



Public Health
England

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Laboratory confirmed cases of pertussis in England: annual report for 2017 supplementary data tables

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Published August 2018
PHE publications
gateway number: 2018076

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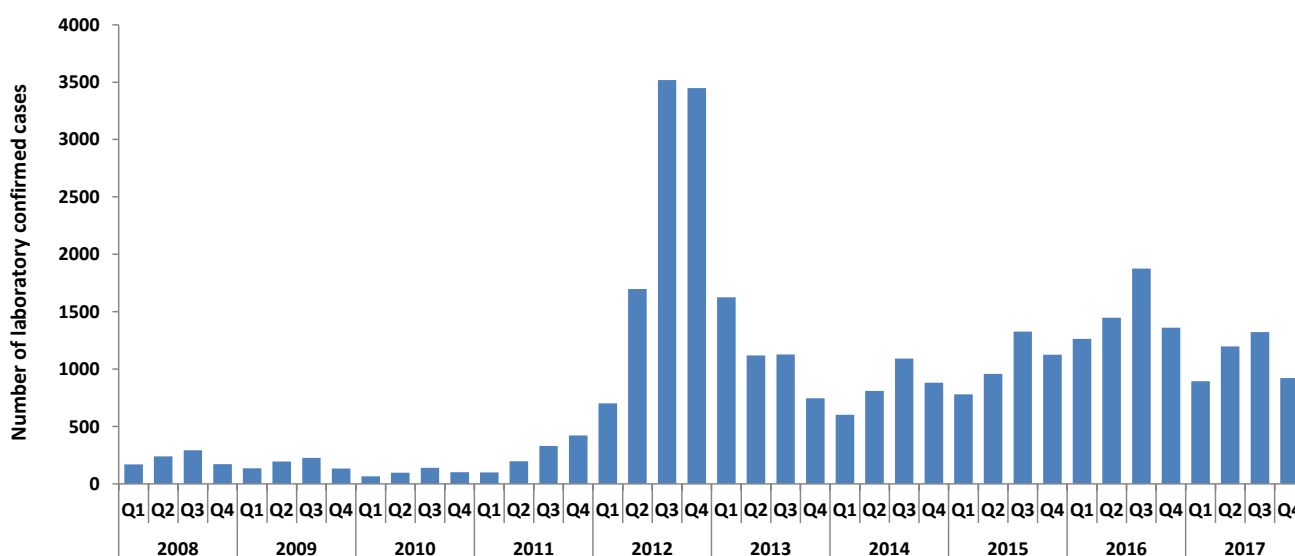
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Laboratory confirmed cases of pertussis in England: annual report for 2017 supplementary data tables

Laboratory confirmed cases of pertussis reported to the enhanced surveillance programme in England: annual report for 2017:

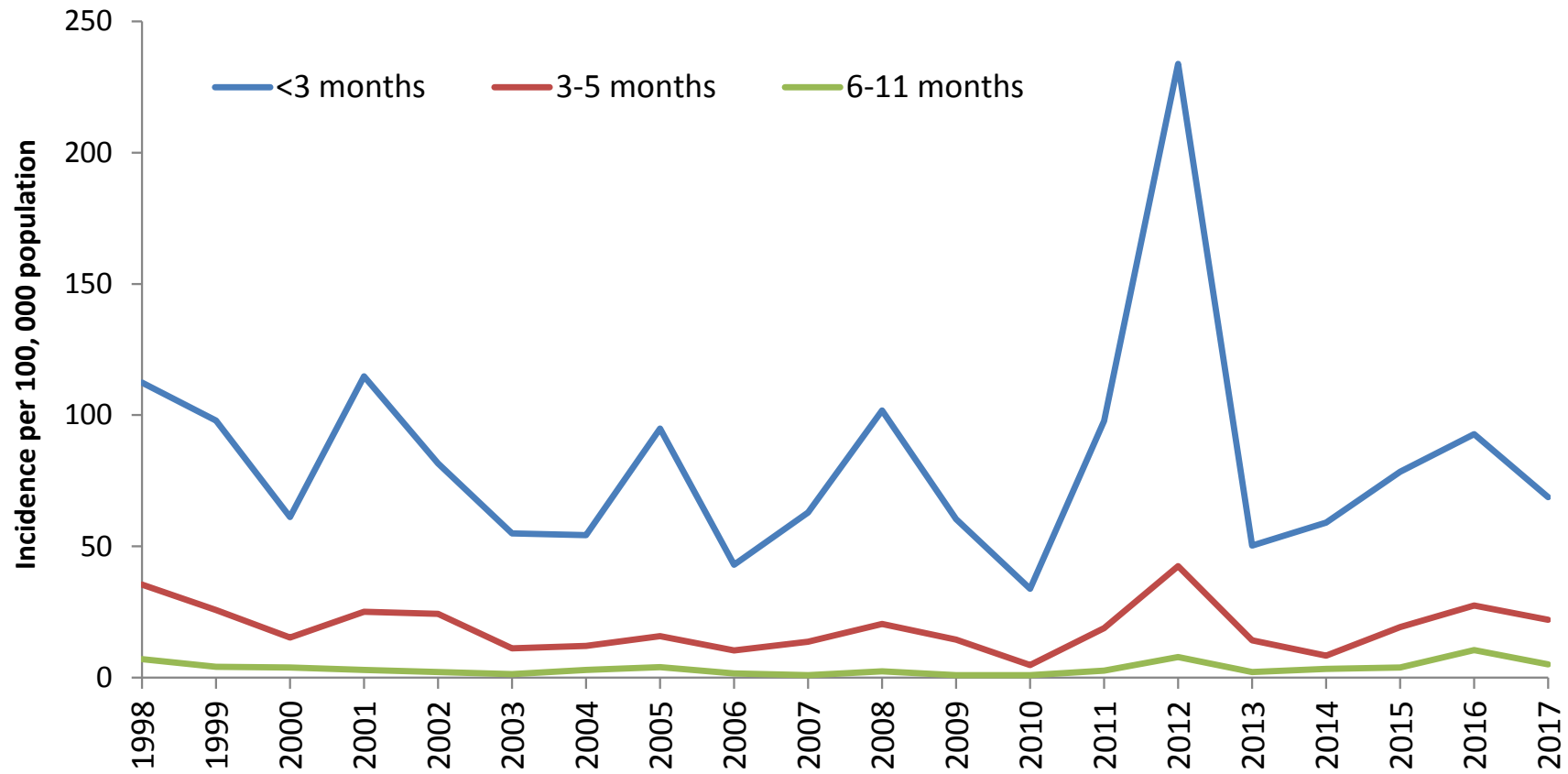
<https://www.gov.uk/government/publications/pertussis-laboratory-confirmed-cases-reported-in-england-2017>

Figure 1: Laboratory confirmed cases of pertussis infection by year and quarter, England: 2008 to 2017*



*2017 are provisional data.

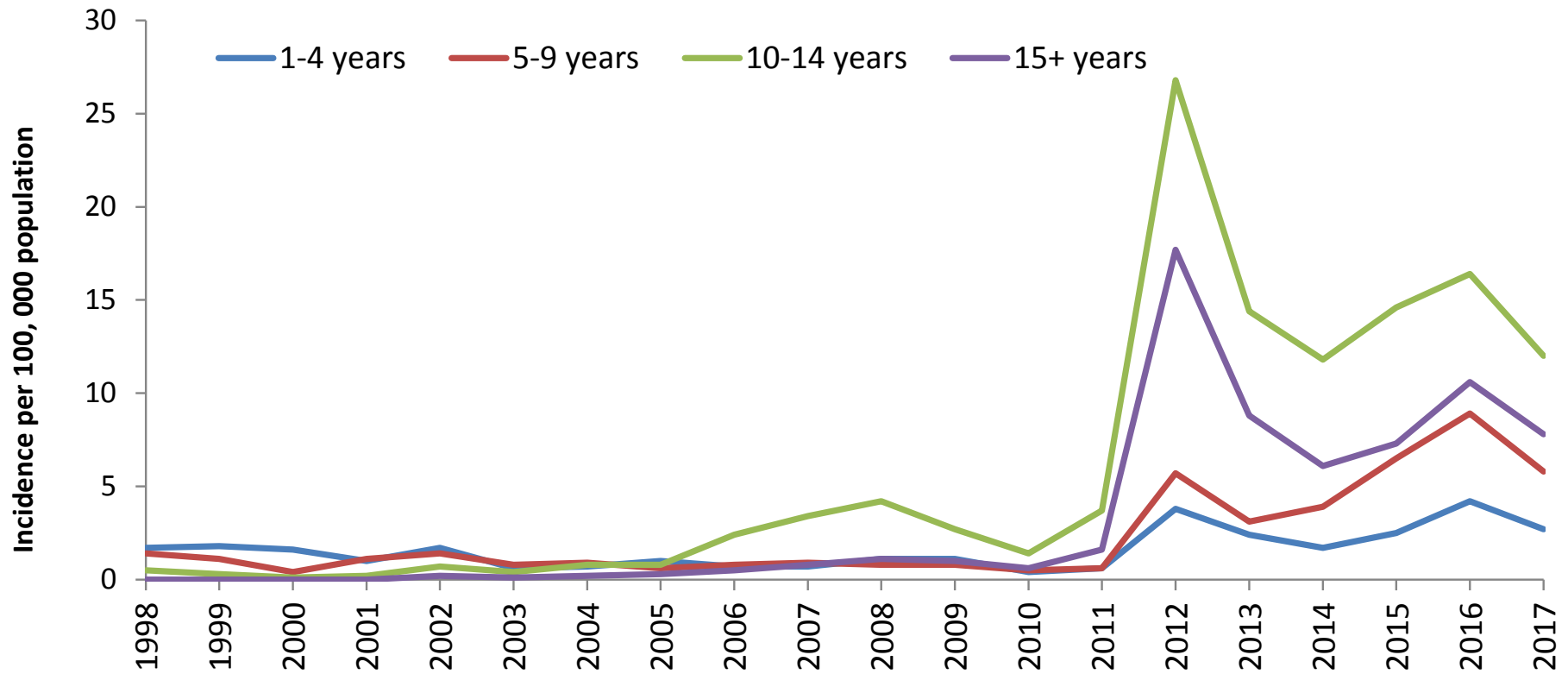
Figure 2a: Incidence of laboratory confirmed pertussis cases, aged < 1 year, England: 1998-2017*~



*2017 are provisional data.

~More diagnostic methods have become available over the time period presented with increasing use of serology in particular from around 2006 (see Table 4 and Figure 3) and oral fluid testing introduced from 2013 for those aged 5-16 years.

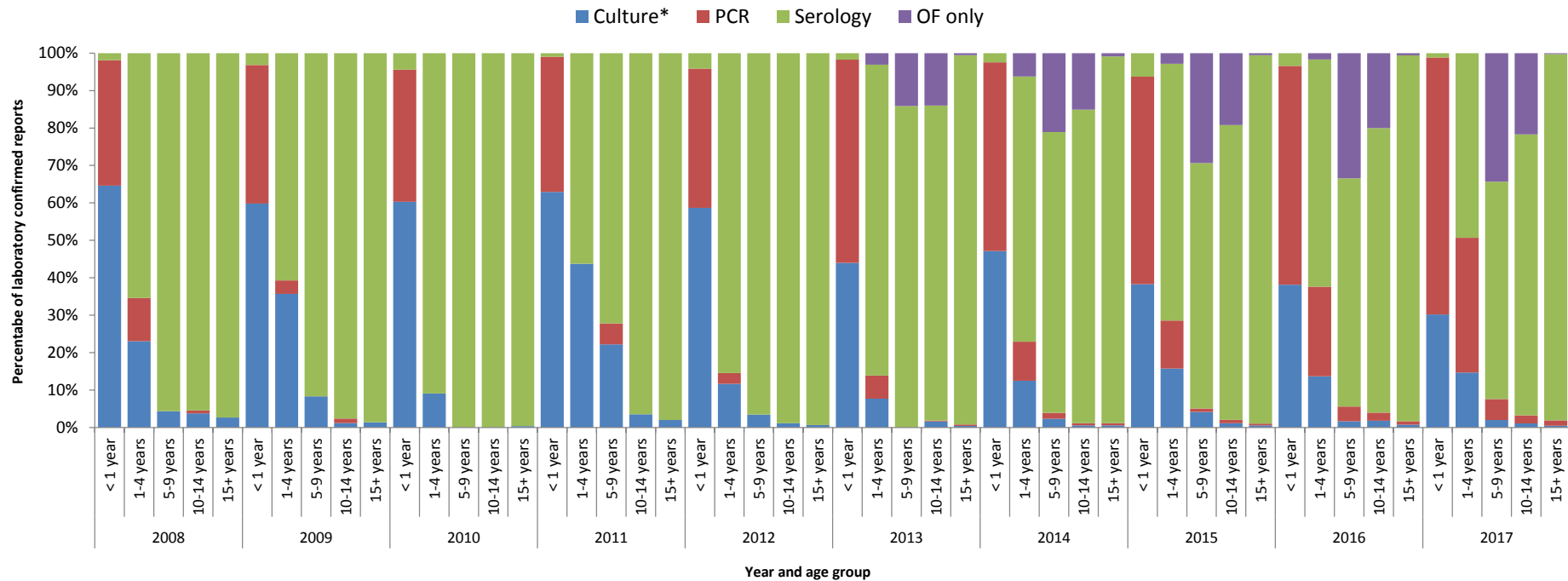
Figure 2b: Incidence of laboratory confirmed pertussis cases, aged 1 year and older, England: 1998-2017*~



*2017 are provisional data.

~More diagnostic methods have become available over the time period presented with increasing use of serology in particular from around 2006 (see Table 4 and Figure 3) and oral fluid testing introduced from 2013 for those aged 5-16 years.

Figure 3: Proportionate distribution of laboratory confirmed pertussis cases by laboratory method shown by year and age group, England 2008-2017*~



*2017 are provisional data.

~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. Cases are only represented once on the graph.

Table 1: Laboratory confirmed cases of pertussis infection by laboratory method[#], year and quarter, England: 2002-2017*~

Year and Quarter	Culture	PCR	Serology	Oral Fluid only	Total	Serology reports as % of total
2002-1	53		13	-	66	20%
2002-2	68	8	42	-	118	36%
2002-3	69	5	36	-	110	33%
2002-4	25	2	15	-	42	36%
2002 Total	215	15	106	-	336	32%
2003-1	15	1	7	-	23	30%
2003-2	28	1	13	-	42	31%
2003-3	47	7	25	-	79	32%
2003-4	12	5	31	-	48	65%
2003 Total	102	14	76	-	192	40%
2004-1	9	3	5	-	17	29%
2004-2	30	11	40	-	81	49%
2004-3	41	11	34	-	86	40%
2004-4	29	5	38	-	72	53%
2004 Total	109	30	117	-	256	46%
2005-1	39	11	24	-	74	32%
2005-2	35	9	30	-	74	41%
2005-3	69	17	54	-	140	39%
2005-4	27	8	43	-	78	55%
2005 Total	170	45	151	-	366	41%
2006-1	24	5	24	-	53	45%
2006-2	21	5	26	-	52	50%
2006-3	35	3	160	-	198	81%
2006-4	21	2	78	-	101	77%
2006 Total	101	15	288	-	404	71%
2007-1	13	2	76	-	91	84%
2007-2	24	6	103	-	133	77%
2007-3	43	19	152	-	214	71%
2007-4	20	16	141	-	177	80%
2007 Total	100	43	472	-	615	77%
2008-1	36	10	125	-	171	73%
2008-2	47	18	175	-	240	73%
2008-3	70	34	189	-	293	65%
2008-4	9	13	151	-	173	87%
2008 Total	162	75	640	-	877	73%
2009-1	19	13	104	-	136	76%
2009-2	36	14	146	-	196	74%
2009-3	30	18	179	-	227	79%
2009-4	10	4	120	-	134	90%
2009 Total	95	49	549	-	693	79%
2010-1	8	3	56	-	67	84%
2010-2	15	7	76	-	98	78%
2010-3	12	7	122	-	141	87%
2010-4	8	7	88	-	103	85%
2010 Total	43	24	342	-	409	84%

Laboratory confirmed cases of pertussis in England: 2017 data tables

Year and Quarter	Culture	PCR	Serology	Oral Fluid only	Total	Serology reports as % of total
2011-1	22	12	66	-	100	66%
2011-2	47	12	138	-	197	70%
2011-3	50	25	256	-	331	77%
2011-4	39	26	358	-	423	85%
2011 Total	158	75	818	-	1051	78%
2012-1	72	22	608	-	702	87%
2012-2	83	60	1554	-	1697	92%
2012-3	155	77	3287	-	3519	93%
2012-4	66	34	3349	-	3449	97%
2012 Total	376	193	8798	-	9367	94%
2013-1	18	21	1553	33	1625	96%
2013-2	27	21	1047	25	1120	93%
2013-3	23	31	1050	25	1129	93%
2013-4	12	9	712	14	747	95%
2013 Total	80	82	4362	97	4621	94%
2014-1	15	13	552	22	602	92%
2014-2	21	25	743	21	810	92%
2014-3	32	39	990	32	1093	91%
2014-4	17	9	824	32	882	93%
2014 Total	85	86	3109	107	3387	92%
2015-1	11	22	723	25	781	93%
2015-2	28	30	845	55	958	88%
2015-3	49	50	1172	56	1327	88%
2015-4	22	27	1045	31	1125	93%
2015 Total	110	129	3785	167	4191	90%
2016-1	28	35	1149	52	1264	91%
2016-2	65	63	1249	71	1448	86%
2016-3	45	94	1664	72	1875	89%
2016-4	17	41	1266	38	1362	93%
2016 Total	155	233	5328	233	5949	90%
2017-1	21	45	799	31	896	89%
2017-2	24	59	1049	66	1198	88%
2017-3	32	74	1178	40	1324	89%
2017-4	10	34	859	20	923	93%
2017 Total	87	212	3885	157	4341	89%

#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. Cases are only represented once in the table.

*2017 are provisional data.

~More diagnostic methods have become available over the time period presented with increasing use of serology in particular from around 2006 (see Table 4 and Figure 3) and oral fluid testing introduced from 2013 for those aged 5-16 years.

Table 2: Laboratory confirmed cases of pertussis infection by region[#], England: 1994 to 2017*~ (confirmed by culture, PCR, serology and/or oral fluid)

Year	East Midlands	East of England	London	North East	North West	South East	South West	West Midlands	Yorkshire & Humber	England Total
1994	28	53	38	24	119	67	59	20	48	456
1995	16	16	16	9	49	40	14	16	10	186
1996	29	27	14	24	77	51	63	48	32	365
1997	50	61	31	53	128	88	85	67	70	633
1998	46	41	11	21	71	51	53	23	33	350
1999	22	33	18	20	56	29	59	29	28	294
2000	6	22	13	8	32	39	30	22	11	183
2001	12	13	16	16	45	66	48	38	27	281
2002	59	22	19	18	35	59	65	47	12	336
2003	7	21	19	11	48	32	28	15	11	192
2004	32	17	37	19	42	52	22	19	16	256
2005	35	25	36	12	48	54	69	57	30	366
2006	56	32	55	32	74	56	51	23	25	404
2007	61	52	66	35	68	139	119	39	36	615
2008	66	73	107	48	90	183	161	89	60	877
2009	56	57	89	24	92	152	121	50	52	693
2010	30	26	55	42	65	61	65	20	45	409
2011	133	104	92	73	114	192	178	73	92	1051
2012	1182	1112	785	411	657	1814	1517	752	1137	9367
2013	551	499	516	234	348	855	716	399	503	4621
2014	266	357	537	98	231	715	426	298	459	3387
2015	364	410	559	157	387	791	642	440	441	4191
2016	537	943	799	208	547	848	682	632	753	5949
2017	403	492	633	164	303	723	669	438	516	4341

[#]Region based on patient GP surgery.

*2017 are provisional data.

~More diagnostic methods have become available over the time period presented with increasing use of serology in particular from around 2006 (see Table 4 and Figure 3) and oral fluid testing introduced from 2013 for those aged 5-16 years.

Table 3: Laboratory confirmed cases of pertussis infection by age group, England: 1994 to 2017*~ (confirmed by culture, PCR, serology and/or oral fluid)

Year	<3 months	3-5 months	6-11 months	1-4 years	5-9 years	10-14 years	15+ years	Total #
1994	157	35	22	114	59	22	10	456
1995	76	20	9	37	34	6	4	186
1996	152	36	17	75	53	16	11	365
1997	290	71	26	127	84	18	14	633
1998	168	53	21	41	44	17	6	350
1999	145	38	12	43	36	10	10	294
2000	88	22	11	38	14	4	6	183
2001	160	35	8	24	35	7	12	281
2002	114	34	6	40	42	24	68	336
2003	79	16	4	14	24	13	42	192
2004	81	18	9	16	29	27	76	256
2005	144	24	12	24	19	26	117	366
2006	67	16	5	17	23	77	199	404
2007	101	22	3	18	27	107	337	615
2008	170	34	8	26	23	132	484	877
2009	100	24	3	28	24	84	430	693
2010	57	8	3	11	15	43	272	409
2011	164	32	9	16	18	113	699	1051
2012	407	74	27	103	175	806	7775	9367
2013	85	24	7	65	99	429	3912	4621
2014	98	14	11	48	128	351	2737	3387
2015	130	32	13	70	218	437	3291	4191
2016	155	47	34	117	305	504	4787	5945
2017	115	37	17	75	198	369	3530	4341

*2017 are provisional data.

~More diagnostic methods have become available over the time period presented with increasing use of serology in particular from around 2006 (see Table 4 and Figure 3) and oral fluid testing introduced from 2013 for those aged 5-16 years.

#The totals include a very small number of cases where the age was not known.

Table 4: Laboratory confirmed cases of pertussis infection by age group and laboratory method[#], England: 2002 to 2017*~

Year	Laboratory method	<1 year	1-4 years	5-9 years	10-14 years	15+ years	Total [∞]
2002	Culture	140	30	19	5	13	215
	PCR	10	3	2	0	0	15
	Serology	4	7	21	19	55	106
2002 Total		154	40	42	24	68	336
2003	Culture	86	10	3	1	2	102
	PCR	12	2	0	0	0	14
	Serology	1	2	21	12	40	76
2003 Total		99	14	24	13	42	192
2004	Culture	81	13	6	4	5	109
	PCR	27	0	2	0	1	30
	Serology	0	3	21	23	70	117
2004 Total		108	16	29	27	76	256
2005	Culture	137	18	6	1	8	170
	PCR	38	1	1	3	2	45
	Serology	5	5	12	22	107	151
2005 Total		180	24	19	26	117	366
2006	Culture	72	10	2	9	8	101
	PCR	13	1	0	1	0	15
	Serology	3	6	21	67	191	288
2006 Total		88	17	23	77	199	404
2007	Culture	77	4	5	6	8	100
	PCR	41	1	0	1	0	43
	Serology	8	13	22	100	329	472
2007 Total		126	18	27	107	337	615
2008	Culture	137	6	1	5	13	162
	PCR	71	3	0	1	0	75
	Serology	4	17	22	126	471	640
2008 Total		212	26	23	132	484	877
2009	Culture	76	10	2	1	6	95
	PCR	47	1	0	1	0	49
	Serology	4	17	22	82	424	549
2009 Total		127	28	24	84	430	693
2010	Culture	41	1	0	0	1	43
	PCR	24	0	0	0	0	24
	Serology	3	10	15	43	271	342
2010 Total		68	11	15	43	272	409
2011	Culture	129	7	4	4	14	158
	PCR	74	0	1	0	0	75
	Serology	2	9	13	109	685	818
2011 Total		205	16	18	113	699	1051

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Year	Laboratory method	<1 year	1-4 years	5-9 years	10-14 years	15+ years	Total [∞]
2012	Culture	298	12	6	9	51	376
	PCR	189	3	0	0	1	193
	Serology	21	88	169	797	7723	8798
2012 Total		508	103	175	806	7775	9367
2013	Culture	51	5	0	7	17	80
	PCR	63	4	0	1	14	82
	Serology	2	54	85	361	3860	4362
	OF	0	2	14	60	21	97
2013 Total		116	65	99	429	3912	4621
2014	Culture	58	6	3	2	16	85
	PCR	62	5	2	2	15	86
	Serology	3	34	96	294	2682	3109
	OF	0	3	27	53	24	107
2014 Total		123	48	128	351	2737	3387
2015	Culture	67	11	9	5	18	110
	PCR	97	9	2	4	17	129
	Serology	11	48	143	344	3239	3785
	OF	0	2	64	84	17	167
2015 Total		175	70	218	437	3291	4191
2016	Culture	90	16	5	9	35	155
	PCR	138	28	12	11	44	233
	Serology	8	71	186	383	4680	5328
	OF	0	2	102	101	28	233
2016 Total		236	117	305	504	4787	5949
2017	Culture	51	11	4	4	17	87
	PCR	116	27	11	8	50	212
	Serology	2	37	115	277	3454	3885
	OF	0	0	68	80	9	157
2017 Total		169	75	198	369	3530	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. Cases are only represented once in the table.

*2017 are provisional data.

∞The totals include a very small number of cases where the age was not known.

~More diagnostic methods have become available over the time period presented with increasing use of serology in particular from around 2006 (see Figure 3) and oral fluid testing introduced from 2013 for those aged 5-16 years.

Table 5: Pertussis notifications and deaths, England: 2001 – 2017*

Year	Notifications	Deaths[∞]
2001	851	6
2002 [#]	858	2
2003	386	0
2004 [#]	475	4
2005	567	6
2006	539	4
2007	1,070	4
2008	1,465	6
2009	1,126	2
2010	382	1
2011	811	5
2012	6,223	14
2013 [#]	2,967	3
2014	2,302	7
2015	2,680	4
2016 [#]	4,134	4
2017*	3,027	0

[∞] From 2001 death data includes deaths from all sources linked to a laboratory-confirmed case of pertussis aged less than 1 year.

[#] Where a case was confirmed in one year but died the following year this is recorded as a death in the year it was confirmed. This ensures consistency between data presented on laboratory confirmed cases of pertussis and related deaths.

* 2017 data are provisional data.

Table 6: Historic pertussis notifications and deaths, England and Wales:

1940 - 2000

Year	Notifications	Deaths~
1940	53,607	678
1941	173,330	2,383
1942	66,016	799
1943	96,136	1,114
1944	93,990	1,054
1945	62,663	689
1946	92,912	808
1947	92,662	905
1948	146,383	748
1949	102,809	527
1950	157,752	394
1951	169,347	453
1952	114,863	181
1953	157,835	243
1954	105,904	139
1955	79,101	87
1956	92,407	92
1957	85,017	87
1958	33,400	27
1959	33,252	25
1960	58,030	37
1961	24,469	27
1962	8,347	24
1963	34,736	36
1964	31,594	44
1965	12,945	21
1966	19,417	23
1967	33,531	27
1968	17,367	15
1969	4,994	6
1970	16,597	15

Year	Notifications	Deaths~
1971	16,844	26
1972	2,069	2
1973	2,437	2
1974	16,225	13
1975	8,910	12
1976	3,907	3
1977	17,475	7
1978	65,956	12
1979	30,816	7
1980	21,131	6
1981	19,395	5
1982	65,815	14
1983	19,340	5
1984	5,517	1
1985	22,046	4
1986	36,506	3
1987	15,203	5
1988	5,117	0
1989	11,646	1
1990	15,286	7
1991	5,201	0
1992	2,309	1
1993	4,091	0
1994	3,964	3
1995	1,869	2
1996	2,387	2
1997	2,989	2
1998	1,577	4
1999	1,139	2
2000	712	2

~ONS death data only is presented.

Source: Notifications of Infectious Disease

<https://www.gov.uk/government/collections/notifications-of-infectious-diseases-noids>

Table 7: Pertussis notifications by age group, England: 1982 - 2017*~

Year	<1 year	1-4 years	5-9 years	10-14 years	15-24 years	25-44 years	45-64 years	65+ years	NK	Total
1982	5,548	34,071	18,433	1,851	557	1,059	260	90	606	62,475
1983	1,649	9,830	5,425	572	189	359	70	32	189	18,315
1984	564	2,738	1,513	169	52	84	33	7	47	5,207
1985	2,059	9,935	6,783	725	184	287	79	22	208	20,282
1986	3,410	15,223	12,591	1,418	418	680	186	53	382	34,361
1987	1,609	6,573	4,786	592	169	342	78	18	141	14,308
1988	655	2,292	1,415	215	53	85	22	5	61	4,803
1989	1,268	4,870	3,700	585	129	212	57	9	137	10,967
1990	1,442	5,614	5,301	957	206	323	87	20	175	14,125
1991	574	2,009	1,707	337	62	139	15	7	58	4,908
1992	324	826	693	164	44	60	20	7	33	2,171
1993	496	1,399	1,345	362	59	102	41	10	42	3,856
1994	500	1,301	1,235	349	69	104	51	7	64	3,680
1995	316	628	509	137	40	69	23	6	29	1,757
1996	412	684	745	181	44	107	33	11	35	2,252
1997	660	871	797	206	63	136	48	11	36	2,828
1998	378	466	374	108	21	72	20	9	23	1,471
1999	288	316	288	70	21	67	14	4	9	1,077
2000	195	200	143	40	20	29	17	4	10	658
2001	288	192	221	66	20	32	17	3	12	851
2002	248	197	224	68	20	62	26	6	7	858
2003	115	86	65	38	21	32	16	8	5	386
2004	128	90	85	70	14	53	23	6	6	475
2005	178	100	75	65	28	61	43	12	5	567
2006	131	78	72	83	47	77	39	11	1	539
2007	154	142	116	208	90	182	142	27	9	1,070
2008	254	201	130	201	152	260	203	51	13	1,465
2009	182	177	95	130	93	235	175	34	5	1,126
2010	56	59	31	40	31	81	64	17	3	382
2011	96	128	73	78	71	165	139	55	6	811
2012	564	714	351	499	744	1,639	1,348	343	21	6,223
2013	179	342	163	261	303	827	713	171	8	2,967
2014	147	280	163	225	249	614	493	128	3	2,302
2015	203	324	235	258	233	670	608	144	5	2,680
2016	262	416	306	345	363	1,062	1,095	276	9	4,134
2017*	198	298	212	273	297	742	791	210	6	3,027

* 2017 are provisional data.

~ More diagnostic methods have become available over the time period presented with increasing use of serology in particular from around 2006 (see Table 4 and Figure 3) and oral fluid testing introduced from 2013 for those aged 5-16 years.

Source: Notifications of Infectious Disease

<https://www.gov.uk/government/collections/notifications-of-infectious-diseases-roids>