



Infection report

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Laboratory confirmed cases of pertussis reported to the enhanced pertussis surveillance programme in England during October to December 2016

In England there were 1359 laboratory confirmed cases of pertussis (culture, PCR, serology or oral fluid) reported to the Public Health England (PHE) pertussis enhanced surveillance programme in the fourth quarter of 2016, from October to December 2016 (table 1). Total cases were 21% higher than those reported in the same quarter of 2015 (1125 cases).

The HPA declared a national outbreak of pertussis (level 3 incident [1]) in April 2012 and, as a response to the ongoing outbreak and high number of infant deaths, the Department of Health announced the introduction of a temporary immunisation programme for pregnant women on 28 September 2012 [2]. From 1 April 2016 the recommended gestational age for vaccination was revised to between 16-32 weeks, and for operational reasons, should be offered from around 20 weeks on or after the foetal anomaly scan [3]. The pertussis immunisation in pregnancy programme in England has shown high levels of protection against pertussis and the risk of dying from pertussis in babies born to vaccinated mothers [4,5,6]. The Medicines and Healthcare Products Regulatory Agency also found no safety concerns relating to pertussis vaccination in pregnancy based on a large study of nearly 18,000 vaccinated women with similar rates of normal, healthy births in vaccinated and in unvaccinated women [7].

Pertussis vaccine coverage averaged 75% across October and December 2016 (November data was unavailable), 14.2% higher than the October to December period in 2015. This continued the upward trend that started in the summer of 2016. Higher coverage in October to December may relate to pregnant women receiving pertussis vaccination alongside seasonal influenza vaccine. In addition, extended eligibility criteria for the vaccine, may have contributed to the increase [8].

Following the high levels of activity in 2012 (figure), an overall decrease has been observed with slight annual increases in the third quarters of subsequent years (2013 to 2016), in line with the usual seasonal pattern. Pertussis cases usually increase in the third quarter of each year and follow a recognised epidemiological pattern of 3-4 yearly cyclical peaks.

The number of laboratory confirmed cases in the first quarter of 2016 (1264 cases) was 12% higher than the 1125 reported during October to December 2015 (Q4) and such an increase into quarter 1 is unusual. The increase in the number of laboratory confirmed cases continued into quarter 2 (1448 cases) and quarter 3 (1874 cases) and then decreased in quarter 4 as expected. Confirmed cases in 2016 (5945 cases) were 42% higher than total cases in 2015 (4191 cases) however confirmed cases were 37% lower than the 9367 reported during 2012 (figure and table 2).

Total case numbers of pertussis in individuals aged six months and over were higher in Q4 2016 than in Q4 2015 (table 2) with the greatest number of laboratory confirmed cases in England persisting in individuals aged 15 years and over. Overall activity remained higher in all age groups from one year and older relative to the pre-2012 peak. Ascertainment in those aged 5-16 years has improved with availability of oral fluid testing since 2013. Please see the 2015 annual report [9] for details of appropriate laboratory investigation of suspected cases of pertussis which may be affected by the age of the suspect case and time since onset of their symptoms.

Although disease incidence continues to be highest in infants aged up to three months, the number of laboratory-confirmed cases aged under three months (20 cases) in the fourth quarter of 2016 was 38% lower than the 32 cases reported in the same quarter of 2015 (table 2) and remains low relative to the same period in 2012 (72 cases). In England one infant was reported to have died with pertussis confirmed between October and December 2016. Of the 18 infants who have died following confirmed pertussis disease and who were born after the introduction of the maternal programme on 1 October 2012, 16 have been born to mothers who had not been immunised against pertussis during pregnancy.

Surveillance data in young infants following the introduction of the pertussis immunisation in pregnancy programme continues to demonstrate that a relatively low incidence has been maintained in this age group, with expected seasonal increases. It is important to be aware, however, that raised levels of pertussis persist in groups aged one year and older. The increase in coverage reported during October and December is extremely encouraging and women should therefore continue to be encouraged to be immunised against pertussis during pregnancy (ideally between 20-32 weeks) in order to protect their babies from birth.

Table 1. Laboratory-confirmed cases of pertussis by age and testing method in England, October to December 2016.

Age group	Culture*	PCR	Serology	Oral fluid only	Total
<3 months	7	12	1	0	20
3-5 months	4	6	0	0	10
6-11 months	1	3	0	0	4
1-4 years	0	6	20	1	27
5-9 years	0	0	39	11	50
10-14 years	0	3	74	23	100
15+ years	5	8	1132	3	1148
Total	17	38	1266	38	1359

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

Total number of laboratory-confirmed pertussis cases per quarter in England, 2007 to 2016

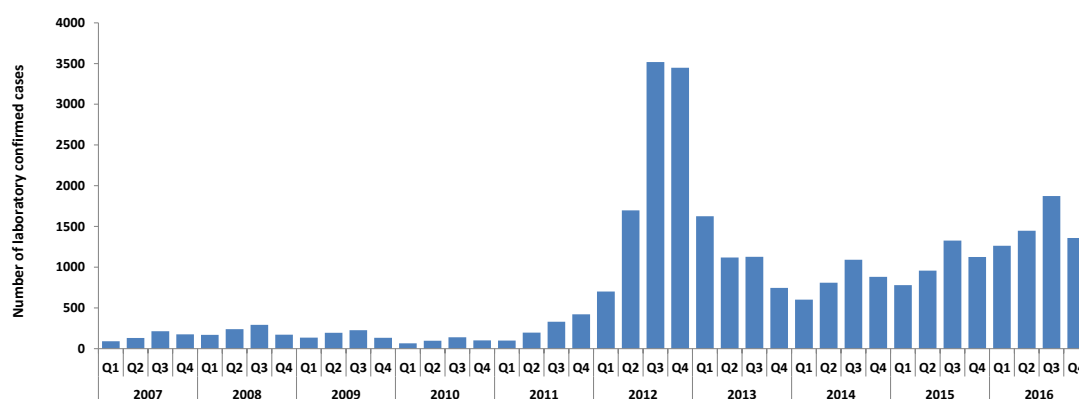


Table 2. Laboratory-confirmed cases of pertussis by age and year England, October to December: 2012-2016

Age group	2012	2013	2014	2015	2016
<3 months	72	13	13	32	20
3-5 months	10	1	4	4	10
6-11 months	5	0	1	2	4
1-4 years	45	24	21	20	27
5-9 years	59	24	34	56	50
10-14 years	240	47	84	88	100
15+ years	3018	638	725	923	1148
Grand Total	3449	747	882	1125	1359

References

1. [National increase in laboratory-confirmed pertussis cases in England and Wales](#), *HPR* **6**(15), 13 April 2012.
2. Department of Health: <https://www.gov.uk/government/news/pregnant-women-to-be-offered-whooping-cough-vaccination>
3. JCVI minutes: <https://www.gov.uk/government/groups/joint-committee-on-vaccination-and-immunisation#minutes>
4. G Amirthalingam, N Andrews, H Campbell, S Ribeiro, E Kara, K Donegan, N K Fry, E Miller, M Ramsay (2014). Effectiveness of maternal pertussis vaccination in England: an observational study. *Lancet*.
5. Dabrera G, Amirthalingam G, Andrews N et al (2014). A Case-Control Study to Estimate the Effectiveness of Maternal Pertussis Vaccination in Protecting Newborn Infants in England and Wales, 2012–2013. *Clin Infect Dis*.
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8. Pertussis Vaccination Programme for Pregnant Women: vaccine coverage estimates in England, October to December 2016, *HPR* **11**(8), 24 February 2017.
9. Laboratory confirmed cases of pertussis reported to the enhanced pertussis surveillance programme in England during October to December 2014, *HPR* **10**(16), 6 May 2016.