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Laboratory confirmed pertussis in England: data to end-May 2014

With the exception of a small expected seasonal peak in July and August 2013, overall pertussis activity in England continued to fall through to April 2014 but has increased slightly into May and continues to persist at raised levels compared to the years preceding the outbreak in 2012. An increase in laboratory confirmed cases has been observed in adolescents aged 10-14 years from December 2013, in infants <3 months of age from April 2014 and in adults aged 15 years and older in May 2014. There have been five deaths in infants with pertussis diagnosed in 2014 to the end of May. Immunisation of pregnant women continues to be important in the face of these continued raised levels of pertussis and recent infant deaths and with the newly published high effectiveness and safety of the pertussis immunisation in pregnancy programme [1,2]. This news report presents current pertussis activity to 31 May 2014, updating the previous report that included data to the end of December 2013 [3].

A level 3 incident was declared in April 2012 to coordinate the response to the ongoing increased pertussis activity observed in the third quarter of 2011 and extending into 2012 (figure 1) [4]. In response to this ongoing outbreak, the Department of Health announced on 28 September [5,6] that pertussis immunisation would be offered to pregnant women from 1 October 2012 to protect infants from birth whilst disease levels remain high. Available data relating to the coverage, effectiveness and safety of the programme, its impact on disease and current epidemiology were considered by the Joint Committee on Vaccination and Immunisation (JCVI) at its June 2014 meeting and on the basis of these data it has advised that this programme should be continued for a further five years [7].

In infants under three months of age low numbers of cases have been sustained since December 2012 with <10 cases per month up to August 2013 and six or fewer cases reported each month between September 2013 and March 2014. Cases increased in April and May 2014, however, with 11 and 14 cases respectively; the highest number of monthly cases since 23 reported in November 2012. The greatest decrease in disease since the peak in 2012 has been in infants under six months of age who are targeted by the maternal pertussis vaccination programme.

Disease incidence has, as expected, continued to be highest in this age group. There have been five deaths reported in young babies (<2 months) diagnosed with pertussis this year. In total eight deaths have been reported in young babies with confirmed pertussis who were born after the introduction of the pregnancy programme on 1 October 2012. Seven of these eight babies were born to mothers who had not been vaccinated against pertussis.

Pertussis activity in infants aged 3-11 months of age remained low with occasional cases reported, almost all in infants who had not received three primary doses of vaccine. Confirmed pertussis also remains low in children aged 1-4 years and, whilst small numbers of cases were confirmed in those aged 5-9 years, these increased slightly to 10-13 cases each month from February 2014 and in the first five months of 2014 exceeded the number of cases in the same time period confirmed each year from 2008.

Pertussis activity in adolescents, teenagers and adults (aged 10-14 and ≥15 years) was lower in January to May 2014 when compared to the equivalent period in 2013 (table 1). Monthly cases in the 10-14 year age group had increased, however, from December 2013. Cases in those aged 15 years and older were relatively stable in the first four months of 2014 but appeared to increase in May. Overall, confirmed cases of pertussis have been lower between January and May 2014 than in the first five months of the two preceding years but cases continue to exceed those confirmed in years prior to 2012. High pertussis activity has been observed across all regions in England with a third of cases in 2014 reported from the South of England (table 2).

The pertussis vaccination in pregnancy programme continues to be important for the prevention of serious disease and death in young babies. To optimise protection of their babies, women should ideally be immunised between 28-32 weeks gestation but may be immunised up to week 38 of pregnancy. Immunisation after week 38 is not ideal as it is unlikely to provide direct passive protection to the infant. Pregnant women who remain unprotected can be offered vaccination after 38 weeks as can new mothers who have not been vaccinated in pregnancy. At this stage of pregnancy, however, vaccination would potentially only directly protect the mother against disease and thereby just reduce the risk of exposure to her infant.

Approximately 60% of all pregnant women in England are currently being vaccinated in pregnancy [8]. This is important because around 75% of all cases of pertussis in babies occur before they can be protected by even the first dose of infant vaccine and when there is a high risk of serious disease. The babies that have died from pertussis in England over recent years all acquired pertussis in the first few weeks of life. Information generated from the pertussis immunisation in pregnancy programme in England has shown high levels of protection against disease in babies born to vaccinated women. Babies born to women vaccinated at least a week

before delivery had a 91% reduction in the risk of disease in their first weeks of life when compared to babies whose mothers had not been vaccinated [1]. In addition, no safety concerns were found relating to pertussis vaccination in pregnancy in a study undertaken by the Medicines and Healthcare Products Regulatory Agency [2].

Figure 1: Provisional number of laboratory confirmed cases of pertussis in England by age group and month: January 2011 to May 2014

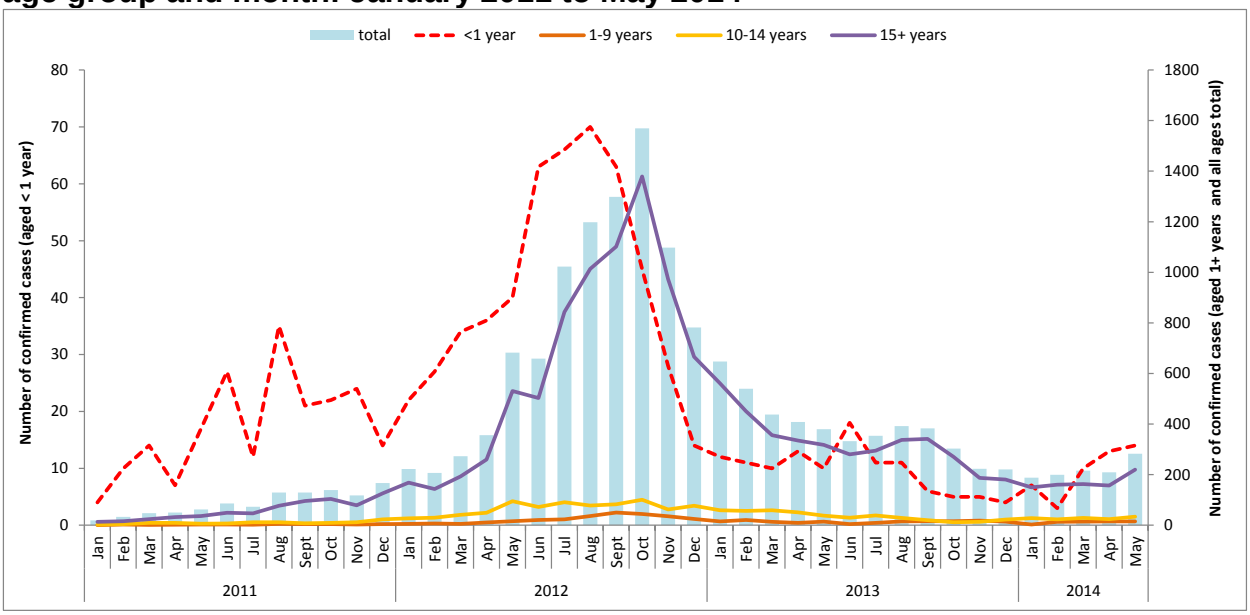

Table 1: Provisional number of laboratory confirmed cases in England, 2008-2014 by age group: January to May

Year	Month	Age group							
		<3 months	3-5 months	6-11 months	1-4 years	5-9 years	10-14 years	15+ years	All ages
2008	January - May	62	13	2	11	8	57	155	308
2009	January - May	45	13	0	9	4	33	137	241
2010	January - May	21	3	0	2	5	22	78	131
2011	January - May	41	9	2	4	5	30	121	212
2012	January - May	136	21	2	7	37	242	1295	1740
2013	January - May	42	13	1	27	45	264	2021	2413
2014	January - May	37	5	5	12	48	138	850	1095

Table 2: Provisional number of laboratory confirmed cases in England, 2008-2014 by PHE Region and PHE Centre: January to May

PHE Region	PHE Centre	2008	2009	2010	2011	2012	2013	2014
		January - May	January - May	January - May	January - May	January - May	January - May	January - May
London	London	33	37	15	26	145	260	183
Midlands and East of England	Anglia and Essex	21	18	8	13	95	197	71
	East Midlands	22	28	4	31	191	282	82
	South Midlands and Hertfordshire	12	5	2	12	64	71	46
	West Midlands	23	18	1	14	98	193	89
	Total	78	69	15	70	448	743	288
North of England	Cheshire and Merseyside	17	9	4	5	34	84	28
	Cumbria and Lancashire	11	14	9	12	31	59	17
	Greater Manchester	5	2	4	7	60	45	22
	North East	19	5	19	19	86	147	36
	Yorkshire and Humber	15	13	15	16	200	266	158
	Total	67	43	51	59	411	601	261
South of England	Avon, Gloucestershire and Wiltshire	41	24	7	18	275	244	53
	Devon, Cornwall and Somerset	15	9	17	7	80	115	45
	Sussex, Surrey and Kent	23	20	8	18	191	306	154
	Thames Valley	36	27	15	11	79	65	45
	Wessex	15	12	3	3	111	79	66
	Total	130	92	50	57	736	809	363
England Total		308	241	131	212	1740	2413	1095

References

1. Amirthalingam G, Andrews N, Campbell H *et al*. "Effectiveness of maternal pertussis vaccination in England: an observational study". *Lancet* (Early Online Publication), 16 July 2014.

2. Donegan K, King B, Bryan P. "The safety of pertussis vaccination in pregnant women in the UK: An observational study". *BMJ* 2014; 349: g4219.

3. Confirmed pertussis cases in England and Wales: update to end-December 2013. *HPR* **8**(6): news, 14 February 2014. http://www.hpa.org.uk/hpr/archives/2014/news0614.htm#prtsss.

4. 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* **6**(15), http://www.hpa.org.uk/hpr/archives/2012/news1512.htm).

5. "Pregnant women to be offered whooping cough vaccination", 28 September 2012. Department of Health website, http://www.dh.gov.uk/health/2012/09/whooping-cough/.

6. "HPA welcomes introduction of whooping cough vaccination for pregnant women as outbreak continues", HPA press release, 28 September 2012, HPA legacy website: http://www.hpa.org.uk/NewsCentre/NationalPressReleases/2012PressReleases/120928whoopvaccforpregwomenwelcome/.

7. Joint committee of Vaccination and Immunisation minutes: https://www.gov.uk/government/groups/joint-committee-on-vaccination-and-immunisation#minutes

8. Pertussis Vaccination Programme for Pregnant Women: vaccine coverage estimates in England, October 2012 to March 2014: https://www.gov.uk/government/publications/pertussis-vaccine-uptake-in-pregnant-women-october-2012-to-march-2014.