



Infection report

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Laboratory confirmed cases of pertussis reported to the enhanced pertussis surveillance programme in England: annual report for 2016

In England there were 5945 laboratory confirmed cases of pertussis (culture, PCR, serology or oral fluid) reported to the Public Health England pertussis enhanced surveillance programme in 2016. Pertussis is a cyclical disease (with increases occurring every 3-4 years) with pertussis activity usually peaking each year in quarter three. Numbers of confirmed cases in England in 2016 were 42% higher than the 4191 reported in 2015 but were 37% lower than the major peak observed in 2012 (9367 cases, figure 1). A third (32%; 1874/5945) of all confirmed cases in England in 2016 were reported in the third quarter (July to September) (table1).

Confirmed cases aged between 6-11 months and 5-9 years were higher in 2016 than any year reported since the introduction of enhanced surveillance in 1994, while cases aged 1-4 years were higher than in any of the previous 18 years. Similarly, the number of laboratory confirmed cases aged between 10-14 years reported in 2016 was the second highest reported after 2012. In infants under a year, pertussis cases were 33% higher in 2016 (n=233) than in 2015 (175) but lower than the 508 reported in 2012.

A national outbreak of pertussis (level 3 incident [1]) was declared by the HPA in April 2012 and, as a response to the ongoing outbreak, the Department of Health (DH) introduced a temporary immunisation programme for pregnant women from October 2012 [2]. In June 2014 the Joint Committee on Vaccination and Immunisation (JCVI) recommended that the programme should continue for a further five years [3] based on UK evidence of impact, high effectiveness and safety and continuing high levels of disease [4,5,6]. Latest effectiveness data indicate sustained effectiveness against laboratory confirmed pertussis and death in young infants in the three years following the introduction of the maternal vaccination programme [7]. From the 1st of April 2016, the recommended gestational age for vaccination changed to 16-32 weeks and for operational reasons should be offered from around 20 weeks on or after the foetal anomaly scan [3].

The most recent PHE figures report that the proportion of mothers due to give birth between January 2016 and December 2016 (November data unavailable) who had been immunised with

a pertussis containing vaccine in pregnancy in England increased from 59.7% in January to 76.2% in December 2016, the highest recorded since the programme started [8]. Since April 2016 a number of changes to the way coverage data are extracted from GP system came into effect and are thought to have contributed to the increase in coverage [9]. In addition, extended eligibility criteria for the vaccine, may have contributed to the increase [3].

The national incidence for all age groups, based on laboratory confirmations in England and 2015 population estimates [10], was; 2 cases of pertussis per 100,000 population in 2011, 18 per 100,000 in 2012 and 11 per 100.00 in 2016 (figure 2). As in 2012 to 2015, the majority (81%; 4786/5945) of laboratory confirmed cases in England in 2016 (incidence 11/100,000) occurred in individuals aged 15 years and older. Although incidence remains highest in infants <3 months, who are at most risk and too young to be fully vaccinated, there has been a decline since the introduction of the maternal vaccination programme from 234 per 100,000 in 2012 to 93 per 100,000 in 2016 (figure 2). Due to the cyclical nature of pertussis disease, the number of confirmed cases in infants <3 months increased by 18% in 2016 (154 cases) compared to 2015 (130 cases), although it was still 62% lower than in 2012 (407 cases).

In England, 14 deaths were reported in infants with confirmed pertussis in the 2012 peak year. Following the introduction of pertussis vaccination in pregnancy there have been 18 further deaths in babies with confirmed pertussis, with only four in 2016. All of the cases were too young to be fully protected by infant vaccination. Only two of the infants born after the introduction of the maternal programme had a mother who had been vaccinated during pregnancy. In both cases the vaccination was too close to delivery to confer optimal passive protection in the infant.

These surveillance data in young infants following the introduction of a programme to immunise pregnant women demonstrate that, despite high levels of circulating pertussis, a relatively low incidence has been maintained in infants being targeted by the programme, even during the expected seasonal increases. It is important to be aware, however, that raised levels of pertussis persist in all age groups other than infants. Women should, therefore, continue to be encouraged to be immunised against pertussis during pregnancy in order to protect their babies from birth. The advice to offer vaccination earlier in pregnancy should lead to more opportunities for pregnant women to be vaccinated and to have their vaccine status checked.

Please see the 2015 annual report [HPR Vol 10 No. 16 (11)] 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.

Figure 1. Total number of laboratory-confirmed pertussis cases per evaluation quarter in England: 2007 to 2016

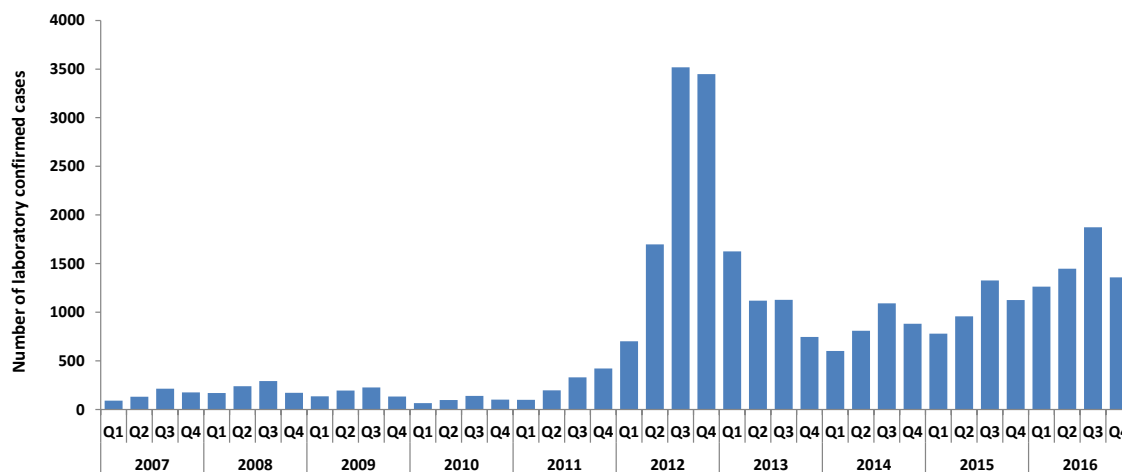


Table 1. Laboratory-confirmed cases of pertussis by quarter and test method in England: 2016

Quarter	Culture*	PCR	Serology	OF only	Total
Jan - Mar	28	35	1149	52	1264
Apr - Jun	65	63	1249	71	1448
Jul - Sep	45	93	1664	72	1874
Oct - Dec	17	38	1266	38	1359
Total	155	229	5328	233	5945

* 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.

Figure 2. Incidence of laboratory-confirmed pertussis cases by age group in England: 1998-2016

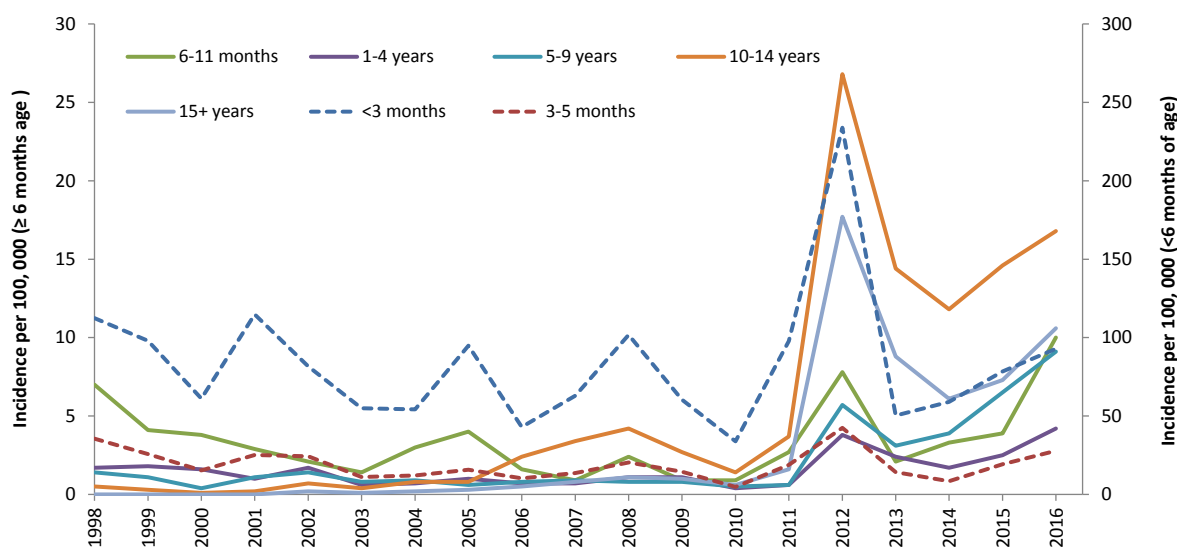


Table 2. Age distribution of laboratory-confirmed cases of pertussis in England: 2016

Age group	Culture*	PCR	Serology	OF only	Total
<3 months	60	89	5	-	154
3-5 months	17	27	2	-	46
6-11 months	13	19	1	-	33
1-4 years	16	28	71	2	117
5-9 years	5	12	186	102	305
10-14 years	9	11	383	101	504
15+ years	35	43	4680	28	4786
Total	155	229	5328	233	5945

* 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.

References

1. [National increase in laboratory-confirmed pertussis cases in England and Wales](#), *HPR* 6(15), 13 April 2012.
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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.
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10. [Office for National Statistics – 2014 Census population estimates](#).
11. 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.