29) group Y, 15% (28) group W and 3% (6) group C. There were no reported cases for capsular groups A, X and Z/E (table 1) in England during this period. All of the five IMD cases reported to PHE from Wales were capsular group B.

Fifty per cent (91/182) of IMD cases reported in England were female. In England, children aged less than 1 year accounted for 25% (46/182) of the IMD reports. Half of infant cases (50%; [23/46]) were in infants aged between zero and five months, and of these; 21 had capsular group B and two were group Y. In 23 infants with IMD aged between six and 11 months; 19 were group B, two were group W, 1one was group Y and one was ungrouped. A fifth (20%; [37/182]) of cases were in children aged between one and four years of which the majority were

capsular group B (89%; [33/37]), three were group W and one was group C (table 2). Over half of the capsular group B cases (62%; [73/118]) were in children aged under five years of age. Of the 29 capsular group Y cases, 59% (17/29) were in adults aged 45 and over and 17% (5/29) were in individuals aged 20-44 years. Individuals aged 45 years and over accounted for 43% (12/28) of all capsular group W disease followed by individuals aged between 15 and 24 years (32%; [9/28]).

Table 1. Invasive meningococcal disease in England by capsular group and laboratory testing method, weeks 40-52 (Q4), 2012 and 2013

Capsular groups †	Method of diagnosis						Total		Cumulative total, weeks 1 to 52 (Q1 to Q4)	
	Blood and/or CSF isolate		Blood and/or CSF non-culture		Other sites culture					
	2012 (Q4)	2013 (Q4)	2012 (Q4)	2013 (Q4)	2012 (Q4)	2013 (Q4)	**2012 (Q4)**	**2013 (Q4)**	**2012**	**2013**
B*	68	57	74	59	2	2	144	118	582	535
C	4	3	1	3	–	–	5	6	28	30
W	11	25	3	3	–	–	14	28	42	76
Y	21	23	2	4	4	2	27	29	77	78
Z/E	–	–	–	–	–	–	–	–	1	–
Ungrouped	–	–	–	1	–	–	–	1	5	3
Ungroupable*	–	–	–	–	–	–	–	–	3	6
Total	**104**	**108**	**80**	**70**	**6**	**4**	**190**	**182**	**738**	**728**

† No cases capsular groups A or X were confirmed during any of the periods summarised in the table.
* Ungroupable refers to invasive clinical meningococcal isolates that were non-groupable, while ungrouped cases refers to culture-negative but PCR screen (*ctrA*) positive and negative for the four genogroups [B, C, W and Y] routinely tested for.

* Erroneous group allocation corrected on 3/4/2014.

Table 2. Invasive meningococcal disease in England by capsular group and age at diagnosis, weeks 40-52 (Q4), 2013

Capsular groups †	<1	1-4	5-9	10-14	15-19	20-24	25-44	45-64	65+	Total
B	40	33	9	4	13	3	5	6	5	**118**
C	–	1	1	–	–	1	2	–	1	**6**
W	2	3	–	1	5	4	1	4	8	**28**
Y	3	–	1	–	3	1	4	8	9	**29**
Ungrouped	1	–	–	–	–	–	–	–	–	**1**
Total	**46**	**37**	**11**	**5**	**21**	**9**	**12**	**18**	**23**	**182**

† No cases of capsular groups A, X, Z/E or ungroupable cases were reported during this quarter. 2013.

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Early evidence of the impact of the national rotavirus immunisation programme

This report presents (i) provisional vaccine coverage data for one of the first monthly cohorts of children in England to be 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. These data show an excellent start to the national programme; 93% of the children evaluated at 25 weeks of age had received the first dose and 88% had completed the two dose course. Laboratory reports of rotavirus for the period July 2013 to March 2014 were 70% 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 new Green Book chapter on rotavirus 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 is at: www.gov.uk/government/organisations/public-health-england/series/immunisation.

Vaccine coverage data collection

Early provisional 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.

Data for children reaching 25 weeks in February 2014 were automatically uploaded to the ImmForm survey for 49% of all GP practices in England (representing around 25,500 children). This is less than the 90% of practices who could potentially upload data as one major GP IT system supplier was unable contribute to this month's survey. The proportion of practices represented varied by area team (range 10-80% of all practices in area team) and so only national coverage estimates for February are presented.

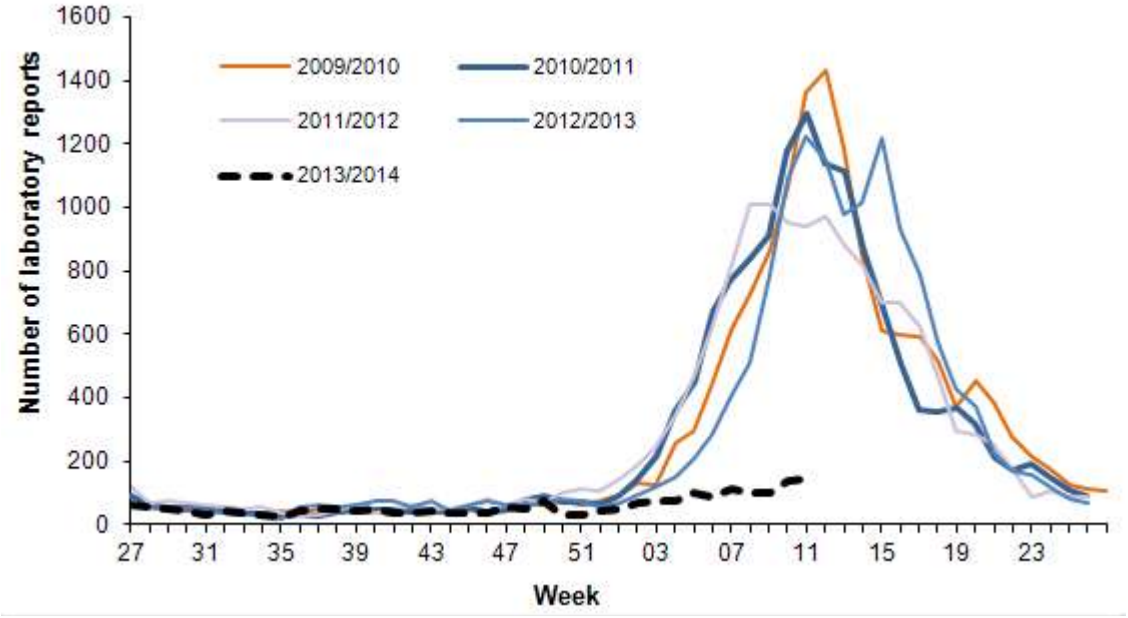
Rotavirus vaccine coverage data for children who reached 25 weeks during February was 93% for the one dose; 88% had completed the two dose course.

Data for March will be uploaded during April when it is expected that the proportion of reporting practices will increase to approximately 90% of all GP practices in England. This will allow the next report on rotavirus coverage to be published at the area team level.

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 2013/14 season to date (1 July 2013 to 16 March 2014) the number of rotavirus laboratory reports are 70 per cent lower than the 10-season average for the same period in the seasons 2003/2004 to 2012/2013 (see figure) [6]. The observed decrease in rotavirus activity is likely to be associated with the introduction of the oral vaccine in July 2013.

Seasonal comparison of laboratory reports of rotavirus 2009/2010 to 2013/14: England



Source: PHE GEZI. Note: In order to capture the winter peak of rotavirus activity in one season, for reporting purposes, the rotavirus season runs from week 27 in year 1 to week 26 in year 2, ie 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 here 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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Quarterly vaccination coverage statistics for children aged up to five years in the UK (COVER programme): October to December 2013

Commentary on the third quarterly report since re-organisation of the NHS in England

Coverage of all antigens evaluated at one, two and five years of age in October to December 2013 remained the same as or very similar to the previous quarter, with the exception of coverage of the second dose of MenC evaluated at one year. As reported in the last COVER report, the decrease in coverage of this antigen appears to be related to the removal of the second dose of MenC at age 16 weeks (four months) from the routine schedule for infants from 1 June 2013 [1,2]. Across the UK a decrease of 1.5% (to 92.1%) was observed for MenC2 coverage and was seen in all countries (range –1.3% to –3.1%). Although the children evaluated at 12 months (born between October and December 2012) were scheduled to have their primary MenC immunisations at 3 and 4 months (between January and April 2013) some may not have received both doses on time. Those infants who received a first dose of Menjugate Kit® but not a second dose by 1 June 2013, did not need a second dose after 1 June 2013. Those who received a first dose of Meningitec® but not a second dose by 1 June 2013 should have received a second dose of vaccine, which should preferably be either Meningitec® or Menjugate Kit® [2]. This schedule change will adversely impact on future quarterly MenC2 coverage evaluations until the April to June 2013 quarter, when infants exclusively offered one dose of MenC will be evaluated.

UK MMR coverage at two years increased by 0.1% to 93.3%, and for the first time marginally exceeds PCV and Hib/MenC booster coverage (also offered at 12-13 months) which remained at 93.2% this quarter. All three devolved administrations achieved at least 95% coverage. Despite achieving a record high coverage for MMR at two years of 92.9% and with eleven of the 25 area teams achieving at least 95%, England is the only country in the UK below the WHO target. Coverage of the second dose of MMR in the UK remained at 89.1%, with Scotland, Wales, Northern Ireland and 18 English area teams achieving at least 90%.

New format for COVER data in England from April 2013

From April 2013, commissioning and coordination of immunisation programmes is the responsibility of NHS England [3]. Given the transfer of responsibility for public health, however, to local authorities (LAs) on 1st April 2013, population vaccination coverage is included in the Public Health Outcomes Framework (PHOF) (Indicator 3.3) [4]. In line with all the outcomes indicators, population vaccination coverage is expected to be collected for LA resident population. Primary Care Trusts (PCT) coverage collections in the NHS have been based around responsible population (i.e. patients who are registered with a GP in the PCT or unregistered patients who reside in the PCT area).

In order to ensure that accurate PHOF vaccine coverage data are available, the Health Protection Agency (HPA) Immunisation Department surveyed Primary Care Trusts (PCTs) immunisation coordinators and Child Health Information System (CHIS) managers in February 2013. The aim was to understand which CHIS systems can currently produce reliable LA resident population data. Several responses indicated that using LA resident population data would lead to a drop in vaccination coverage because the organisation with responsibility for delivery of the immunisation programme is different from the organisation with responsibility for data. It was therefore proposed, and agreed with the PHOF team, that vaccination coverage data (Indicator 3.3) be collected by LA responsible population – meaning coverage would be supplied for patients registered with GPs based in that LA and for unregistered patients who were resident in that LA. For LAs that are co-terminus with a PCT this will approximate to the PCT responsible population. Those LAs not coterminous with PCT boundaries may need to collate data from more than one CHIS to provide LA responsible population coverage data.

From April 2013, quarterly request parameters for COVER data in England have been simplified in line with the PHOF outcome sub-indicators [4], and are requested in two formats, (i) by PCT responsible population to allow for continuity with historical data and (ii) by LA responsible population (as defined above). Individual PCT, and where available LA, data are published on the HPA website [5]. To reflect the new NHS organisations in England COVER reports present coverage data by English Area Teams (tables 1a-4a). Former Strategic Health Authorities tabulations are also provided for historical comparisons (tables 1b-4b).

Pilot collection of GP practice-level COVER data by NHS England in February 2014

To enable NHS England to commission effectively and to tackle inequalities in access locally, vaccine coverage data also needs to be collected at a lower geography. During the September to December 2013 (Q3) collection period NHS England ran a parallel pilot, collecting GP practice-level data for the first three quarters of 2013/14 (April to December 2013 inclusive), where data was submitted directly by CHIS providers to the Unify2 system. This collection included data for unregistered children aggregated at CCG level based on patient's residence. This

approach was been ratified by the Public Health Steering Group leads within NHS England, Department of Health and PHE.

The new collection only takes place in England and experimental CCG level results will be published on the NHS England website on the 28th March 2014.

This new GP-level quarterly collection, which matches the existing COVER parameters, will continue to run in parallel with the existing routine quarterly COVER return until such time as the data quality is sufficiently assured. Longer term, both collections should be replaced by the Maternity and Children's Dataset (MCDS). The Health & Social Care Information Centre (HSCIC) are developing a children and young people's dataset as part of the MCDS. Consideration will be given to the collection of historical data for the full MCDS back to April 2013. The MCDS will run in parallel with the collection of the existing aggregate returns until it is of sufficient quality to be used to populate the PHOF indicators. More details about the dataset are available on the HSCIC website at http://www.hscic.gov.uk/maternityandchildren.

For further clarification regarding the new GP practice-level collection, please contact: england.dataflows@nhs.net.

Results for October to December 2013

This report presents quarterly coverage data for children in the UK who reached their first, second, or fifth birthday during the evaluation quarter (October to December 2013). This is the third quarterly data to be collected since the re-organisation of the NHS in England.

Children who reached their first birthday in the quarter (born October to December 2012) would have been scheduled to receive their primary vaccinations according to the schedule introduced on 4 September 2006 [6] (three doses diphtheria, tetanus, acellular pertussis, polio, and *Haemophilus influenzae* type b vaccine (DTaP/IPV/Hib vaccine), two doses each of meningococcal serogroup C conjugate vaccine (MenC vaccine) and pneumococcal conjugate vaccine (PCV).

Children who reached their second birthday in the quarter (born October to December 2011) would have been scheduled to receive their third dose primary vaccinations between February and April 2012, and their first measles, mumps, and rubella (MMR) vaccination, a booster dose of Hib and MenC vaccine (given as a combined Hib/MenC vaccine) and PCV vaccine at the same visit at 12 months of age, between November 2012 and January 2013 [6].

Children who reached their fifth birthday in the quarter (born October to December 2008) would have been scheduled to receive their third dose DTaP/IPV/Hib and second MenC and PCV vaccinations between February and April 2009. They would have been scheduled to receive their first MMR between November 2009 and January 2010, their pre-school diphtheria, tetanus, acellular pertussis, inactivated polio booster and second dose MMR from January 2012. Children born between October and December 2008 were scheduled to receive Hib/MenC booster vaccine at 12 months and PCV booster vaccine at 13 months [7].

Methods for the COVER data collection are described on the PHE health protection website [8].

Participation and data quality

Data were received from all Health Boards (HBs) in Scotland, Northern Ireland and Wales. In England, Area Teams (ATs) and Child Health Records Departments (CHRDs) submitted data for all but one former PCT in London. A further five former PCTs reported general data quality issues. This is the third quarter collecting data from the new structures in the reorganised NHS and requesting coverage data in two formats; by PCT and by Local Authority (LA). There are some challenges in maintaining data flows for the PCT level collection as these organisations formally ceased to exist on 1st April 2013 and some Child Health Information Systems (CHISs) have moved to extracting at the Clinical Commission Group (CCG) level; these data were aggregated to PCT level based on GGC postcode. In addition, many CHISs are not able to currently provide accurate LA level coverage data by the resident population, however, where LAs are coterminous with a former PCT boundary coverage data for the responsible population PCT will approximate to the LA responsible population [1]. For those LAs not coterminous with PCT boundaries many areas were not able to provide LA responsible population coverage data. Coverage data by individual PCT and LA, where available, will be published on the HPA legacy website [9].

Coverage at 12 months

UK coverage at 12 months for DTaP/IPV/Hib3 remained at 94.8% and PCV2 decreased by 0.2% (to 94.5%) compared to the previous quarter (table 1a) [1]. Country-specific comparisons for minimum coverage levels achieved for DTaP/IPV/Hib3 and PCV2 evaluated at 12 months show Scotland and Northern Ireland achieved at least 97% coverage, Wales at least 96% and England at least 94%; within England 18 ATs achieved at least 95% (tables 1a).

UK coverage at 12 months for MenC2 decreased by a further 1.5% this quarter compared to the previous, following a 1% decrease between the July to September and April to June 2013 quarters. This drop is related to the removal of the second dose of MenC at age 16 weeks (four months) from the routine schedule for infants from 1 June 2013 (see commentary above).

Within the UK, 125 of the 175 participating PCTs/HBs (72%) achieved at least 95% coverage at 12 months for DTaP/IPV/Hib3, 117 (67%) achieved 95% for two doses of PCV, and 43 (25%) for two doses of MenC vaccine.

Table 1a. Completed October to December 2013 *(July to September 2013)*

Country and English Area Team (AT code)	Number of PCTs/HBs†	DTaP/IPV/Hib3 %	MenC2 %	PCV2 %
United Kingdom	**175** ¥	**94.8** *(94.8)*	**92.1** *(93.6)*	**94.5** (*94.7*)
Wales	**7**	**96.5** (*96.7*)	**93.5** (*95.9*)	**96.2** (*96.4*)
Northern Ireland	**4**	**97.2** (*97.4*)	**94.1** (*96.8*)	**97.2** (*97.4*)
Scotland	**14**	**97.7** (*97.6*)	**93.7** (*96.8*)	**97.8** (*97.7*)
England (Total)	**150** ¥	**94.4** (*94.3*)	**91.8** (*93.1*)	**94.1** (*94.3*)
English Area Teams				
Cheshire, Warrington and Wirral (Q44)	4	96.7 (*96.8*)	94.0 *(96.0)*	96.5 *(97.1*)
Durham, Darlington and Tees (Q45)	6	96.5 (*96.5*)	93.5 (*96.0*)	96.2 (*96.2*)
Greater Manchester (Q46)	10	96.2 (*96.8*)	92.3 (*94.9*)	96.0 (*96.3*)
Lancashire (Q47)	5	93.9 (*91.0*)	89.8 (*90.2*)	91.7 (*90.5*)
Merseyside (Q48)	4	94.7 (*95.2*)	90.5 (*94.3*)	94.8 (*95.6*)
Cumbria, Northumberland, Tyne and Wear (Q49)	7	97.0 (*97.3*)	94.3 (*96.3*)	96.8 (*97.2*)
N Yorkshire and Humber (Q50)	5	96.1 (*95.9*)	92.8 *(94.5)*	95.7 (*95.9*)
S Yorkshire and Bassetlaw (Q51)	5	95.6 (*96.0*)	92.5 (*94.9*)	95.4 (*95.9*)
W Yorkshire (Q52)	5	96.8 (*96.2*)	94.6 (*96.2*)	96.5 (*95.9*)
Arden, Herefordshire and Worcestershire (Q53)	4	96.8 (*97.0*)	95.3 (*95.5*)	96.4 (*96.7*)
Birmingham and the Black Country (Q54)	8	93.1 (*93.7*)	93.8 (*92.5*)	93.0 (*93.6*)
Derbyshire and Nottinghamshire (Q55)	4	95.8 (*95.5*)	93.5 (*94.3*)	95.6 (*95.1*)
East Anglia (Q56)	5	95.8 (*95.8*)	92.0 (*94.5*)	95.3 (*95.4*)
Essex (Q57)	5	96.1 (*96.4*)	93.3 (*95.7*)	96.0 (*96.2*)
Hertfordshire and the S Midlands (Q58)	5	97.2 (*96.8*)	93.6 (*95.8*)	96.9 (*96.8*)
Leicestershire and Lincolnshire (Q59)	3	96.7 (*96.9*)	93.2 (*95.6*)	96.4 (*96.9*)
Shropshire and Staffordshire (Q60)	5	97.0 (*97.6*)	96.2 *(96.8)*	97.0 (*97.3*)
Bath, Gloucestershire, Swindon and Wiltshire (Q64)	4	96.3 (*96.4*)	96.8 (*95.5*)	96.1 (*96.3*)
Bristol, N Somerset, Somerset and S Gloucestershire (Q65)	4	96.1 (*96.2*)	97.5 (*95.3*)	96.2 (*96.2*)
Devon, Cornwall and Isles of Scilly (Q66)	4	96.2 (*95.4*)	95.7 (*93.9*)	95.9 (*95.3*)
Kent and Medway (Q67)	3	92.3 (*94.3*)	95.6 (*93.2*)	92.2 (*94.1)*
Surrey and Sussex (Q68)	5	90.0 (*89.6*)	86.8 (*87.8)*	89.6 (*90.2*)
Thames Valley (Q69)	4	94.7 (*95.1*)	89.7 (*93.7*)	94.3 (*94.7*)
Wessex (Q70)	6	97.2 (*95.7*)	94.7 (*95.0*)	95.8 (*95.7*)
London (Q71)	30 ¥	89.3 (*89.3*)	85.3 (*87.2*)	89.3 (8 *9.5*)

† Primary Care Trusts/health boards
¥ Data from one PCT omitted due to data quality issues.

Table 1b. UK completed primary immunisations at 12 months by former Strategic Health Authority, England: October to December 2013 *(July to September 2013)*

Former English Strategic Health Authorities (SHAs)	PCT/HB†	DTaP/IPV /Hib3 %	MenC%	PCV2%
North East	12	96.7 (*96.8*)	96.8 (*96.2*)	96.4 (*96.5*)
North West	24	95.7 (*95.5*)	92.0 (*94.1*)	95.1 (*95.3*)
Yorkshire and Humber	14	96.3 (*96.1*)	93.5 (*95.4*)	96.0 (*95.9*)
East Midlands	8	96.5 (*96.5*)	93.3 (*95.3*)	96.2 (*96.3*)
West Midlands	17	95.0 (*95.6*)	94.8 (*94.4*)	94.8 (*95.4*)
East of England	13	96.4 (*96.3*)	93.1 (*95.3*)	96.0 (*96.1*)
London	30 ¥	89.3 (8 *9.3*)	85.3 (*87.2*)	89.3 (*89.5*)
South Central	9	96.1 (*95.4*)	91.8 (*94.5*)	95.2 (*95.2*)
SE Coast	8	90.9 (*91.5*)	90.3 (*90.0*)	90.7 (*91.7*)
South West	14	96.1 (*95.9*)	96.6 (*94.7*)	95.9 (*95.8*)

Primary Care Trusts/health boards
¥ Data from one PCT omitted.

Coverage at 24 months

UK coverage of DTaP/IPV/Hib3 at 24 months remained at 96.6% for the fourth consecutive quarter [1,9-10]. Surrey and Sussex (Q68) and London (Q71) are the only ATs with DTaP/IPV/Hib3 coverage below the 95% target at 92.4% and 93.3% respectively (table 2a).

UK PCV and Hib/MenC booster coverage remained at 93.2% compared to the last quarter (table 2a) [1]. Country-specific comparisons for minimum coverage levels achieved for both PCV and Hib/MenC boosters evaluated at 24 months show Scotland, Wales and Northern Ireland achieved at least 95% coverage, and England at least 92%. Within England 8 ATs achieved at least 95%, and only Birmingham and the Black Country (Q54), Surrey and Sussex (Q68) and London (Q71) area teams achieved coverage below 92% for either or both booster doses (table 2a).

UK MMR coverage increased by 0.1% to 93.3%, marginally exceeding PCV and Hib/MenC booster coverage for the first time (table 2a) [1]. All three devolved administrations achieved at least 95%. Despite having coverage at a record high of 92.9% and eleven of the 25 English ATs achieving 95%, England is the only country in the UK below the WHO target (table 2a).

Country-specific comparisons for minimum coverage levels achieved for all four immunisations evaluated at 24 months show Scotland, Wales, and Northern Ireland achieved at least 95% coverage and England achieved at least 92%; within England eight ATs achieved 95% for all four immunisations (table 2a).

Within the UK, at least 95% coverage at 24 months was achieved by 140 of the 175 PCTs/HBs (80%) for DTaP/IPV/Hib3, 82 for Hib/MenC booster and PCV booster (47%), and 79 (45%) for MMR.

Table 2a. Completed primary immunisations at 24 months by country and English Area Team: October to December *2013 (July to September 2013)*

Country and English Area Team (AT code*)	PCT/HB†	DTaP/IPV/Hib3 %	PCV booster %	Hib/MenC %	MMR1 %
United Kingdom	**175**	**96.6** (*96.6*)	**93.2** (*93.2*)	**93.2** (*93.4*)	**93.3** (*93.2*)
Wales	**7**	**97.8** (*97.9*)	**96.0** (*95.5*)	**95.4** (*95.8*)	**96.6** (*98.4*)
Northern Ireland	**4**	**98.6** (*98.8*)	**96.3** (*95.9*)	**96.5** (*96.0*)	**96.3** (*96.0*)
Scotland	**14**	**98.2** (*98.2*)	**95.6** (*95.9*)	**95.7** (*96.1*)	**95.6** (*95.6*)
England (Total)	**150**	**96.3** (*96.3*)	**92.8** (*92.7*)	**92.7** (*92.7*)	**92.9** (*92.7*)
English Area Teams					
Q44	4	98.0 (*98.0*)	94.8 (*95.0*)	95.8 (*95.7*)	95.3 (*95.1*)
Q45	6	97.5 (*97.6*)	96.4 (*95.6*)	96.2 (*95.9*)	94.8 (*95.4*)
Q46	10	97.6 (*97.8*)	94.9 (*95.0*)	94.2 (*94.7*)	95.2 (*95.6*)
Q47	5	96.9 (*97.1*)	90.4 (*92.3*)	90.0 (*92.2*)	91.0 (*92.2*)
Q48	4	97.8 (*96.7*)	96.2 (*94.6*)	95.8 (*94.5*)	96.5 (*94.4*)
Q49	7	98.6 (*98.2*)	96.6 (*95.9*)	96.5 (*96.1*)	96.8 (*96.3*)
Q50	5	97.3 (*97.1*)	95.5 (95.2)	94.6 (*94.6*)	95.7 (*94.6*)
Q51	5	97.4 (*97.1*)	93.5 (*93.1*)	95.4 (*94.8*)	93.5 (*92.3*)
Q52	5	97.7 (*97.9*)	95.5 (*95.9*)	95.8 (*96.1*)	95.2 (*95.5*)
Q53	4	98.0 (*97.9*)	95.6 (*96.1*)	94.6 (*95.7*)	96.2 (*96.2*)
Q54	8	95.3 (*95.5*)	92.1 (*92.3*)	90.6 (*90.9*)	91.9 (*91.4*)
Q55	4	97.9 (*97.9*)	94.9 (*94.9*)	95.0 (*95.4*)	94.7 (*94.5*)
Q56	5	96.3 (*96.8*)	93.6 (*94.0*)	94.1 (*94.6*)	93.0 (*92.9*)
Q57	5	97.5 (*97.4*)	95.6 (*93.9*)	96.2 (*95.3*)	95.0 (*93.5*)
Q58	5	97.3 (*97.4*)	95.5 (*95.5*)	95.7 (*95.9*)	95.1 (*95.2*)
Q59	3	97.6 (*98.0*)	95.7 (*95.8*)	95.5 (*95.9*)	95.3 (*95.4*)
Q60	5	98.2 (*98.1*)	96.7 (*96.4*)	95.9 (*95.4*)	95.8 (*95.7*)
Q64	4	97.7 (*97.6*)	95.5 (*94.9*)	94.1 (*94.1*)	94.9 (*94.7*)
Q65	4	97.7 (*97.6*)	94.9 (*95.0*)	94.6 (*93.2*)	94.8 (*94.7*)
Q66	4	97.0 (*97.3*)	94.7 (*93.6*)	93.8 (*92.2*)	93.7 (*93.5*)
Q67	3	97.5 (*97.7*)	93.3 (*94.4*)	92.7 (*93.8*)	93.2 (*94.6*)
Q68	5	92.4 (*91.9*)	86.6 (*86.9*)	86.9 (*88.3*)	87.9 (*88.6*)
Q69	4	96.1 (*96.4*)	93.2 (*93.6*)	93.7 (*93.5*)	94.0 (*93.9*)
Q70	6	96.9 (*96.4*)	94.4 (*93.9*)	93.8 (*93.3*)	94.1 (*93.8*)
Q71	30 ¥	93.3 (*93.3*)	86.6 (*86.4*)	86.9 (*86.9*)	87.3 (*87.0*)

* See table 1a for key to Area Team organisational code
† Primary Care Trusts/health boards
¥ Data from one PCT omitted.

Table 2b. Completed primary immunisations at 12 months by former Strategic Health Authority, England: October to December 2013 (*July to September 2013*)

Former English Strategic Health Authorities (SHAs)	PCT/HB†	DTaP/IPV /Hib3 %	PCV booster %	Hib/MenC %	MMR1 %
North East	12	98.1 (*97.9*)	95.6 (*95.6*)	96.4 (*95.9*)	95.8 (*95.7*)
North West	24	97.6 (*97.6*)	94.3 (*94.5*)	94.0 (*94.5*)	94.7 (*94.8*)
Yorkshire and Humber	14	97.5 (*97.5*)	95.0 (*95.0*)	95.3 (*95.3*)	94.9 (*94.4*)
East Midlands	8	97.9 (*98.0*)	95.4 (*95.6*)	95.5 (*95.8*)	95.2 (*95.2*)
West Midlands	17	96.7 (*96.8*)	94.1 (*94.3*)	93.0 (*93.3*)	93.9 (*93.7*)
East of England	13	96.9 (*97.1*)	94.8 (*94.3*)	95.3 (*95.2*)	94.2 (*93.7*)
London	30 ¥	93.3 (*93.3*)	86.6 (*86.4*)	86.9 (*86.9*)	87.3 (*87.0*)
South Central	9	96.4 (*96.3*)	93.8 (*93.9*)	93.8 (*93.6*)	94.2 (*94.1*)
SE Coast	8	94.4 (*94.1*)	89.2 (*89.8*)	89.1 (*90.4*)	90.0 (*90.9*)
South West	14	97.5 (*97.5*)	94.8 (*94.4*)	94.0 (*93.1*)	94.2 (*94.1*)

† Primary Care Trusts/health boards
¥ Data from one PCT omitted.

Coverage at five years

UK coverage at five years for all antigens evaluated remained similar to the previous quarter. All countries and all but two English ATs (Surrey and Sussex (Q68), and London (Q71)) achieving at least 95% coverage for primary course DTP/Pol3 [1] (tables 3a).

UK coverage of MMR1 at five years remained at 94.8% and all countries and all but one English AT (Surrey and Sussex (Q68) achieved at least 90%. Scotland, Northern Ireland, Wales and 18 English ATs achieved at least 95% coverage for MMR1 and at least 90% for MMR2 at five years (tables 3a).

Coverage of UK DTaP/IPV booster coverage decreased 0.1% to 89.6% with all devolved administrations and all but four English ATs achieving at least 90% coverage.

The five-year birth cohort evaluated this quarter (born between July to September 2008) were the tenth to have had all their primary immunisations scheduled according to the revised schedule from September 2006 when Hib/MenC booster was included for the first time [4]. UK coverage of Hib/MenC decreased 0.2% to 92.6% (table 3a).

Table 3a. UK completed primary immunisations and boosters at five years by country and English Area Team: October to December 2013 (*July to September 2013*)

ENGLAND Area Team (AT) code*	Number of PCTs in AT	Primary		Booster		
		DTaP/ Hib %	MMR1 %	MMR2 %	DTaP/ IPV %	Hib/ MenC
United Kingdom	**175**	**95.9** (*96.2*)	**94.8** (*94.8*)	**89.1** (*89.1*)	**89.6** (*89.7*)	**92.6** (*92.8*)
Wales	**7**	**97.3** (*97.3*)	**97.0** (*98.3*)	**92.6** (*92.7*)	**93.7** (*93.1*)	**94.0** (*94.3*)
N. Ireland	**4**	**98.3** (*98.4*)	**97.3** (*97.6*)	**92.5** (*91.9*)	**93.5** (*92.9*)	**95.6.** (*96.1*)
Scotland	**14**	**98.0** (*98.2*)	**97.2** (*97.3*)	**93.2** (*93.4*)	**94.1** (*94.3*)	**95.9** (*96.0*)
England (Total)	**150**	**95.6** (*95.9*)	**94.4** (*94.3*)	**88.4** (*88.5*)	**88.8** (*89.0*)	**92.1** (*92.3*)
English Area Teams						
Q44	4	96.7 (*97.4*)	96.0 (*96.5*)	90.5 (92.2)	91.7 (*93.3*)	94.6 (*94.8*)
Q45	6	97.1 (*97.2*)	96.2 (*96.2*)	92.5 (*92.4*)	92.9 (*92.3*)	95.1 (*94.8*)
Q46	10	96.4 (*97.2*)	95.9 (*96.3*)	91.9 (*92.2*)	92.1 (*92.0*)	91.7 (*92.2*)
Q47	5	96.6 (*96.9*)	96.3 (*95.9*)	87.8 (*88.3*)	87.4 (*88.6*)	93.4 (*94.2*)
Q48	4	98.2 (*97.6*)	97.7 (*96.5*)	92.5 (*91.9*)	91.7 (*91.9*)	94.3 (*93.6*)
Q49	7	98.5 (*98.4*)	97.5 (*96.3*)	93.2 (*93.7*)	93.8 (*94.7*)	94.3 (*96.6*)
Q50	5	96.8 (*97.0*)	95.2 (*96.0*)	91.3 (*91.4*)	91.5 (*92.0*)	93.3 (*93.9*)
Q51	5	96.9 (*97.1*)	95.3 (*95.0*)	90.1 (*90.2*)	90.9 (*91.5*)	95.2 (*94.9*)
Q52	5	97.5 (*97.7*)	96.3 (*96.3*)	92.3 (*92.1*)	93.6 (*92.7*)	95.9 (*95.9*)
Q53	4	97.6 (*97.7*)	96.8 (*96.3*)	93.3 (*92.6*)	94.4 (*94.2*)	91.8 (*91.8*)
Q54	8	96.2 (*96.4*)	94.6 (*94.4*)	86.6 (*87.2*)	87.1 (*87.9*)	92.4 (*92.2*)
Q55	4	97.8 (*97.4*)	96.3 (*95.8*)	91.7 (*90.7*)	92.0 (*91.6*)	94.8 (*94.8*)
Q56	5	95.8 (*96.1*)	93.9 (*93.8*)	88.3 (*88.9*)	89.7 (*90.4*)	92.8 (*93.0*)
Q57	5	95.8 (*97.1*)	95.0 (*94.8*)	91.2 (*91.0*)	92.5 (*92.1*)	95.6 (*95.5*)
Q58	5	96.5 (*96.6*)	95.2 (*95.3*)	92.6 (*92.3*)	93.3 (*93.6*)	94.5 (*94.9*)
Q59	3	97.2 (*97.2*)	95.7 (*96.3*)	90.4 (*91.3*)	94.9 (*95.5*)	93.4 (*94.0*)
Q60	5	97.9 (*97.7*)	96.3 (*96.6*)	92.9 (*92.6*)	93.7 (*93.6*)	96.2 (*96.1*)
Q64	4	96.5 (*96.5*)	95.3 (*95.5*)	91.6 (*90.7*)	92.4 (*92.3*)	93.7 (*93.3*)
Q65	4	97.6 (*97.6*)	96.0 (*95.8*)	90.7 (*90.0*)	91.9 (*91.4*)	93.3 (*93.4*)
Q66	4	97.3 (*97.1*)	95.8 (*95.2*)	90.1 (*89.4*)	91.7 (*91.1*)	93.1 (*93.5*)
Q67	3	95.8 (*96.9*)	95.3 (*95.4*)	89.8 (*90.7*)	92.3 (*92.7*)	93.2 (*93.5*)
Q68	5	88.6 (*90.6*)	89.6 (89.7)	80.9 (*81.8*)	81.5 (*82.6*)	84.3 (*82.3*)
Q69	4	95.8 (*95.5*)	94.5 (*94.7*)	89.1 (*90.2*)	88.9 (*89.9*)	93.6 (*93.4*)
Q70	6	96.0 (*95.9*)	94.6 (*94.1*)	90.0 (*89.7*)	91.0 (*90.6*)	92.2 (*91.6*)
Q71	30 ¥	92.3 (*93.2*)	90.6 (*90.6*)	80.1 (*80.2*)	78.3 (*78.8*)	87.3 (*87.9*)

* See table 1a for key to Area Team organisational code.
¥ Data from one PCT omitted.

3b. Completed primary immunisations and boosters at five years by former Strategic Health Authority, England: October to December 2013 (*July to September 2013*)

Former English SHAs	PCT/ HB †	Primary		Booster		
		DTaP/IPV /Hib3 %	MenC%	MMR2 %	DTaP/ IPV %	Hib/ MenC
North East	12	97.8 (*97.8*)	97.0 (*96.2*)	92.8 (*93.0*)	93.4 (*93.5*)	95.1 (*95.8*)
North West	24	96.9 (*97.3*)	96.4 (*96.3*)	91.1 (*91.5*)	91.2 (*91.7*)	92.9 (*93.3*)
Yorkshire and Humber	14	97.2 (*97.3*)	95.8 (*95.9*)	91.6 (*91.6*)	92.4 (*92.1*)	95.0 *(95.1*)
East Midlands	8	97.5 (*97.3*)	95.9 (*96.0*)	91.6 (*91.4*)	93.5 (*93.9*)	94.1 (*94.5*)
West Midlands	17	97.0 (*97.1*)	95.6 (*95.5*)	90.0 (*90.0)*	90.7 (*91.0*)	93.2 (*93.1*)
East of England	13	96.2 *(96.5*)	94.6 (*94.4*)	90.4 (*90.4*)	91.7 (*91.7*)	94.3 (*94.3*)
London	30 ¥	92.3 (*93.2*)	90.6 (*90.6*)	80.1 (*80.2*)	78.3 (*78.8*)	87.3 (*87.9*)
South Central	9	96.0 (*95.6*)	94.7 (*94.6*)	89.6 (*90.1*)	89.8 (*90.4*)	92.8 (*92.5*)
SE Coast	8	91.3 (*92.6*)	91.7 (*91.9*)	84.3 (*85.2*)	85.6 (*86.4*)	87.6 (*87.0*)
South West	14	96.9 (*97.0*)	95.4 (*95.3*)	90.6 (*90.0*)	91.9 (*91.5*)	93.3 (*93.3*)

† Primary Care Trusts/health boards
¥ Data from one PCT omitted.

Neonatal hepatitis B vaccine coverage in England: October to December 2013

Vaccine coverage data in England for three doses of hepatitis B vaccine in infants, born to hepatitis B surface antigen (HBsAg) positive mothers, who reached the age of one year in this quarter (ie those born between October to December 2011), and coverage of four doses of vaccine in infants who reached two years of age (ie those born between October to December 2012) are presented by Area Team (table 4a). Table 4b shows coverage by SHA for historical comparison. For both tables coverage for the previous quarter, October to December 2013, is given in brackets [1].

One hundred and twenty-five of the 151 former PCTs provided 12 month data this quarter (83%), and 127 provided 24 month data, compared to 114 in the previous quarter [1]. The quality of these data is variable and should be interpreted with caution. Where a zero was reported a check was made to ensure that this was a true zero rather than no data available. Forty PCTs provided zero returns for the 12 month data, and for the 24 month data 41 were zero returns. Thirteen of the 25 ATs provided data for the whole area (table 4a) and two former SHAs reported data from all former PCTs (table 4b). Compared to last quarter, 12 month coverage of three doses of Hep B in England decreased by 1% to 84% and coverage of four doses at 24 months decreased by 2% to 67% [1].

Table 4a. Neonatal hepatitis B coverage in England by English Area Team: October to December 2013 (*July to September 2013*)

Area Team (AT code)	PCT returns with 12 month data	12 month deno-minator	Coverage at 12 months	PCT returns with 24 month data	24 month deno-minator	Coverage at 24 months
Q44	4 of 4	2	50 (*100*)	4 of 4	3	100 (*100*)
Q45	2 of 6	0	– (–)	2 of 6	0	– (*100*)
Q46	9 of 10	82	88 (*76*)	9 of 10	84	87 (*66*)
Q47	5 of 5	0	– (–)	5 of 5	0	– (–)
Q48	4 of 4	9	89 (*90*)	4 of 4	1	0 (*100*)
Q49	6 of 7	12	92 (*100*)	6 of 7	8	100 (*75*)
Q50	3 of 5	2	100 (*75*)	4 of 5	3	100 (–)
Q51	3 of 5	7	100 (*86*)	3 of 5	5	60 (*100*)
Q52	5 of 5	31	90 (*100*)	5 of 5	22	77 (*100*)
Q53	3 of 4	7	100 (*100*)	3 of 4	9	89 (*86*)
Q54	3 of 8	19	90 (*77*)	4 of 8	16	75 (*86*)
Q55	2 of 4	13	85 (*100*)	2 of 4	7	86 (*85*)
Q56	5 of 5	16	69 (*89*)	5 of 5	6	100 (*100*)
Q57	5 of 5	19	16 (*90*)	5 of 5	17	29 (*100*)
Q58	5 of 5	28	97 (*97*)	5 of 5	26	88 (*66*)
Q59	1 of 3	0	– (–)	1 of 3	0	– (*100*)
Q60	5 of 5	9	100 (*100*)	5 of 5	7	100 (*100*)
Q64	4 of 4	7	86 (*100*)	4 of 4	6	100 (*100*)
Q65	4 of 4	0	– (–)	4 of 4	1	100 (0)
Q66	4 of 4	3	100 (*100*)	4 of 4	1	100(–)
Q67	3 of 3	16	63 (*4 6*)	3 of 3	9	33 (*50*)
Q68	3 of 5	7	100 (*60*)	3 of 5	11	64 (*75*)
Q69	4 of 4	37	100 (*100*)	4 of 4	19	95 (*100*)
Q70	5 of 6	6	83 (*50*)	5 of 6	7	100 (*75*)
Q71	28 of 31	256	82 (*72*)	28 of 31	267	74 (*57*)
England	**125 of 151**	**588**	**84 (*85*)**	**127 of 151**	**622**	**67 (*69*)**

Notes: " – " indicates "no data available" for the denominator but "not applicable" for coverage; see table 1a for key to Area Team organisational code.

Table 4b. Neonatal hepatitis B coverage in England by fromer Strategic Health Authority: July to October to December 2013 (*July to September 2013*)

English SHAs	PCT returns with 12 month data	12 month deno-minator	Coverage at 12 months	PCT returns with 24 month data	24 month deno-minator	Coverage at 24 months
North East	8 of 12	12	92 (*100*)	8 of 12	8	100 *(79)*
North West	22 of 24	93	87 (*80*)	22 of 24	88	86 *(68)*
Yorks. & Humber	10 of 14	40	93 *(95*)	11 of 14	30	77 *(100)*
East Midlands	5 of 9	24	92 (*95)*	5 of 9	11	91 *(55)*
West Midlands	11 of 17	35	94 (*91*)	12 of 17	32	84 *(86)*
East of England	13 of 13	47	53 (*95*)	13 of 13	35	60 *(94)*
London	28 of 31	256	82 (*81*)	28 of 31	354	56 *(57)*
South Central	8 of 9	48	98 (*100*)	8 of 9	35	94 *(98)*
SE Coast	6 of 8	23	74 (5 *2*)	6 of 8	20	50 *(62)*
South West	14 of 14	10	90 (*86*)	14 of 14	9	100 *(78)*
England	**125 of 151**	**588**	**84 (*85)***	**127 of 151**	**622**	**67 *(69)***

Relevant links for country-specific coverage data

England: http://www.ic.nhs.uk/statistics-and-data-collections/health-and-lifestyles/immunisation
Northern Ireland:
http://www.publichealthagency.org/directorate-public-health/health-protection/vaccination-coverage
Scotland: http://www.isdscotland.org/Health-Topics/Child-Health/Immunisation/
Wales: http://www.wales.nhs.uk/sitesplus/888/page/43510
Other relevant links: http://www.hpa.org.uk/infections/topics_az/cover/default.htm

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2. Department of Health/Public Health England/NHS England. Changes to the schedule for meningococcal serogroup C conjugate vaccine(NHS England/PHE/DH letter, 7 May 2013).
3. Department of Health. National screening and immunisation programmes. Letter setting out the agreement between the Department of Health, Public Health England and the NHS Commissioning Board 23 August 2012. Available from: http://www.dh.gov.uk/health/2012/08/screening-immunisation-programmes/.
4. Public Health Outcomes Framework 2013 to 2016 and technical updates. Available from: https://www.gov.uk/government/publications/healthy-lives-healthy-people-improving-outcomes-and-supporting-transparency.
5. Health Protection Agency. Quarterly COVER Reports. PHE health protection website: Infections A-Z › Vaccine coverage and COVER › Publications › Quarterly COVER Reports: United Kingdom.
6. Department of Health. Vaccinations at 12 and 13 months of age. Letter from the Chief Medical Officer (interim), the Chief Nursing Officer and the Chief Pharmaceutical Officer 17 November 2010. PL/CMO/2010/3, PL/CNO/2010/4, PL/CPHO/2010/2.
7. Department of Health. Important changes to the childhood immunisation programme. PL CMO (2006) 1.
8. Health Protection Agency. Methods of collection and publication of data for the COVER programme. Available from: http://www.hpa.org.uk/Topics/InfectiousDiseases/InfectionsAZ/VaccineCoverageAndCOVER/COVERMethods.
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10. Public Health England (2013). Vaccination coverage statistics for children up to the age of five years in the United Kingdom, April to June 2013. *HPR* **7**(40), http://www.hpa.org.uk/hpr/archives/2013/hpr4013.pdf.