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Laboratory confirmed cases of pertussis (England): annual report for 2017

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In England there were 4341 laboratory confirmed cases of pertussis (culture, PCR, serology or oral fluid) reported to the Public Health England pertussis enhanced surveillance programme in 2017. Pertussis is a cyclical disease, with increases occurring every 3-4 years, with pertussis activity usually peaking each year in quarter three. The 4341 confirmed cases in England in 2017 were 27% lower than the 5949 reported in 2016 (Figure 1). Almost a third (30%; 1324/4341) of all confirmed cases in England in 2017 were reported in the third quarter (July to September) (table1).

A national outbreak of pertussis [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 [4,5,6,7]. From 1 April 2016 the recommended gestational age for vaccination was revised to between 20-32 weeks but can be given as early as 16 weeks [3].

The most recent PHE figures report that the proportion of mothers due to give birth between January 2017 and December 2017 who had been immunised with a pertussis containing vaccine in pregnancy in England was 72.3% (range 69.3% to 75.3%) [8] compared to 67.5% in 2016. 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 in the increase in coverage [9]. In addition, extended gestational 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 2016 population estimates [10], was 8 per 100,000 in 2017 compared to 11/100,000 in 2016 and 18/100,000 in 2012 (peak years). Prior to the major peak in

2012, incidence ranged between 0.4/100,000 to 2/100,000 (figure 2).

In infants under a year, laboratory confirmed pertussis cases were 28% lower in 2017 (n=169) than in 2016 (n=236) and in 2015 (n=175) compared to 508 cases reported in 2012. The number of cases aged 6-11 months (17 cases) and 1-4 years (75 cases) confirmed in 2017 were 50% and 36% lower than the 34 and 117 cases confirmed in 2016. Similarly the number of confirmed cases aged 5-9 years (198 cases) was 35% lower than 305 cases reported in 2016. A peak pertussis year occurred in 2016 with the highest number of cases reported in the 6-11 month and 5-9 year age groups since the introduction of enhanced surveillance in 1994; cases in 1-4 year olds were the highest in 18 years. As in 2012 to 2016, the majority (81%; 3530/4341) (table 2) of laboratory confirmed cases in England in 2017 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 234/100,000 in 2012 to 93/100,000 in 2016 and 69/100,000 in 2017 (figure 2). Due to the cyclical nature of pertussis disease, the number of confirmed cases in infants <3 months increased by 19% in 2016 (155 cases) compared to 2015 (130 cases) and decreased by 26% (115) in 2017. The number of infants <3 months confirmed in 2017 was 72% 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. There were no reported deaths in babies confirmed with pertussis in 2017. All of the deaths in 2012 and those that have occurred following introduction of the maternal programme 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 guidelines for the public health management of pertussis (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: 2008 to 2017.

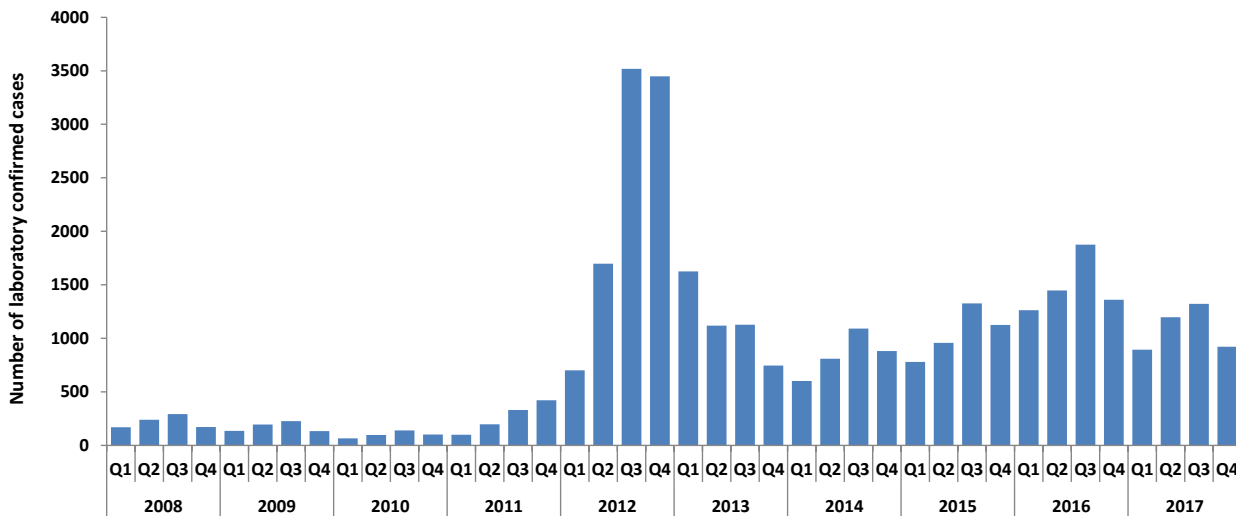


Table 1. Laboratory-confirmed cases of pertussis by quarter and test method in England: 2017

Quarter	Culture*	PCR	Serology	OF only	Total
Jan - Mar	21	45	799	31	896
Apr - Jun	24	59	1049	66	1198
Jul - Sep	32	74	1178	40	1324
Oct - Dec	10	34	859	20	923
Total	87	212	3885	157	4341

* Culture confirmed cases may additionally have tested positive by any other method, PCR confirmed cases may have additionally tested positive by

serology or OF and serology confirmed cases may also have been confirmed by OF. 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: 1998-2017

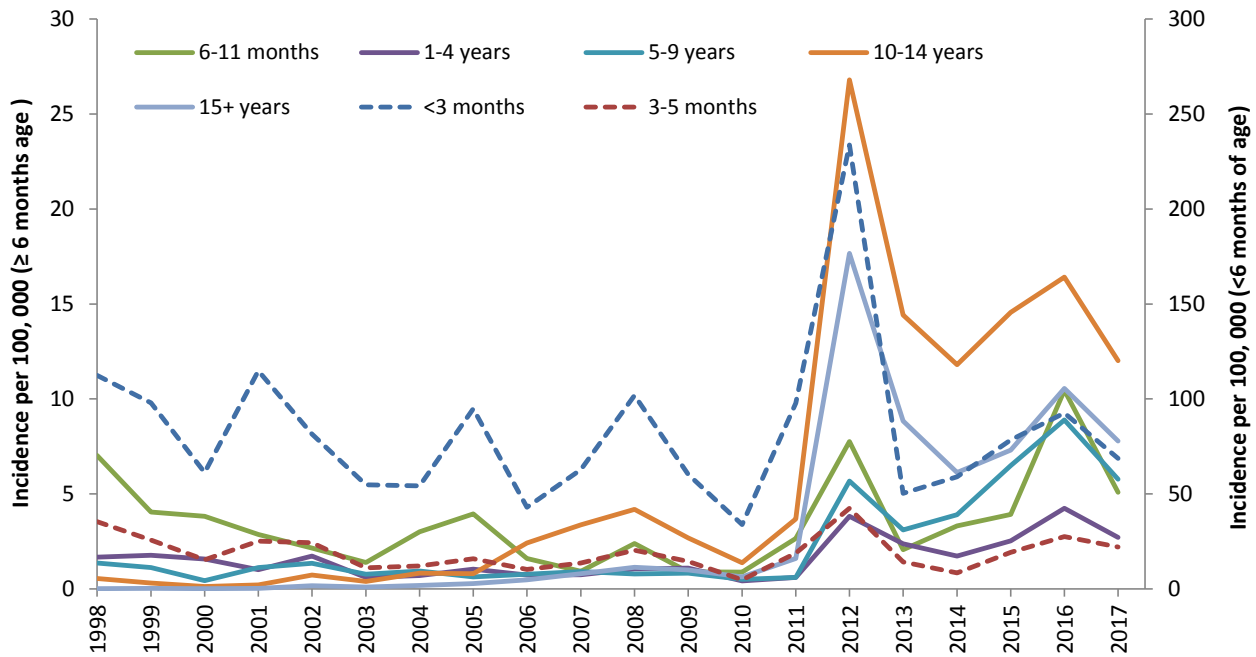


Table 2. Age distribution of laboratory-confirmed cases of pertussis in England: 2017

Age group	Culture*	PCR	Serology	OF only	Total
<3 months	40	75	0	0	115
3-5 months	7	30	0	0	37
6-11 months	4	11	2	0	17
1-4 years	11	27	37	0	75
5-9 years	4	11	115	68	198
10-14 years	4	8	277	80	369
15+ years	17	50	3454	9	3530
Total	87	212	3885	157	4341

* Culture confirmed cases may additionally have tested positive by any other method, PCR confirmed cases may have additionally tested positive by serology or OF and serology confirmed cases may also have been confirmed by OF. Submission of all presumptive *B. pertussis* isolates is encouraged for confirmation of identity and to allow further characterisation for epidemiological purposes.

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Health Protection Report is a national public health bulletin for England and Wales, published by Public Health England. It is PHE's principal channel for the dissemination of laboratory data relating to pathogens and infections/communicable diseases of public health significance and of reports on outbreaks, incidents and ongoing investigations.

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