Public Health England

Health Protection Report
weekly report

Volume 10 Number 8 Published on: **26 February 2016**

Current News

- **Zika virus – epidemiological update**

Infection reports

Vaccine preventable disease

- **Laboratory confirmed reports of invasive meningococcal disease in England: October to December 2015**
- **Laboratory confirmed cases of measles, mumps and rubella, England: October to December 2015**
- **Laboratory reports of *Haemophilus influenzae* by age group and serotype (England and Wales): October to December 2015, and consolidated annual report for 2015**

Vaccine coverage

- **Provisional vaccine coverage estimates for the new meningococcal B (MenB) immunisation programme for England, January 2016**
- **Pertussis Vaccination Programme for Pregnant Women: vaccine coverage estimates in England, October to December 2015**
- **National rotavirus immunisation programme: preliminary data for England, August 2015 to January 2016**

News

Volume 10 Number 8 Published on: **26 February 2016**

Zika virus – epidemiological update

As of 25 February, 42 countries and territories worldwide have reported confirmed cases of autochthonous (locally-acquired) Zika virus infection in the last nine months (see PHE Zika webpage for latest information) for latest information [1].

The outbreak in the Americas continues to spread rapidly, with 31 countries within Central and South America and the Caribbean currently affected by active Zika virus transmission (see PHE Map). It is anticipated that in the coming weeks and months further countries and territories within the geographical range of competent mosquito vectors – especially Aedes aegypti – will report autochthonous transmission.

Within continental Europe, no autochthonous Zika virus cases have been reported. However, active Zika virus transmission is ongoing in a number of the European overseas territories (Aruba, Bonaire, Curaçao, French Guiana, Guadeloupe, Martinique and Saint Martin) [2].

ECDC has recorded 177 imported cases in 15 continental Europe: Austria (1 case), Czech Republic (2), Denmark (1), Finland (2), France (66), Germany (20), Ireland (3), Italy (6), Malta (1), Netherlands (30), Portugal (7), Spain (27), Sweden (2), Slovenia (1) and the UK (8) [2]. Aedes albopictus, a potential vector of Zika virus, is established in most places around the Mediterranean coast [3]. During winter, the risk of transmission of Zika virus infection is extremely low within Europe as the climatic conditions are not suitable for the activity of Aedes albopictus. During the summer season, autochthonous transmission following the introduction of the virus by a viraemic traveller is possible in areas where Aedes albopictus is established [4].

In the UK, the risk of autochthonous, vector-borne Zika virus transmission is deemed to be negligible due to climatic factors (that preclude the Aedes mosquito vector surviving). As at 24 February, seven imported cases associated with the current outbreak have been reported in the UK (from Barbados, Colombia, Curacao/Venezuela, Guyana/Suriname and Mexico/Venezuela) [1].

Recent increases in congenital anomalies (particularly microcephaly) and Guillain-Barré syndrome are being reported in some areas where Zika virus outbreaks have occurred. The association of these illnesses with the virus is temporal and causality has yet to be proven, however there is growing evidence to support such an association. Further information about these findings is available ECDC and from WHO [4,5].

More information on Zika virus infection can be found on the PHE website [1].

References

1. PHE website. Zika virus: health protection guidance collection.
2. ECDC. Communicable Disease Threats Report. Week 8, 21-27 February 2016.
3. ECDC. Exotic mosquitoes: Distribution maps.
4. ECDC (23 February 2016). Rapid risk assessment: Zika virus disease epidemic: potential association with microcephaly and Guillain-Barre syndrome, third update.
5. WHO. Emergencies: Zika virus situation reports.

Public Health England

Health Protection Report
weekly report

Infection reports

Volume 10 Number 8 Published on: **26 February 2016**

Infection Reports

Vaccine preventable disease

Laboratory confirmed reports of invasive meningococcal disease in England: October to December 2015

Laboratory confirmed cases of measles, mumps and rubella, England: October to December 2015

Laboratory reports of *Haemophilus influenzae* by age group and serotype (England and Wales): October to December 2015, and consolidated annual report for 2015

Vaccine coverage

Provisional vaccine coverage estimates for the new meningococcal B (MenB) immunisation programme for England, January 2016

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

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

Infection report

Volume 10 Number 8 Published on: **26 February 2016**

Laboratory confirmed reports of invasive meningococcal disease in England: October to December 2015

In England, the national Public Health England (PHE) Meningococcal Reference Unit (MRU) confirmed 235 cases of invasive meningococcal disease (IMD) between October and December 2015 [1]. IMD cases were 32% higher this quarter than the 178 cases confirmed in the equivalent quarter in 2014 (table 1).

The distribution of meningococcal capsular groups causing IMD by age is summarised in table 2, with capsular group B (MenB) accounting for 57% (134/235) of all cases, followed by MenW (n=62, 26%), MenY (n=25, 11%) and MenC (n=10, 4%). The 62 cases of MenW IMD confirmed in the second quarter of the 2015/16 epidemiological year (running 1 July, in one year, to 30 June the following year) were 51% higher than the 41 cases confirmed during the same period in 2014/15, similarly MenY increased by 56% from 16 to 25 cases. MenB cases increased from 107 in the second quarter of 2014/15 to 134 cases (25% increase) in the same period of 2015/16 and the number of MenC cases was relatively stable with 11 and 10 cases respectively. During the first two quarters of 2015/16, there were no reported cases for capsular groups A, X and Z/E (table 1) in England.

In quarter four of 2015 MenB was responsible for the majority of IMD cases in infants (26/36, 72%) and toddlers (47/56, 84%) but, as expected, contributed to a lower proportion of cases in older age groups (table 2). The introduction of a routine national MenB immunisation programme for infants was announced in June 2015 [2] with immunisation of infants starting from 1 September 2015. Provisional first vaccine coverage estimates for the new MenB immunisation programme for England are published in this issue of *HPR* with high uptake reported [3].

Capsular groups other than MenB were more prevalent in older age groups (table 2). Sixteen percent of the 62 MenW cases were in children under five years with 34% in adults aged 65+ years, and 24% in 15-24 year-olds. The increase in MenW cases, which has been previously reported [4,5], led to the introduction of MenACWY conjugate vaccine to the national immunisation programme in England [6,7]. MenACWY vaccine replaced the existing time-limited ‘freshers’ programme from August 2015 and was directly substituted for MenC vaccine in the routine adolescent schools programme (school year 9 or 10) from Autumn 2015. In addition a catch-up campaign is being implemented offering MenACWY vaccine to all adolescents aged 14 to 18 years (to school year 13 in the 2014/15 academic year); 2015 school leavers (aged 17/18) were prioritised for the first phase of the catch-up.

It is too early following the introduction of both of these new vaccination programmes to assess their impact on IMD.

Table 1: Invasive meningococcal disease in England by capsular group and laboratory testing method: October - December (Q4), 2015

Capsular groups~	CULTURE AND PCR		CULTURE ONLY		PCR ONLY		Total		Cumulative Total#	
	2014	2015	2014	2015	2014	2015	2014	2015	2014/15	2015/16
	Q4	Q4	Q4	Q4	Q4	Q4	Q4	Q4	Q3-Q4	Q3-Q4
A	–	–	–	–	–	–	–	–	–	–
B	30	31	25	24	52	79	107	134	166	197
C	1	4	6	3	4	3	11	10	15	16
W	7	10	23	43	11	9	41	62	64	88
Y	2	7	12	15	2	3	16	25	24	38
Ungrouped*	–	–	–	–	2	–	2	–	2	3
Ungroupable*	–	–	–	4	–	–	1	4	1	5
Total	40	52	67	89	71	94	178	235	272	347

2015/16 epidemiological year (running from 01/07/2015 to 30/06/2016).
~ No cases of groups X or Z/E were confirmed during 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.

Table 2: Invasive meningococcal disease in England by capsular group and age group at diagnosis: October - December (Q4), 2015

Age groups	Capsular Group~										Total		2015/16# Total to date	
	B		C		W		Y		Other*		Q4		Q3 - Q4	
	Total	%	Total	%	Total	%	Total	%	Total	%	Total	%	Total	%
<1 year	26	19	1	10	6	19	2	8	1	25	36	15	61	18
1-4 years	47	35	1	10	4	13	2	8	2	50	56	24	86	25
5-9 years	11	8	1	10	1	3	–	–	–	–	13	6	18	5
10-14 years	3	2	1	10	–	–	1	4	1	25	6	3	7	2
15-19 years	12	9	1	10	8	25	2	8	–	–	23	10	37	11
20-24 years	9	7	–	–	7	22	2	8	–	–	18	8	22	6
25-44 years	1	1	3	30	4	13	1	4	–	–	9	4	17	5
45-64 years	14	10	1	10	11	34	6	24	–	–	32	14	38	11
>=65 years	11	8	1	10	21	66	9	36	–	–	42	18	61	18
Total	134		10		62		25		4		235		347	

2015/16 epidemiological year (running from 01/07/2015 to 30/06/2016).
~ No cases of groups A, X or Z/E were confirmed during the periods summarised in the table.
* Other includes Ungroupable and Ungrouped.

References

1. Data source: Public Heath England Meningococcal Reference Unit, Manchester.
2. PHE and NHS England: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/436525/2015_06_10_MenB_bipartite_letter_v_24_final_final_track_change_MD1_TRACK....pdf
3. PHE (2016). *HPR* **10**(8), 26 February 2016, https://www.gov.uk/government/publications/meningococcal-b-immunisation-programme-vaccine-coverage-estimates
4. PHE (2016). *HPR* **9**(7), 27 February 2015.
5. "Freshers told, 'It's not too late' for meningitis C vaccine", PHE press release, 27 November 2014. https://www.gov.uk/government/news/freshers-told-its-not-too-late-for-meningitis-c-vaccine
6. PHE and NHS England: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/436535/15-06-10_ACWY_single_bipartite_letter_draft14_final_final_track_changeMD....pdf
7. https://www.gov.uk/government/collections/meningococcal-acwy-menacwy-vaccination-programme

Infection report

Volume 10 Number 8 Published on: **26 February 2016**

Laboratory confirmed cases of measles, mumps and rubella, England: October to December 2015

Measles, mumps and rubella are notifiable diseases and healthcare professionals suspecting a case are legally required to inform the authorities. Oral fluid testing is offered to all notified cases to confirm the diagnosis. This is part of the enhanced surveillance for these vaccine preventable diseases. Recent infection is confirmed by measuring the presence of IgM antibodies or detecting viral RNA (by PCR) in the samples.

Data presented here are for the fourth quarter of 2015 (ie October to December). Cases include those confirmed by oral fluid testing (IgM antibody tests and/or PCR) at the National Reference Laboratory, Colindale, and national routine laboratory reports (mumps infections only) (table 1). Analyses are by date of onset and regional breakdown figures relate to Government Office Regions.

Quarterly figures from 2013 for cases confirmed by oral fluid antibody detection only and annual total numbers of confirmed cases by region and age are available from:

https://www.gov.uk/government/publications/measles-confirmed-cases

https://www.gov.uk/government/publications/mumps-confirmed-cases

https://www.gov.uk/government/publications/rubella-confirmed-cases

Table 1. Total laboratory confirmed cases of measles, mumps and rubella, and oral fluid IgM antibody tests in notified cases: weeks 40-53/2015

Notified and investigated cases						Confirmed cases		
Infecting virus	Cases reported to Health Protection Teams in England*	Oral fluid testing					Other samples	**Total**
		Number Tested	% of reported cases tested	*Total Positive*	*Recently Vaccinated*	Confirmed infections		
Measles	385	275	71.4%	*18*	*6*	12	11	**23**
Mumps	1910	1159	60.7%	*68*	*0*	68	119	**187**
Rubella	145	81	55.9%	*5*	*5*	0	0	**0**

*This represents the number of infections reported as possible cases and investigated by individual PHE centres in England

Measles

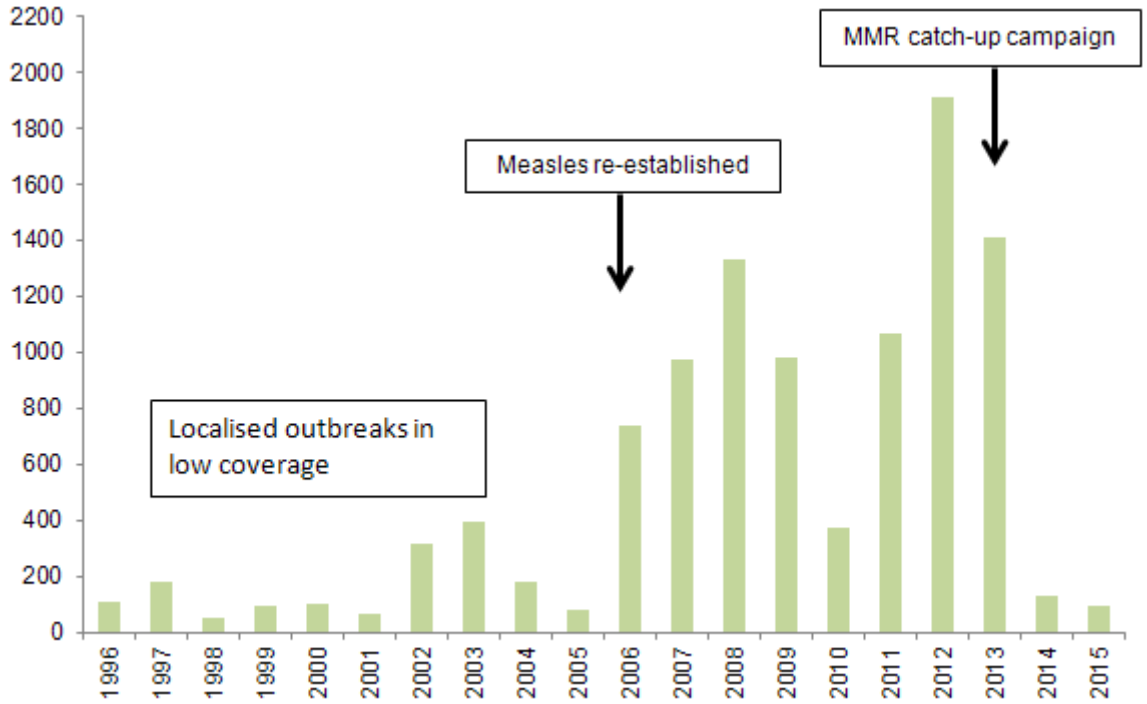
In England, 23 new measles infections were diagnosed in the period between October and December 2015 compared to 15 in the previous quarter of 2015 [1]. This brings the total number of measles cases for 2015 in England to 91, the lowest annual figure in a decade (figure 1).

All but one of the 23 infections were associated with an outbreak in South East London. None of the affected individuals were vaccinated and acquired their infection from family members, in hospital or within the community. There was one imported infection this quarter with a history of recent travel to Africa.

The majority (17/235, 74%) of measles diagnoses were in children and adolescents: two (9%) aged under 1 year of age; five (22%) aged 1-4 years; one (4%) aged 5-9; six (26%) aged 10-14; and three (13%) aged 15-18 years. The remaining six cases (26%) were adults aged 19-53 years.

Scotland, Northern Ireland and Wales reported no measles cases in 2015.

Figure 1. Annual confirmed cases of measles in England – 1996-2015



Mumps

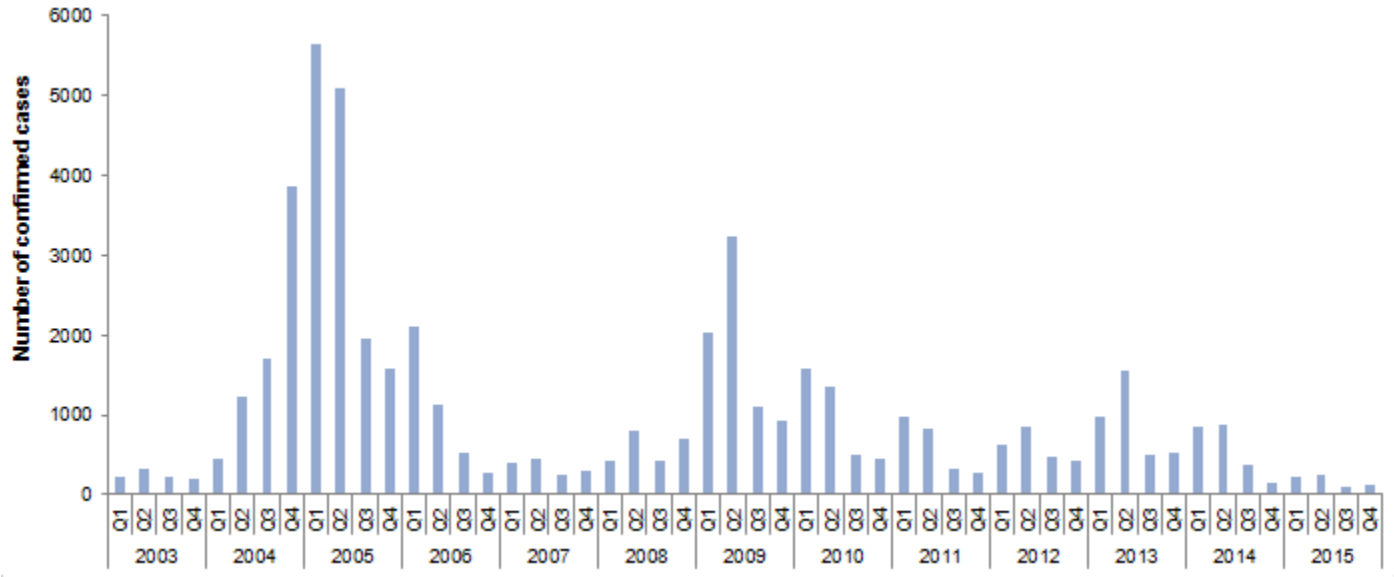
There were 121 laboratory confirmed mumps infections in England with onset dates in the fourth quarter of 2015, bringing the total number of cases in 2015 to 713. The number of cases confirmed in the previous quarter was 112 (figure) [1]. An additional 62 mumps cases were confirmed in oral fluid samples from Wales.

The numbers of infections in 2015 were the lowest reported for 12 years, similar to the total for 2003 (figure 2). Cases continued to be identified predominantly in young adults between 18 and 35 years of age (58/121 48%, table 2). Over a third (45/121) of all cases this quarter reported receiving two doses of MMR vaccination in childhood. Mumps cases were reported in all regions of England (table 2).

Table 2. Laboratory confirmed cases of mumps by age group and region, England: weeks 40-53/2015

Region	<1	1-4	5-9	10-14	15-19	20-24	25+	Total
North East	–	–	–	5	14	–	7	**26**
North West	–	3	–	1	2	4	4	**14**
Yorkshire & Humber	–	2	1	–	4	3	1	**11**
East Midlands	–	1	1	–	2	–	1	**5**
West Midlands	–	–	–	–	1	3	3	**7**
East of England	–	2	2	1	–	1	3	**9**
London	–	7	1	–	–	2	8	**18**
South East	–	2	3	–	2	4	4	**15**
South West	–	1	1	–	7	1	6	**16**
Total	**0**	**18**	**9**	**7**	**32**	**18**	**37**	**121**

Figure 2. Laboratory confirmed cases of mumps by quarter, England, 2003-2015



Rubella

No new cases of rubella infection were confirmed this quarter. In 2015, there were only three confirmed infections of rubella. In addition, two cases of congenital rubella syndrome (CRS) were also identified in babies born to mothers who acquired rubella infection abroad.

Reference

1. PHE (November 2015). 'Laboratory confirmed cases of measles, mumps and rubella, England: July to September 2015', *HPR* **9**(42): immunisation.

Infection report

Volume 10 Number 8 Published on: **26 February 2016**

Vaccine-preventable infections

Laboratory reports of *Haemophilus influenzae* by age group and serotype (England and Wales): October to December 2015, and consolidated annual report for 2015

Laboratory reports of *Haemophilus influenzae* by age group and serotype, England and Wales: fourth quarter 2015 (*2014*)

In the fourth quarter of 2015 (October to December) there was a total of 176 laboratory confirmed cases of invasive *Haemophilus influenzae* (Hi). This was similar to the 172 cases confirmed in the fourth quarter of 2014. There were 113 cases in the third quarter of 2015.

Of the samples which underwent serotyping (n=156), 86% were non-capsulated *Haemophilus influenzae* (ncHi), a further 13% were serotype a, e, or f, and 1% were serotype b (Hib). This was similar to the fourth quarter of 2014 where: 86% of serotyped samples were ncHi, 13% were serotype a, e, or f and 1% were Hib.

Age-group was well reported (see table). Of the laboratory confirmed cases during the fourth quarter of 2015: 86% were aged 15 years and over; 7% were under one year of age, 4% were 1-4 years old, and 3% were among 5-14 year olds. In the fourth quarter of 2014: 81% were aged 15 years and over; 8% were 1-4 years, 7% were under one year, and 2% were 5-14 year olds.

During this quarter, 86% of cases in children under 15 years were ncHi (n=18/21). There were no cases of Hib in this age-group during the fourth quarter of 2015. In comparison, there were two cases in unimmunised children during the fourth quarter of 2014.

Age distribution of laboratory-confirmed cases of *Haemophilus influenzae* by serotype England and Wales, fourth quarter 2015 (*and 2014*)

Serotype	Age-group					Total, third quarter 2014 *(2013)*
	<1y	1-4y	5-14y	15+	nk	
b	– *(–)*	1 *(–)*	1 *(–)*	*2 (2)*	– *(–)*	*2 (2)*
nc	*10 (14)*	*4 (11)*	*4 (2)*	*115 (103)*	– *(–)*	**133** *(130)*
a,e,f	– (1)	2 (2)	1 (–)	18 (17)	– *(–)*	**21** *(20)*
not typed	2 (1)	1 (1)	– (1)	17 (17)	– *(–)*	**20** *(20)*
Total	12 (16)	7 (14)	5 (3)	152 (139)	**–** *(–)*	**176** *(172)*

Notes: Percentages may not add up to 100 due to rounding. " –" Indicates that testing yielded no positives.

Laboratory reports of *Haemophilus influenzae* by age group and serotype, England and Wales: annual 2015 (and *2014*)

During 2015 (January to December inclusive) there was a total of 711 laboratory confirmed cases of invasive *Haemophilus influenzae* (Hi). This was an 8% compared to the 661 cases confirmed in 2014.

Of the samples which underwent serotyping (n=620; 87%), 88% were non-capsulated *Haemophilus influenzae* (ncHi), a further 10% were serotype a, e, or f, and 1% were serotype b (Hib). In comparison, in 2014; 85% of serotyped samples (n=557, 85%) were ncHi, 13% were serotype a, e, or f, and 2% were Hib. Hib cases among those aged under 15 years declined from three in 2013 to one in 2014 (66% decrease).

Age-group was well reported (Table). During 2015, 86% of all Hi cases were aged 15 years and over; 7% were under one year of age; 5% were 1-4 years old; and 2% were 5-14 years old. The majority of serotyped cases in children under 15 years were ncHi (n=76/86; 88%). This distribution was broadly similar to 2014, where: 81% were aged 15 years and over; 10% were under one year of age; 6% were among 1-4 year olds and 3% were among 5-14 year olds.

There was a 21% (from 105 in 2014 to 83 in 2015) decrease in cases among children under five years old due to a 24% (from 83 to 65 cases) fall in the number of ncHi cases.

Annual distribution by serotype and age group 2015 (*and 2014*)

Serotype	Age-group					Total, 2015 *(2014)*
	<1y	1-4y	5-14y	15+	nk	
b	– *(1)*	1 *(1)*	– *(1)*	8 *(9)*	– *(–)*	**9** *(12)*
nc	42 *(52)*	21 *(31)*	13*(14)*	472 *(379)*	– *(–)*	**548** *(476)*
a,e,f	2 *(6)*	*6 (4)*	1 *(–)*	54 *(60)*	– *(–)*	**63** *(70)*
not typed	6 *(5)*	5 *(5)*	1 *(3)*	79 *(90)*	– *(–)*	**91** *(103)*
Total	50 *(64)*	33 *(41)*	15 y	613 (*538)*	**–** *(–)*	**711** *(661)*

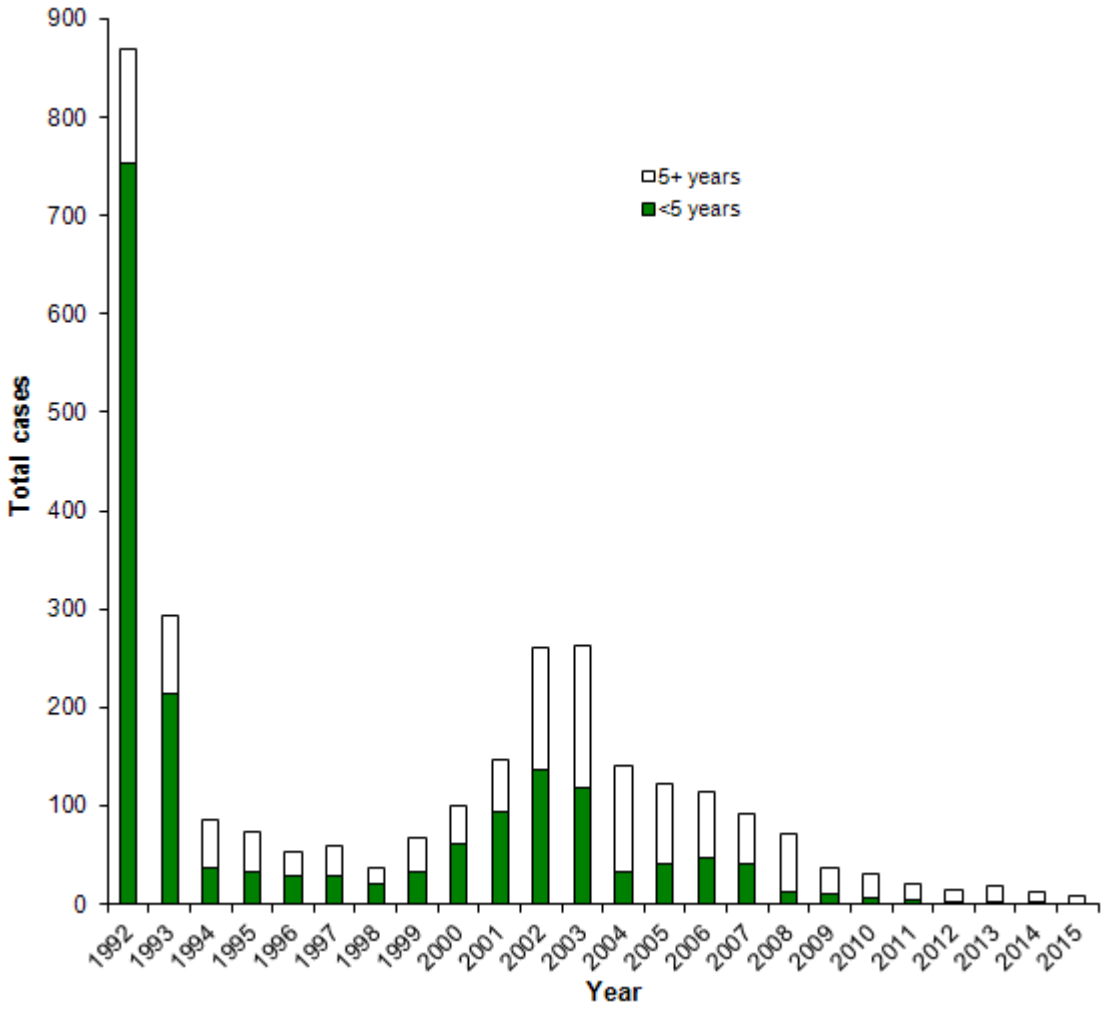
Notes: Percentages may not add up to 100 due to rounding. " –" Indicates that testing yielded no positives.

As reported previously [1], cases of invasive Hib disease have declined since the introduction of the Hib conjugate vaccine in 1992 and remained at low levels since the introduction of a fourth dose of vaccine in 2006 (see figure). In 2015, invasive Hib disease continued to be well controlled across all age groups. Compared to 2014, Hib cases declined from 12 to 9 cases; this was due to the decrease in cases among children under 15 years, whereas the number of cases among adults remained stable.

During 2015, there were one case of Hib among children who were eligible for immunisation; a three year old who had been fully immunised presented with Hib meningitis and made a partial recovery. This was the first case of invasive Hib disease in a fully immunised child since 2012. In 2014, there were three cases of Hib among children who were eligible for immunisation; none of whom had been immunised. One child presented with pneumonia, one with bacteraemic-tonsillitis, and one with bacteraemia; all subsequently recovered.

There were no deaths attributed to invasive Hib disease in 2015 or 2014; the most recent death in a child aged under 16 years attributed to invasive Hib disease was in 2011.

Total cases of Hib by year, 1992-2015



Reference

1. Public Health England (2014). Laboratory reports of *Haemophilus influenzae* by age group and serotype (England and Wales): annual report for 2014, *HPR* **9**(7): immunisation. Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/409070/hpr0715_pge_d.pdf.

Infection report

Volume 10 Number 8 Published on: **26 February 2016**

Vaccine coverage

Provisional vaccine coverage estimates for the new meningococcal B (MenB) immunisation programme for England, January 2016

Preliminary vaccine coverage estimates for the first routine cohort eligible for infant Meningococcal B immunisation are 94.0% for one dose and 84.8% for two doses by six months of age (evaluated at the end of January 2016).

Introduction

Meningococcal B (MenB) vaccination was introduced from 1 September 2015 for infants due to receive their primary immunisations starting at two months of age on or after 1 September 2015 (i.e. those babies born on or after 1 July 2015). The vaccine is offered alongside other routine immunisations at two and four months of age, with a booster dose at 12-13 months. A limited one-off catch-up programme was also delivered targeting infants born in May and June 2015. This report describes the first MenB coverage estimates for one and two doses of vaccine received by these cohorts when evaluated at six months (26 weeks) of age (i.e. between November 2015 and January 2016).

Methods

In order to rapidly assess vaccine coverage of this newly implemented immunisation programme, PHE has put in place a temporary sentinel surveillance system. This uses general practice (GP) level MenB vaccine coverage data automatically uploaded via participating GP IT suppliers to the ImmForm* website on a monthly basis. These data are then validated and analysed by PHE to check data completeness, identify and query any anomalous results and describe epidemiological trends.

Monthly MenB vaccine coverage data are collected for each cohort reaching six months of age in the survey month (table 1) using the following definitions:

- *Denominator:* the number of infants in a GP practice who, in the survey month, reach 26 weeks of age;
- *Numerators:* the number of infants in the denominator who received (a) 1st dose and (b) 2nd dose of Bexsero® (MenB vaccine) from eight weeks of age up to 26 weeks of age, including vaccinations given by other healthcare providers.

* ImmForm is the system used by Public Health England to record vaccine coverage data for some immunisation programmes and to provide vaccine ordering facilities for the NHS

Table 1. Birth cohorts evaluated for MenB vaccination reaching six months of age before 31 January 2016, following introduction of the programme in September 2015

Cohort	Birth dates	Number of doses offered	Vaccine coverage survey month
Catch-up cohort 1	03/05/2015 - 01/06/2015	One	November 2015
Catch-up cohort 2	02/06/2015 - 02/07/2015	Two	December 2015
(First) routine cohort	03/07/2015 - 02/08/2015	Two	January 2016

Vaccine coverage is calculated as the total number of patients who have received the vaccination (numerators) as a percentage of the number of patients registered (denominator).

GP data are aggregated by NHS England organisations (Clinical Commissioning Groups (CCGs), Area Teams (ATs) and NHS England Local Teams (LTs), and by Local Authorities (LAs).

Participation and data quality

Due to data quality issues, MenB coverage data from two of four GP IT suppliers were excluded from the November 2015 collection (catch-up cohort 1), and data from one supplier were excluded from the December 2015 collection (catch-up cohort 2).This partial reporting means coverage estimates should be interpreted with caution. National coverage estimates for catch-up cohort 1 include data representing 83% of GP practices in England, while data for catch-up cohort 2 represent 84% of practices (table 2). For the January 2016 collection (routine cohort), all data were used representing 96% of GP practices.

As a result of the incomplete data for the catch-up cohorts, CCG level MenB coverage estimates are only provided for the routine cohort.

Results

Based on data from 83% of GP practices in England, coverage for the first catch-up cohort (born May 2015), eligible for one dose of MenB vaccine, was 76.6% when evaluated at six months of age in November 2015 (table 2). This ranged by AT from 62.9% (London) to 86.7% (Bath, Gloucestershire, Swindon and Wiltshire).

Based on data from 84% of GP practices in England, coverage for the second catch-up cohort (born June 2015), was 88.8% for one dose and 75.2% for two doses of vaccine when evaluated at six months of age in December 2015 (table 2). This ranged by AT from 80.3% (London) to 94.2% (Durham, Darlington and Tees) for one dose, and from 60.4% (Devon, Cornwall and Isles of Scilly) to 83.9% (Bath, Gloucestershire, Swindon and Wiltshire) for two doses.

Based on 96% of GP practices in England, coverage for the first routine cohort (born July 2015) was 94.0% for one dose when evaluated at six months of age in January 2016 (table 2). This ranged by AT from 89.4% (London) to 97.8% (North Yorkshire and Humber). Of 25 ATs, 16 achieved over 95% coverage for one dose. Coverage for two doses was 84.8%, ranging from 77.1% (Merseyside AT) to 90.2% (North Yorkshire and Humber AT).

Coverage data for the routine cohort by CCG are presented in an appendix to this report

Discussion

Preliminary vaccine coverage at six months of age for the new childhood MenB programme indicates the vaccine has been accepted and delivered well, with high coverage achieved in both catch-up cohorts and the first routine cohort eligible for vaccination. Infants born after 1 July 2015 who were not vaccinated at six months of age continue to be eligible for their primary immunisations and it is anticipated that coverage in this cohort will increase when evaluated at 12 months of age.

The automated MenB GP data collection is a temporary sentinel surveillance programme set up to provide assurance that the vaccine has been well accepted. It will be replaced by data from the routine quarterly COVER (Cover of vaccination evaluated rapidly) reporting scheme which will evaluate two dose MenB vaccine coverage for children at 12 months of age and booster MenB coverage at 24 months of age using data extracted from Child Health Information Systems (CHIS) [1]. The first quarterly COVER evaluation to include MenB coverage will be published in December 2016, for children aged 12 months of age in the July to September 2016 quarter.

The introduction of MenB immunisation has been supported by a comprehensive media and communications campaign in partnership with health partners and meningitis charities, that has led to significant reporting in national, local and parenting media and social media. New patient information leaflets and posters have also supported the campaign, and comprehensive guidance has been added to the NHS Choices website. Existing children's immunisation information booklets and leaflets have been amended to reflect the new schedule. A training factsheet and video for health professionals has also been produced.

Further information

Further information relating to the implementation of this vaccination programme is available from the PHE website document collection, Meningococcal B (MenB) vaccination programme.

Table 2. Vaccine coverage for the MenB infant vaccination programme introduced 1 September 2015, for infants evaluated at six months of age by NHS England Area Team

Area Team	Catch-up cohort 1 (born May 2015)		Catch-up cohort 2 (born June 2015)			Routine cohort (born July 2015)		
	Participating GPs (%)	Dose 1 coverage (%)	Participating GPs (%)	Dose 1 coverage (%)	Dose 2 coverage (%)	Participating GPs (%)	Dose 1 coverage (%)	Dose 2 coverage (%)
Cheshire, Warrington and Wirral (Q44)	92.9	80.2	94.6	90.9	76.4	97.6	97.7	90.0
Durham, Darlington and Tees (Q45)	94.1	83.5	92.4	94.2	76.9	96.5	97.7	88.0
Greater Manchester (Q46)	63.0	74.6	67.1	88.1	70.1	92.8	89.7	77.7
Lancashire (Q47)	96.9	75.8	97.8	90.3	76.8	97.3	95.9	87.8
Merseyside (Q48)	89.2	72.9	90.0	83.2	69.6	91.8	91.0	77.1
Cumbria, Northumb., Tyne and Wear (Q49)	92.2	80.4	93.5	92.7	82.4	96.9	96.5	89.2
N Yorkshire and Humber (Q50)	92.6	82.2	91.7	93.6	77.8	97.8	97.8	90.2
S Yorkshire and Bassetlaw (Q51)	93.9	79.3	92.5	93.0	78.5	97.7	97.1	88.3
W Yorkshire (Q52)	96.3	82.2	94.8	92.0	78.6	99.1	96.8	85.3
Arden, Herts and Worcs. (Q53)	80.3	80.5	83.5	90.2	79.3	95.2	94.8	86.5
Birmingham and Black Country (Q54)	82.6	72.7	82.8	86.3	71.0	93.5	93.5	80.9
Derbyshire and Notts. (Q55)	89.5	79.6	93.2	93.1	80.4	98.9	96.6	90.0
East Anglia (Q56)	88.9	83.2	88.8	91.8	78.8	97.5	96.8	89.6
Essex (Q57)	90.1	83.3	91.9	92.5	78.7	98.8	96.0	87.6
Hertfordshire and the S Midlands (Q58)	88.2	83.4	86.9	93.0	78.3	96.2	96.2	89.0
Leicestershire and Lincolnshire (Q59)	93.9	81.3	90.2	93.6	78.9	98.4	96.6	88.4
Shropshire and Staffordshire (Q60)	89.0	82.3	89.8	90.0	82.1	91.9	95.1	88.6
Bath, Glos., Swindon and Wilts (Q64)	78.4	86.7	75.7	92.8	83.9	96.3	97.4	88.6
Bristol, N Som. and S. Glos. (Q65)	89.6	83.8	93.7	93.0	79.7	96.0	95.5	86.4
Devon, Cornwall and Scilly Isles (Q66)	57.8	82.5	79.8	85.4	60.4	94.6	92.7	84.5
Kent and Medway (Q67)	46.4	73.4	47.2	89.9	79.3	95.2	95.6	81.9
Surrey and Sussex (Q68)	85.1	78.9	84.6	90.0	79.9	98.8	93.4	85.4
Thames Valley (Q69)	79.2	75.7	81.8	88.2	78.2	95.7	92.3	87.4
Wessex (Q70)	78.2	80.5	82.0	92.2	80.3	95.5	94.7	88.9
London (Q71)	79.2	62.9	80.9	80.3	66.3	95.5	89.4	78.5
ENGLAND	**82.8**	**76.6**	**84.4**	**88.8**	**75.2**	**96.0**	**94.0**	**84.8**

Infection report

Volume 10 Number 8 Published on: **26 February 2016**

Vaccine coverage

Pertussis Vaccination Programme for Pregnant Women update: vaccine coverage in England, October to December 2015

Pertussis vaccine coverage in pregnant women increased from 59.3% in October 2015 to 61.4% in December 2015, peaking at 61.6% in November 2015. These figures show high quarter four coverage for the third consecutive year.

Introduction

This report describes pertussis vaccine coverage in pregnant women in England for the period October to December 2015, updating previous data reported for June to September 2015 [1].

Following increased pertussis activity in all age groups, including infants under three months of age, and the declaration of a national pertussis outbreak (level 3 incident) in April 2012 [2] [3], pertussis vaccine has been offered to pregnant women since 1 October 2012. Overall pertussis activity persists at raised levels compared to the years preceding the outbreak in 2012 however, reported incidence in young infants, the group targeted by the vaccine programme, is now comparable with before the 2012 peak. Between 1 October 2012 and 30 September 2015, 13 deaths have been reported in young babies with confirmed pertussis. Twelve of these 13 babies were born to mothers who had not been vaccinated against pertussis [4].

The prenatal pertussis vaccination programme aims to minimise disease, hospitalisation and deaths in young infants, through intra-uterine transfer of maternal antibodies, until they can be actively protected by the routine infant programme with the first dose of pertussis vaccine scheduled at eight weeks of age [3]. In June 2014 the Joint Committee on Vaccination and Immunisation (JCVI) considered available data and based on the high effectiveness and safety of the programme, advised it should continue for a further five years [5].

Further information on the history and epidemiology of the disease, recommendations on supply, storage and use of the vaccine, as well as guidance on contraindications, precautions and adverse reactions can be found in the “Immunisation against infectious disease” book (the green book), chapter 24 [6]. Additional background information for the programme can be found on the PHE website and on the vaccine coverage collection in the annual report: Pertussis vaccine coverage in pregnant women April 2014 to March 2015.

Methods

General practice (GP) level pertussis vaccine coverage data are automatically uploaded via participating GP IT suppliers to the ImmForm* website on a monthly basis. ImmForm data are validated and analysed by PHE to check data completeness, identify and query any anomalous results and describe epidemiological trends.

Monthly data are collected on the following:

- *Denominator:* number of women who delivered in the survey month at more than 28 weeks gestational age;
- *Numerator:* number of pregnant women who delivered after 28 weeks gestational age in the survey month that received a dose of pertussis-containing vaccine in the preceding fourteen weeks.

For accurate denominators to be extracted from GP IT systems by the automated survey and precise coverage estimates to be calculated, it is important that the medical records of all women who have given birth have the following fields completed:

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

GP data are aggregated by NHS England organisations (Clinical Commissioning Groups (CCGs), Area Teams (ATs) and NHS England Local Teams (LTs), and by Local Authorities (LAs).

Results

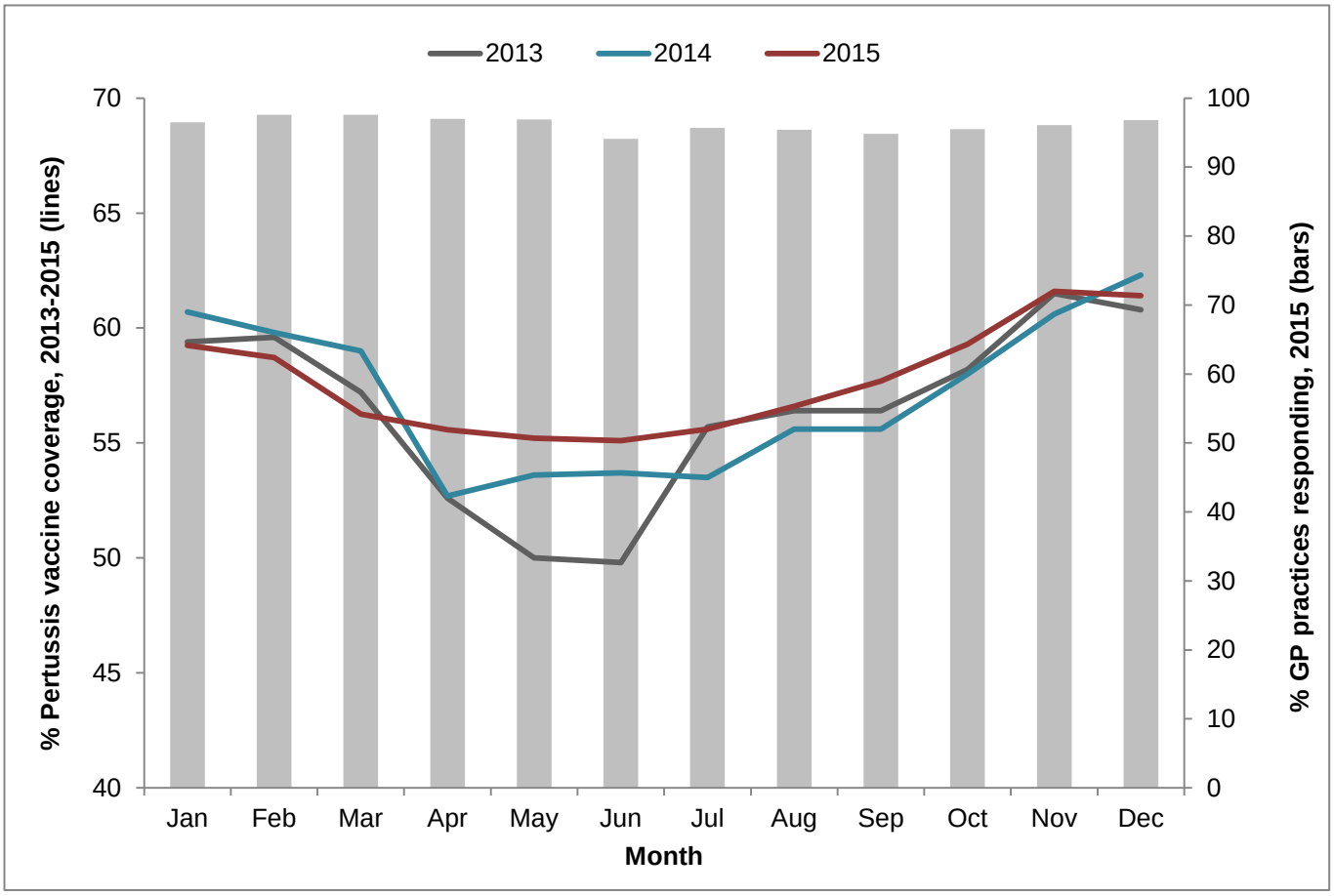
Between October 2015 and December 2015, data were provided for 96.1% of GP practices on average, ranging from 95.5% (October 2015) to 96.8% (December 2015) (see figure).

Pertussis vaccine coverage in pregnant women increased from 59.3% in October 2015 to 61.4% in December 2015, peaking at 61.6% in November 2015 (see figure). These trends are consistent with the same period in previous years. Between October and December 2015, average vaccine coverage by NHS England AT ranged from 50.1% (London) to 69.9% (West Yorkshire) (see table for monthly figures by AT).

Vaccine coverage data by AT and CCG for the period April to December 2015 are presented in an Appendix associated with this report.

***** ImmForm is the system used by Public Health England to record vaccine coverage data for some immunisation programmes and to provide vaccine ordering facilities for the NHS.

Monthly pertussis vaccination coverage (%) in pregnant women: England, 2013-2015, and the percentage of GP practices participating: England, 2015



Discussion

Pertussis vaccine coverage was higher for October and November 2015 compared to the same months in the preceding two years, although it plateaud in December 2015. The increase in coverage between September and December coincides with the delivery of the seasonal influenza vaccination programme which also targets pregnant women [7]. During the flu campaign GP practices actively call and recall eligible patients, which should include pregnant women, and this may be having a positive knock-on effect on pregnant women being offered pertussis vaccine at the same time.

As pertussis continues to circulate in the population, unprotected young infants continue to be at risk of infection and GPs and midwifes should continue to encourage pregnant women to receive the pertussis vaccine, ideally between weeks 28 and 32 of their pregnancy (but up to week 38) [8], to further reduce the incidence of pertussis in young infants. Considerable variation in coverage between ATs has consistently been reported, with around a 20% difference between those with the highest coverage and those with the lowest coverage. Identifying examples of good practice in areas achieving consistently high coverage for

pertussis vaccination during pregnancy and applying them to low coverage areas may help address this gap.

There are limitations to the data presented in this report. First, completeness of data is reliant on the recording of delivery dates in the mothers' medical records and comparison of this data with national data on live births, indicates these data represent about 60% of the population of pregnant women [9]. However, monthly variations in the denominator closely mirror the seasonal variation observed in national live births.

Monthly pertussis vaccination coverage (%) in pregnant women by NHS England Area Team: England, October 2015 to December 2015

Area Team	Oct 2015	Nov 2015	Dec 2015
Cheshire, Warrington and Wirral (Q44)	64.3	72.6	70.5
Durham, Darlington and Tees (Q45)	66.5	68.1	64.5
Greater Manchester (Q46)	55.0	58.3	60.4
Lancashire (Q47)	60.7	63.7	66.3
Merseyside (Q48)	57.7	61.4	63.3
Cumbria, Northumberland, Tyne and Wear (Q49)	67.5	70.4	68.3
N Yorkshire and Humber (Q50)	68.8	66.1	66.3
S Yorkshire and Bassetlaw (Q51)	67.4	72.7	69.7
W Yorkshire (Q52)	68.1	69.4	67.0
Arden, Herefordshire and Worcestershire (Q53)	62.2	63.1	65.9
Birmingham and Black Country (Q54)	51.1	56.1	57.4
Derbyshire and Notts. (Q55)	69.2	69.1	66.5
East Anglia (Q56)	60.3	61.4	60.3
Essex (Q57)	52.9	55.5	52.4
Hertfordshire and the S Midlands (Q58)	59.4	58.9	58.4
Leicestershire and Lincolnshire (Q59)	54.2	58.8	55.1
Shropshire and Staffordshire (Q60)	66.6	68.1	69.6
Bath, Gloucestershire, Swindon and Wiltshire (Q64)	65.6	67.4	66.8
Bristol, N Somerset, Somerset and S Gloucestershire (Q65)	63.2	65.7	67.8
Devon, Cornwall and Scilly Isles (Q66)	57.6	62.0	59.0
Kent and Medway (Q67)	63.5	67.4	65.7
Surrey and Sussex (Q68)	63.5	64.9	64.7
Thames Valley (Q69)	64.1	66.9	65.9
Wessex (Q70)	67.7	68.7	69.5
London (Q71)	47.7	50.6	52.0
ENGLAND	**59.3**	**61.6**	**61.4**
Monthly reported denominator	**36360**	**35791**	**36104**

Second, the survey does not cover all GP practices in England and although data for at least 95% of GP practices were provided, there may be differential completeness of the recording of delivery dates among GPs. Coverage may be overestimated if women who have received the vaccine are more likely to have their delivery date recorded. Furthermore, women not registered with a GP (and therefore less likely to be having regular contact with the health service prior to delivery) will not be captured by this reporting system.

Comparison with other data sources examined to estimate the vaccine coverage of this programme suggests that this methodology may be underestimating coverage [10]. If coverage, and ultimately the impact of the programme itself, is to be accurately monitored, it is essential that GPs and practice nurses ensure that vaccination and date of delivery are recorded in the patient's GP record.

Continued support in the delivery of this important programme is being sought from service providers (GP practices and maternity units), Screening and Immunisation Teams and Health Protection Teams. Screening and Immunisation Teams should continue to update service providers on the current epidemiology of the disease, the effectiveness of the vaccination programme and the need to maintain and improve coverage achieved.

References

1. Public Health England. *Pertussis Vaccination Programme for Pregnant Women: vaccine coverage estimates in England, June to September 2015*. HPR 9(42) 2015; Available from: https://www.gov.uk/government/publications/pertussis-immunisation-in-pregnancy-vaccine-coverage-estimates-in-england-october-2013-to-march-2014.
2. *A level 3 incident is the third of five levels of alert under the HPA's Incident Reporting and Information System (IERP) according to which public health threats are classified and information flow to the relevant outbreak control team is coordinated. A level 3 incident is defined as one where the public health impact is significant across regional boundaries or nationally. An IERP level 3 incident was declared in April 2012 in response to the ongoing increased pertussis activity.* HPR, 2012. **6**(15).
3. Public Health England. *The complete routine immunisation schedule*. 2014; Available from: https://www.gov.uk/government/publications/the-complete-routine-immunisation-schedule.
4. Public Health England. *Laboratory confirmed cases of pertussis reported to the enhanced pertussis surveillance programme in England during July to September 2015 (Q3)*. HPR 9(45) 2015; Available from: https://www.gov.uk/government/publications/pertussis-laboratory-confirmed-cases-reported-in-england-2015.
5. *Joint Committee on Vaccination and Immunisation minutes*. 2014; Available from: https://www.gov.uk/government/groups/joint-committee-on-vaccination-and-immunisation#minutes.
6. Public Health England. *Pertussis: the green book, chapter 24*. 2015; Available from: https://www.gov.uk/government/publications/pertussis-the-green-book-chapter-24.
7. Public Health England. *Influenza: the green book*. 2015 28 August 2015; Available from: https://www.gov.uk/government/publications/influenza-the-green-book-chapter-19.
8. Public Health England. *Vaccination against pertussis (Whooping cough) for pregnant women - 2014*. 2014; Available from: https://www.gov.uk/government/publications/vaccination-against-pertussis-whooping-cough-for-pregnant-women.
9. Public Health England. *Pertussis Vaccination Programme for Pregnant Women: vaccine coverage estimates in England, September to December 2014*. HPR 9(7) 2014; Available from: https://www.gov.uk/government/publications/pertussis-immunisation-in-pregnancy-vaccine-coverage-estimates-in-england-october-2013-to-march-2014.
10. Amirthalingam, G., et al., *Effectiveness of maternal pertussis vaccination in England: an observational study.* The Lancet. **384**(9953): p. 1521-1528.

Infection report

Volume 10 Number 8 Published on: **26 February 2016**

Vaccine coverage

National rotavirus immunisation programme update: preliminary vaccine coverage for England, August 2015 to January 2016

Provisional estimates show average rotavirus vaccine coverage in England at six months of age is 93.8% for one dose and 88.9% for two doses, for the period August 2015 to January 2016. These figures show a continuation of the high coverage trends observed since February 2014.

Introduction

This report describes rotavirus vaccine coverage data for the period August 2015 to January 2016, updating previous data reported for the period February 2014 to July 2015 [1].

The rotavirus immunisation programme aims to provide protection against rotavirus infection by providing two doses of Rotarix® vaccine to infants between the ages of six and 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.

Further information on the history and epidemiology of the disease, recommendations on supply, storage and use of the vaccine, as well as guidance on contraindications, precautions and adverse reactions can be found in the “Immunisation against infectious disease” book (the Green Book), chapter 27b [2]. Additional background information for the programme can be found on the PHE website and on the vaccine coverage collection in this report: Rotavirus vaccine uptake report for England: February 2014 to March 2015.

Methods

General practice (GP) level rotavirus vaccine coverage data are automatically uploaded via participating GP IT suppliers (covering 95% of GP practices in England) to the ImmForm* website on a monthly basis.

ImmForm data are validated and analysed by PHE to check data completeness, identify and query any anomalous results and describe epidemiological trends.

***** ImmForm is the system used by Public Health England to record vaccine coverage data for some immunisation programmes and to provide vaccine ordering facilities for the NHS

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.

This rotavirus ImmForm collection is a temporary sentinel surveillance programme set up to provide assurance that the vaccine has been well accepted. The routine quarterly COVER (Cover of vaccination evaluated rapidly) reporting scheme assesses vaccine coverage for all children in England aged 12 months using data extracted from Child Health Information Systems (CHIS) and rotavirus coverage has now started to be reported through this scheme [3]. It is expected that quarterly and annual COVER reporting will replace the sentinel monthly GP reporting within a year.

GP data are aggregated by NHS England organisations (Clinical Commissioning Groups (CCGs), Area Teams (ATs) and NHS England Local Teams (LTs)), and by Local Authorities (LAs).

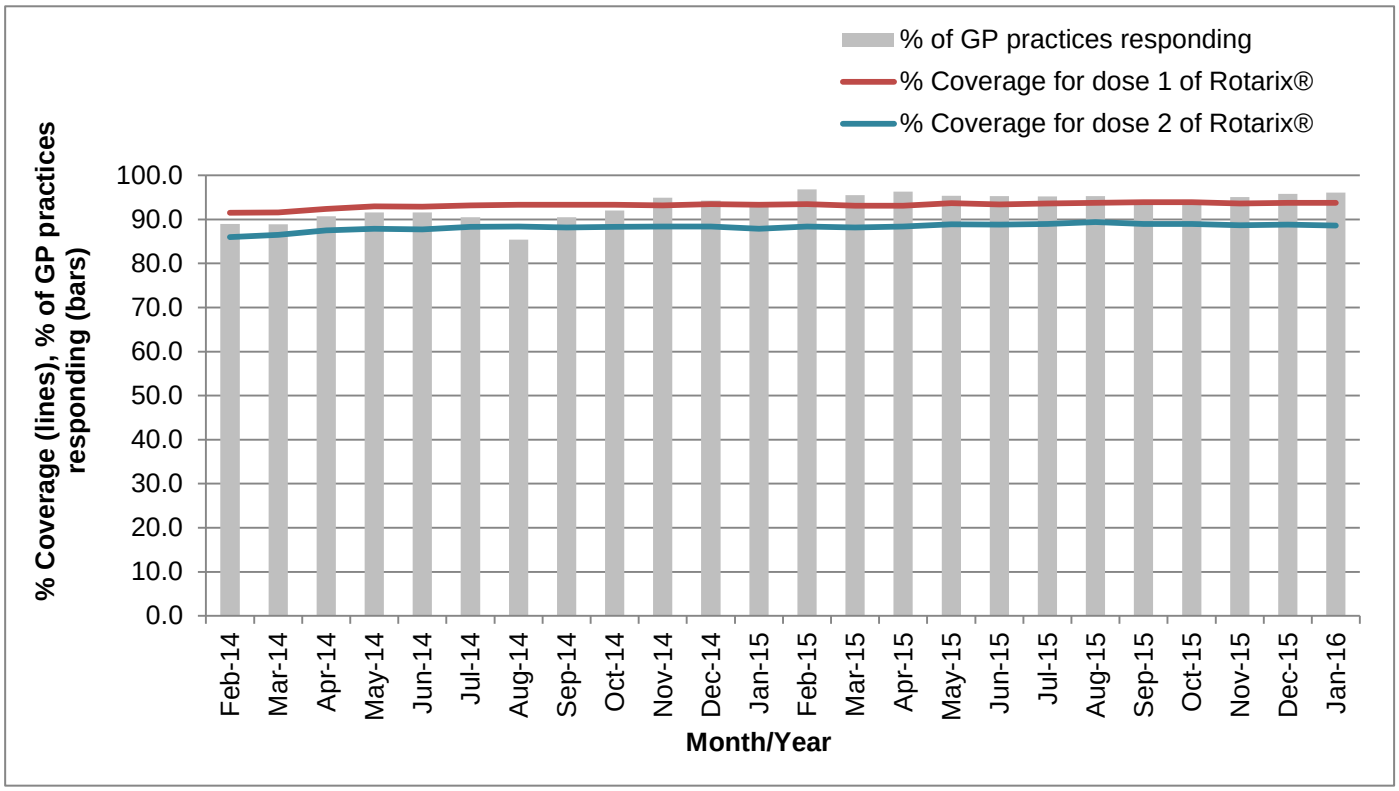
Results

Between August 2015 and January 2016, 95.1%, GP practices responded on average, ranging from 94.1% (September 2015) to 96.1% (January 2016) (figure 1).

Between August 2015 and January 2016, average vaccine coverage was 93.8% for one dose, ranging from 90.7% (London) to 96.4% (Durham, Darlington and Tees) (see table 1 for monthly figures by NHS England AT). Average vaccine coverage was 88.9%, for completed courses, ranging from 83.6% (London) to 92.9% (Durham, Darlington and Tees) (see table 2 for monthly figures by AT). Based on the latest coverage data (January 2016), 50.4% of GPs achieved at least 95% coverage for completed courses of rotavirus vaccine. These figures show a continuation of the high coverage trends observed since February 2014 (figure 1).

Vaccine coverage data by AT and Clinical Commissioning Group (CCG) for the period February 2014 to January 2016 are presented in an Appendix associated with this report.

Figure 1. Monthly rotavirus coverage at 25 weeks of age for one dose and two doses, and the percentage of GP practices reporting: England, February 2014* to January 2016



*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. However, data are presented from the February evaluation due to data quality issues prior to this.

Table 1. Monthly rotavirus vaccine coverage for one dose (%) at 25 weeks of age by Area Team: England, August 2015 to January 2016

Area Team	Aug 2015	Sep 2015	Oct 2015	Nov 2015	Dec 2015	Jan 2016
Cheshire, Warrington and Wirral (Q44)	92.8	94.2	95.3	94.3	95.5	95.9
Durham, Darlington and Tees (Q45)	96.5	96.5	96.9	96.7	95.5	96.2
Greater Manchester (Q46)	92.4	91.2	93.0	91.8	93.2	93.8
Lancashire (Q47)	94.2	96.1	95.5	94.9	95.0	94.6
Merseyside (Q48)	93.2	92.8	91.3	92.2	91.5	92.1
Cumbria, Northumberland, Tyne and Wear (Q49)	96.1	96.2	95.6	95.3	95.9	96.1
N Yorkshire and Humber (Q50)	96.3	95.5	96.2	95.9	95.7	96.5
S Yorkshire and Bassetlaw (Q51)	94.9	96.5	96.1	96.6	95.4	95.2
W Yorkshire (Q52)	95.3	94.6	94.7	95.1	94.7	93.8
Arden, Herefordshire and Worcestershire (Q53)	95.4	94.1	95.4	95.1	94.0	96.1
Birmingham and Black Country (Q54)	93.5	93.4	92.4	92.6	93.7	93.1
Derbyshire and Notts. (Q55)	95.7	95.8	96.4	95.1	95.2	95.4
East Anglia (Q56)	94.9	94.9	95.4	94.6	94.7	95.3
Essex (Q57)	95.1	94.4	96.4	95.7	95.6	94.9
Hertfordshire and the S Midlands (Q58)	95.0	95.2	95.1	94.5	94.9	95.4
Leicestershire and Lincolnshire (Q59)	94.1	95.5	94.6	94.4	94.7	95.7
Shropshire and Staffordshire (Q60)	95.4	94.9	94.4	94.0	94.5	95.8
Bath, Gloucestershire, Swindon and Wiltshire (Q64)	95.2	94.9	95.3	95.2	95.6	95.1
Bristol, N Somerset, Somerset and S Gloucestershire (Q65)	94.6	93.2	93.3	92.0	93.4	92.6
Devon, Cornwall and Scilly Isles (Q66)	92.2	92.2	92.0	93.1	93.6	92.5
Kent and Medway (Q67)	95.5	94.4	95.6	93.4	94.3	95.4
Surrey and Sussex (Q68)	94.2	94.6	92.6	94.2	94.3	93.1
Thames Valley (Q69)	94.5	94.1	94.3	95.0	95.0	93.8
Wessex (Q70)	95.7	95.9	95.4	94.2	94.5	95.5
London (Q71)	90.5	91.1	90.7	90.8	90.8	90.4
ENGLAND	**93.8**	**93.9**	**93.9**	**93.6**	**93.8**	**93.8**
Monthly reported denominator	**50778**	**48444**	**50898**	**51783**	**53640**	**53343**

Table 2. Monthly rotavirus vaccine coverage for two doses (%) at 25 weeks of age by Area Team: England, August 2015 to January 2016

Area Team	Aug 2015	Sep 2015	Oct 2015	Nov 2015	Dec 2015	Jan 2016
Cheshire, Warrington and Wirral (Q44)	88.7	90.0	90.1	90.4	90.7	90.7
Durham, Darlington and Tees (Q45)	92.8	93.3	93.6	93.6	91.3	92.9
Greater Manchester (Q46)	87.7	85.0	86.7	85.6	86.9	86.6
Lancashire (Q47)	89.7	92.1	91.9	91.0	90.3	90.3
Merseyside (Q48)	85.5	85.2	84.1	85.4	84.8	84.3
Cumbria, Northumberland, Tyne and Wear (Q49)	92.9	92.4	92.3	92.6	92.1	91.9
N Yorkshire and Humber (Q50)	93.1	91.3	93.0	92.9	91.7	92.1
S Yorkshire and Bassetlaw (Q51)	91.1	92.7	91.9	93.7	90.7	90.5
W Yorkshire (Q52)	90.9	91.7	90.3	91.3	90.7	89.3
Arden, Herefordshire and Worcestershire (Q53)	91.6	87.9	90.5	89.3	89.4	90.9
Birmingham and Black Country (Q54)	88.5	87.9	86.7	86.6	88.2	86.5
Derbyshire and Notts. (Q55)	92.2	91.7	92.5	89.7	90.7	91.6
East Anglia (Q56)	92.8	91.8	92.2	90.7	91.1	91.6
Essex (Q57)	91.5	90.7	93.1	92.3	91.9	91.2
Hertfordshire and the S Midlands (Q58)	92.4	92.1	92.8	91.2	91.3	91.7
Leicestershire and Lincolnshire (Q59)	91.2	93.6	91.6	91.8	91.3	92.5
Shropshire and Staffordshire (Q60)	91.8	91.5	90.9	90.5	90.2	91.3
Bath, Gloucestershire, Swindon and Wiltshire (Q64)	92.2	91.6	92.2	92.2	92.4	92.1
Bristol, N Somerset, Somerset and S Gloucestershire (Q65)	90.6	88.5	88.6	87.5	89.4	87.8
Devon, Cornwall and Scilly Isles (Q66)	88.8	86.8	88.0	87.3	88.1	87.4
Kent and Medway (Q67)	90.6	89.1	90.4	88.5	88.7	90.4
Surrey and Sussex (Q68)	89.7	89.5	88.3	89.1	89.9	88.7
Thames Valley (Q69)	89.5	89.6	90.0	89.4	89.9	87.8
Wessex (Q70)	92.6	91.9	91.5	90.7	90.9	92.5
London (Q71)	84.0	83.8	83.1	83.6	83.9	83.2
ENGLAND	**89.4**	**89.0**	**89.0**	**88.7**	**88.8**	**88.6**
Monthly reported denominator	**50778**	**48444**	**50898**	**51783**	**53640**	**53343**

References

1. Public Health England, *National rotavirus immunisation programme: preliminary data for England, February 2014 to July 2015.* HPR, 2015. **9**(30). Available from: https://www.gov.uk/government/publications/rotavirus-immunisation-programme-vaccine-coverage-estimates
2. Public Health England. *Rotavirus: the green book, chapter 27b*. 2015; Available from: https://www.gov.uk/government/publications/rotavirus-the-green-book-chapter-27b.
3. Public Health England, *Vaccination coverage report, UK (COVER programme): July to September 2015.* 2015. **9**(45). Available from: https://www.gov.uk/government/statistics/cover-of-vaccination-evaluated-rapidly-cover-programme-2015-to-2016-quarterly-data