

# PERTUSSIS REPORT

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This report includes cases of pertussis reported in EpiSurv up to midnight 4 January 2013. Data were extracted from EpiSurv at 10.00 am 10 January 2013.

## Summary

In the past four surveillance weeks (8 December – 4 January 2013), 520 new cases of pertussis (150, 175, 110 and 85 cases, respectively) were notified, including 254 confirmed cases, 137 probable cases, 24 suspect cases, and 105 cases still under investigation. Slightly fewer cases were reported in the past four surveillance weeks compared to the numbers reported over the previous four weeks (526 cases). Forty-six (8.8%) of the notified cases were aged less than 1 year. Twenty cases were hospitalised.

A total of 5938 pertussis notifications were reported in EpiSurv in 2012 (compared to 1996 in 2011), including 2555 confirmed cases, 2944 probable cases, 292 suspect cases, and 147 cases still under investigation. 424 (7.1%) of the notified cases were in the less than 1 year age group. During this period, 309 hospitalisations and two deaths were reported.

In the last four weeks, the highest number of cases (excluding cases under investigation) were reported in Canterbury (66 cases), Waikato (51 cases), Hutt Valley (41 cases), and Capital and Coast (37 cases) DHBs. The highest cumulative rate in 2012 was recorded in Nelson Marlborough (478.2 per 100 000, 669 cases), followed by West Coast (458.1 per 100 000, 151 cases) and Wairarapa (303.1 per 100 000, 123 cases) DHBs. During this same period the highest number of notifications were reported from Canterbury DHB (1209 cases), followed by Capital and Coast (680), Nelson Marlborough (669), Hutt Valley (364) and Waikato (352) DHBs. Monthly pertussis rates and cases (excluding cases under investigation) by DHB can be seen in Figures 8 and 9 (appendix).

This report summarises pertussis notifications for 2012 (1 January – 31 December 2012) and new cases in the last four weeks (ending 4 January 2013), and incorporates the temporal distribution of cases, the distribution of cases by age, ethnicity (prioritised), and DHB, as well as hospitalisations and immunisation status. The case classification used in this report is specified in the appendix. Case definitions have changed following the release of the Ministry of Health's *Communicable Disease Control Manual 2012* on 31 May 2012.

## Temporal distribution of pertussis cases

Figure 1 shows weekly total pertussis notifications for 2010, 2011, 2012 and 2013 (to week ending 4 January 2013). Notifications for the past three weeks remain above 2011 and 2010 levels. Since week 34 in 2011 (ending 26 August) notifications have been increasing more or less consistently. The highest weekly notification count occurred during week 51 of 2012. Note the total number of notifications may change as cases are investigated further and some are found not to meet the case definition. Two deaths have been reported since the beginning of 2012. Figure 5 (appendix) shows weekly pertussis notifications for confirmed, suspect and probable cases only for 2010, 2011, 2012 and 2013.

**Figure 1: Number of pertussis notifications by week reported 2010 - 2013**

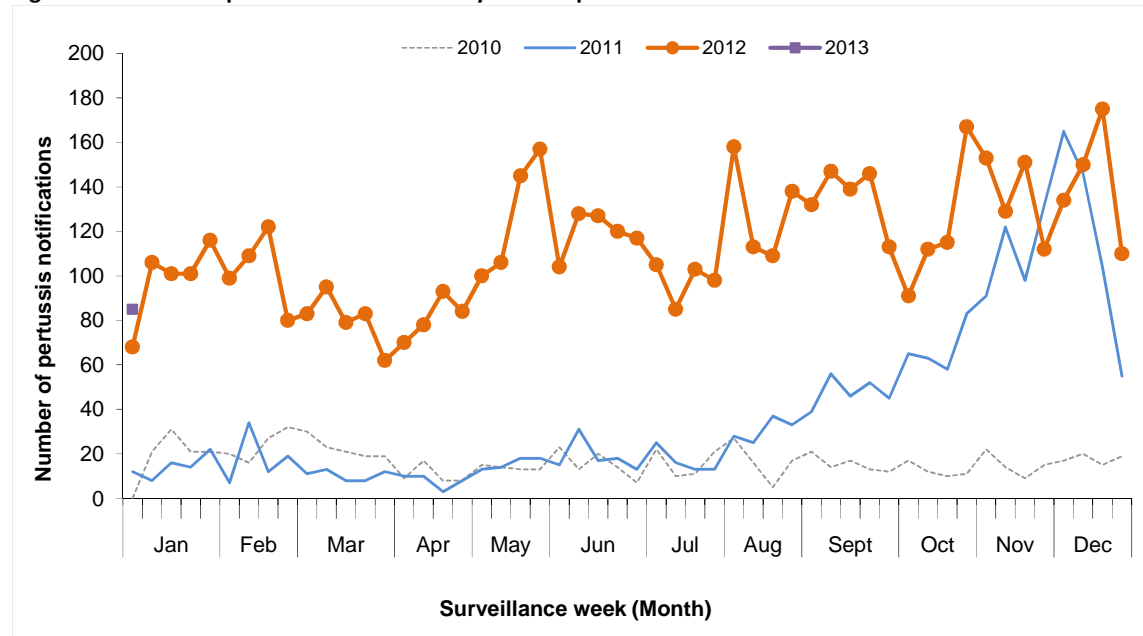
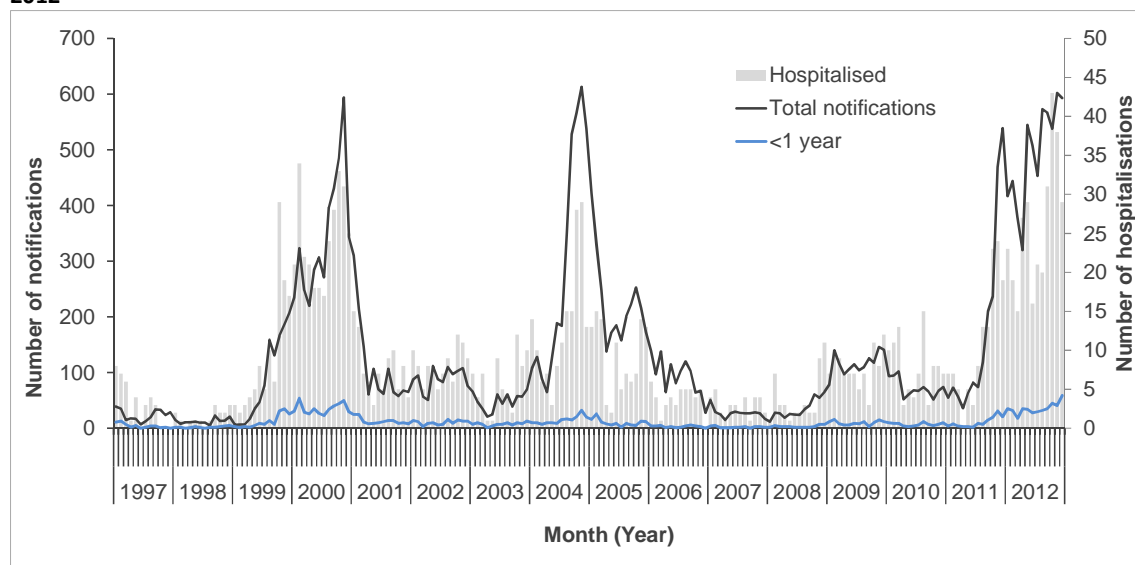


Figure 2 shows pertussis notifications and hospitalisations by calendar month, and notifications in those aged less than 1 year between 1 January 1997 and 31 December 2012. A four to five-year cycle can be seen with large peaks in notifications in years 2000 and 2004 and a much smaller peak in 2009. However, notifications have been rising again since August 2011. Increases in hospitalisations show a similar cycle, although peaks in hospitalisations do not always coincide with peaks in notifications.

Figure 6 (appendix) shows annual rates in the less than 1 year age group over 1997-2012.

**Figure 2: Pertussis notifications and hospitalisations by calendar month-year since 1997 up to 31 December 2012**



In the following sections all analyses exclude cases still under investigation. Therefore, “cases” refer to those classified as confirmed, probable, or suspect.

### Age distribution of cases

Table 1 shows notifications and associated rates by age, including new cases for the last four weeks. Pertussis rates varied across age groups. Of the cases reported in 2012, infants aged less than one year had the highest cumulative notification rate (663.8 per 100 000 population, 414 cases), followed by the 1 to 4 years (354.1 per 100 000, 892 cases), and 5 to 9 years (261.1 per 100 000, 750 cases) age groups.

Of the 5790 cumulative cases with known age, 42 (0.7%) were infants under 6 weeks of age. Figure 3 shows the cumulative notification rate of pertussis cases by age group and ethnicity in 2012.

**Table 1: Pertussis cases and rates by age group in 2012, and new cases in the last four weeks**

Age group (Years)	Cumulative <sup>2</sup> notifications			Last four weeks <sup>3</sup>	
	All cases <sup>1</sup>	Rates <sup>1</sup>	Hosp	New Cases	Hosp
<1	414	663.8	182	39	14
1 to 4	892	354.1	28	61	1
5 to 9	750	261.1	10	64	1
10 to 14	529	180.6	4	29	0
15 to 19	275	86.7	6	20	0
20 to 29	521	84.2	4	38	0
30 to 39	663	117.8	11	40	0
40 to 49	742	117.5	15	55	1
50 to 59	473	85.1	17	38	0
60 to 69	327	78.4	14	18	0
70+	204	50.1	16	12	1
Unknown	1		0	1	0
<b>Overall</b>	<b>5791</b>	<b>131.5</b>	<b>307</b>	<b>415</b>	<b>18</b>

<sup>1</sup>Rate of pertussis cases per 100 000 population calculated using 2011 mid-year population estimates.

<sup>2</sup>Cumulative notifications (excluding cases under investigation) between 1 January and 31 December 2012

<sup>3</sup>Notifications between 8 December 2012 and 4 January 2013 inclusive

**Hosp:** hospitalisation counts

## Ethnicity

Pertussis cases and rates by ethnicity are shown in Table 2. Of the pertussis cases with known ethnicity, the European ethnic group had the highest numbers reported in the last four weeks (290 cases). Of the cases in 2012, the ethnic-specific cumulative rates were highest for the European ethnic group (162.4 per 100 000, 4375 cases), followed by Māori (139.0 per 100 000, 786 cases) and Pacific Peoples (90.6 per 100 000, 205 cases). Figure 3 shows the European ethnic group having the highest notification rates across all age groups except for the under 1 year age group. The ethnic distribution of cases in the under 1 year age group is also shown below. Māori had the highest notification rates in this age group, followed by Pacific Peoples.

**Table 2: Pertussis cases and rates by ethnicity (prioritised) in 2012, and new cases in the last four weeks**

Ethnicity	Cumulative <sup>2</sup> notifications					Last four weeks <sup>3</sup>		
	All cases (Rate <sup>1</sup> )	<1 year (Rate <sup>1</sup> )	Hosp(% <sup>4</sup> )	New Cases	<1 year	Hosp		
Māori	786 (139.0)	130 (926.5)	102 (13.0)	53	9	6		
Pacific Peoples	205 (90.6)	41 (800.6)	43 (21.0)	10	3	2		
Other	208 (55.5)	18 (342.7)	16 (7.7)	12	1	0		
European	4375 (162.4)	214 (720.5)	143 (3.3)	290	20	10		
Unknown	217	11	3	50	6	0		
<b>Overall</b>	<b>5791 (143.8)</b>	<b>414 (731.1)</b>	<b>307 (5.3)</b>	<b>415</b>	<b>39</b>	<b>18</b>		

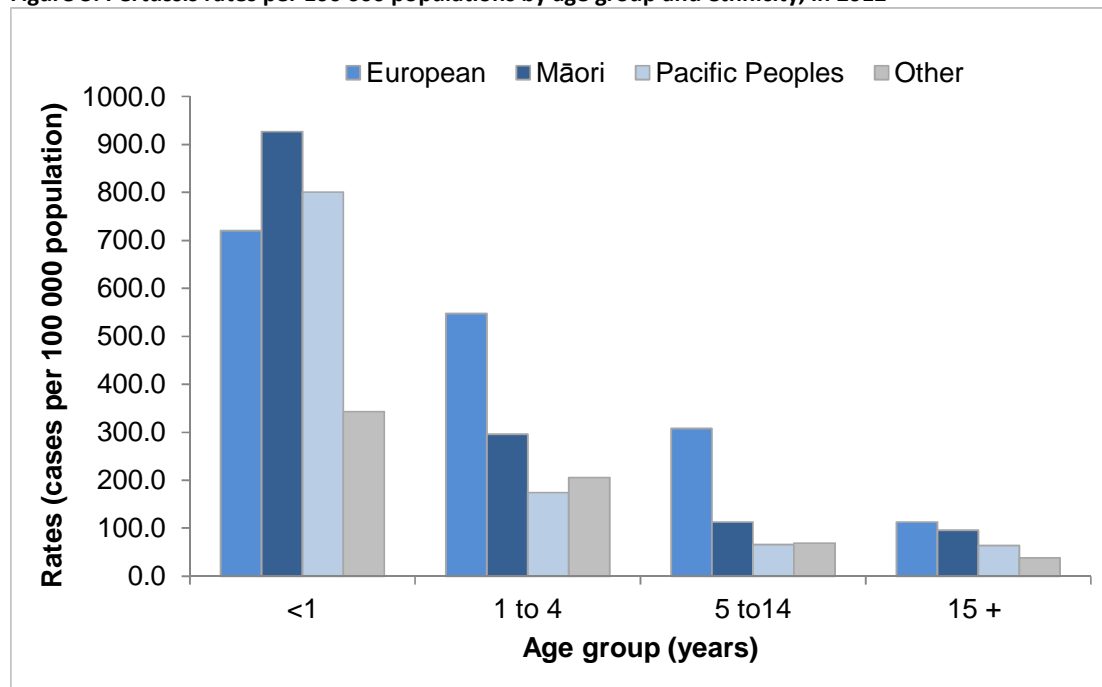
<sup>1</sup>Value in brackets denotes rate of pertussis cases per 100 000 population calculated using usually resident populations (Census 2006).

<sup>2</sup>Cumulative notifications (excluding cases under investigation) between 1 January and 31 December 2012

<sup>3</sup>Notifications between 8 December 2012 and 4 January 2013 inclusive

<sup>4</sup>Percentage of hospitalised notifications by ethnic group

**Figure 3: Pertussis rates per 100 000 populations by age group and ethnicity, in 2012**



**Note:** Rate of pertussis cases per 100 000 population calculated using Census 2006 usually resident populations.

Figure 7 (appendix) shows the trend of cumulative pertussis notification rates (per 100 000 population) by age group and ethnicity for years 2003 to 2012. Over this time period rates have been generally highest among Pacific Peoples in the less than 1 year age group, while

in other age groups rates have been consistently highest in the European ethnic group. Note that these rates are for all notifications.

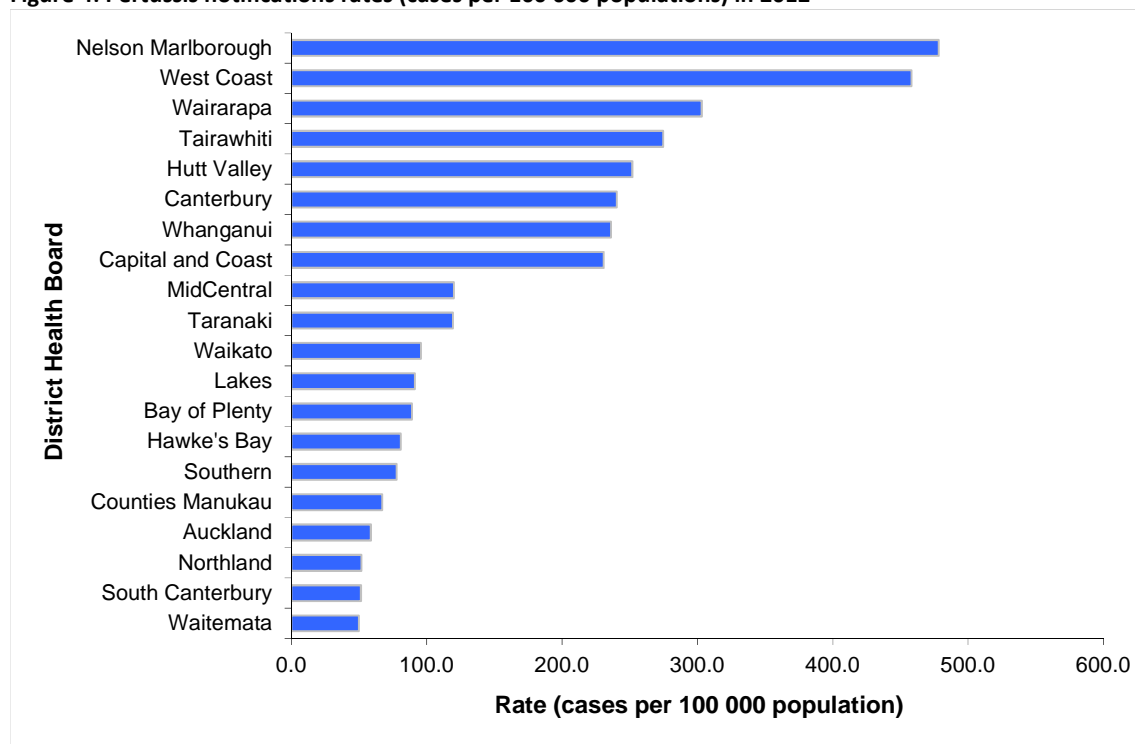
## Hospitalisations and Deaths

The distribution of hospitalisations by age group, ethnicity, and DHB is described in Table 1, Table 2 and Table 5, respectively. In the last four weeks, 18 hospitalisations were recorded. There were 307 hospitalisations reported in EpiSurv in 2012. One hundred and eighty-two (59.3%) of these were infants aged less than one year including 38 cases aged less than six weeks. Of the 5079 cases with known ethnicity and hospitalisation status, the ethnic-specific proportions of hospitalisations were as follows: Pacific Peoples (23.6%, 43/182), Māori (14.5%, 102/704), Other (8.5%, 16/189), and European (3.6%, 143/4004). There were two pertussis deaths reported in 2012. One death occurred in a 3 year old unimmunised child with underlying health conditions, and the other in an infant aged less than 6 weeks with a history of premature birth.

## Geographic distribution

The rates of pertussis notifications by DHB can be seen in Figure 4 and Table 5 (appendix). In the last four weeks, the highest number of cases were reported in Canterbury (66 cases), Waikato (51 cases), Hutt Valley (41 cases), and Capital and Coast (37 cases) DHBs. The highest cumulative rate in 2012 was recorded in Nelson Marlborough (478.2 per 100 000, 669 cases), followed by West Coast (458.1 per 100 000, 151 cases) and Wairarapa (303.1 per 100 000, 123 cases) DHBs. The highest number of notifications were reported from Canterbury DHB (1209 cases), followed by Capital and Coast (680), Nelson Marlborough (669), Hutt Valley (364) and Waikato (352) DHBs. Cases in the under 1 year age group by DHB are shown in Table 5 (appendix). Also, monthly pertussis rates and cases (excluding cases under investigation) by DHB can be seen in Figures 8 and 9 (appendix).

**Figure 4: Pertussis notifications rates (cases per 100 000 populations) in 2012**



**Note:** Rates were calculated using 2011 mid-year population estimates.

## Immunisation status

The immunisation status for confirmed pertussis cases with known age is shown in Table 3 and Table 4 for the last four weeks and for 2012, respectively. Of the 254 confirmed cases reported in the last four weeks, 145 (57.1%) had a known vaccination status. Of these 145 cases, 51 were not vaccinated. Sixteen cases had received one dose of vaccine, 10 cases had received two doses, 18 cases had received three doses, 16 cases had received four doses, and two reported having completed pertussis vaccination. A further 32 cases reported being vaccinated but no dose information was available.

**Table 3: Immunisation status of pertussis cases (confirmed) notified in the last four weeks (ending 4 January 2013)**

Age Group	Total cases	One dose	Two doses	Three doses	Four doses	Five doses	Vaccinated		Unknown
							(no dose info)	Not vaccinated	
<6wks	2	0	0	0	0	0	0	2	0
6wks - 2mths	9	6	0	0	0	0	0	2	1
3-4 mths	9	3	3	0	0	0	2	0	1
5mths - 3yrs	49	3	2	14	0	0	5	22	3
4 - 10yrs	64	3	3	4	14	1	9	13	17
11+ yrs	120	1	2	0	2	1	15	12	87
Unknown	1	0	0	0	0	0	1	0	0
<b>Total</b>	<b>254</b>	<b>16</b>	<b>10</b>	<b>18</b>	<b>16</b>	<b>2</b>	<b>32</b>	<b>51</b>	<b>109</b>

**Note:** Immunisation status has been extracted from Episurv notifications. Health professionals use a range of sources to update immunisation status including the NIR, parental recall or Well Child book records.

Of the 2554 confirmed cases with known age reported during 2012, 1654 (64.8%) had a known vaccination status (Table 4). Of these 1654 cases, 589 were not vaccinated, including 24 cases aged less than 6 weeks and thus not eligible for vaccination. One hundred and forty-one cases had received one dose of vaccine, 50 cases had received two doses, 230 cases had received three doses, 214 cases had received four doses, and 119 cases reported having completed pertussis vaccination. A further 312 cases reported being vaccinated but no dose information was available.

**Table 4: Immunisation status of pertussis cases (confirmed) notified in 2012 (between 1 January and 31 December 2012)**

Age Group	Total cases	One dose	Two doses	Three doses	Four doses	Five doses	Vaccinated		Unknown
							(no dose info)	Not vaccinated	
<6wks	27	0	0	0	0	0	0	24	3
6wks - 2mths	96	53	1	0	0	0	3	33	6
3-4 mths	52	11	22	0	0	0	2	15	2
5mths - 3yrs	418	9	12	175	32	1	26	129	34
4 - 10yrs	631	11	7	40	158	75	87	174	79
11+ yrs	1330	57	8	15	24	43	193	214	776
Unknown	1	0	0	0	0	0	1	0	0
<b>Total</b>	<b>2555</b>	<b>141</b>	<b>50</b>	<b>230</b>	<b>214</b>	<b>119</b>	<b>312</b>	<b>589</b>	<b>900</b>

**Note:** Immunisation status has been extracted from Episurv notifications. Health professionals use a range of sources to update immunisation status including the NIR, parental recall or Well Child book records.

## Appendix

**Table 5: Pertussis cases and rates by DHB in 2012, and new cases in the last four weeks**

DHB	Cumulative <sup>2</sup> notifications				Last four weeks <sup>3</sup>		
	All cases	Rates <sup>1</sup>	<1 year*	Hosp	New Cases	<1 year*	Hosp
Northland	82	51.8	8	5	9	1	1
Waitemata	272	49.8	23	24	24	0	0
Auckland	268	58.7	22	27	16	2	1
Counties Manukau	335	67.0	53	65	9	3	3
Waikato	352	95.7	27	21	51	3	2
Lakes	94	91.3	14	11	3	1	0
Bay of Plenty	189	89.2	11	5	25	2	1
Tairāwhiti	128	274.7	15	4	3	1	0
Taranaki	131	119.2	8	8	18	2	0
Hawke's Bay	126	80.9	12	7	3	0	0
Whanganui	149	236.2	19	14	9	1	0
MidCentral	202	120.0	18	11	15	3	2
Hutt Valley	364	251.9	18	6	41	6	1
Capital and Coast	680	230.8	31	11	37	1	1
Wairarapa	123	303.1	7	13	25	1	2
Nelson Marlborough	669	478.2	38	10	27	1	1
West Coast	151	458.1	4	2	14	0	0
Canterbury	1209	240.5	59	39	66	9	3
South Canterbury	29	51.4	0	3	0	0	0
Southern	238	77.7	27	21	20	2	0
<b>Total</b>	<b>5791</b>	<b>131.5</b>	<b>414</b>	<b>307</b>	<b>415</b>	<b>39</b>	<b>18</b>

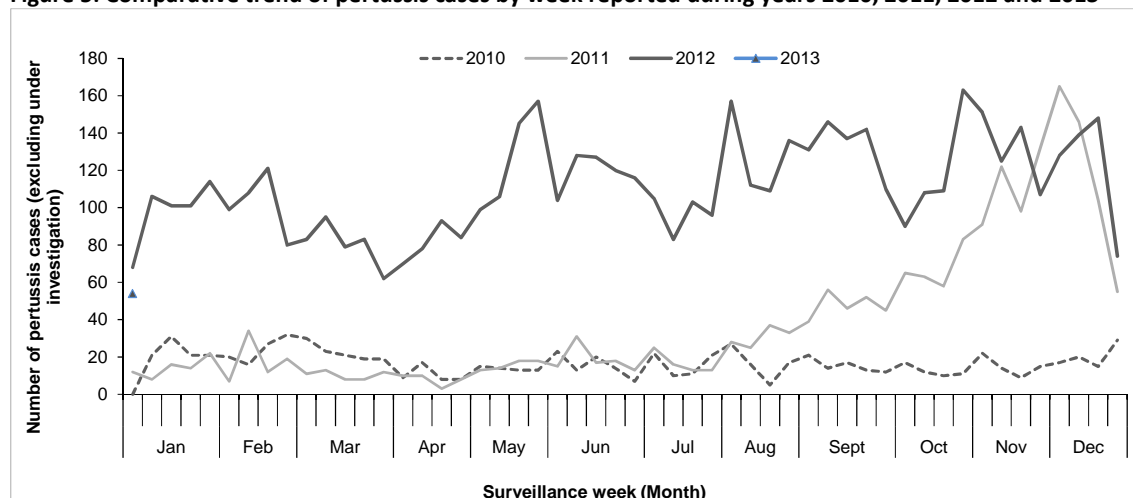
<sup>1</sup>Rate of pertussis cases per 100 000 population calculated using 2011 mid-year population estimates.

<sup>2</sup>Cumulative notifications (excluding cases under investigation) between 1 January and 31 December 2012

<sup>3</sup>Notifications between 8 December 2012 and 4 January 2013 inclusive

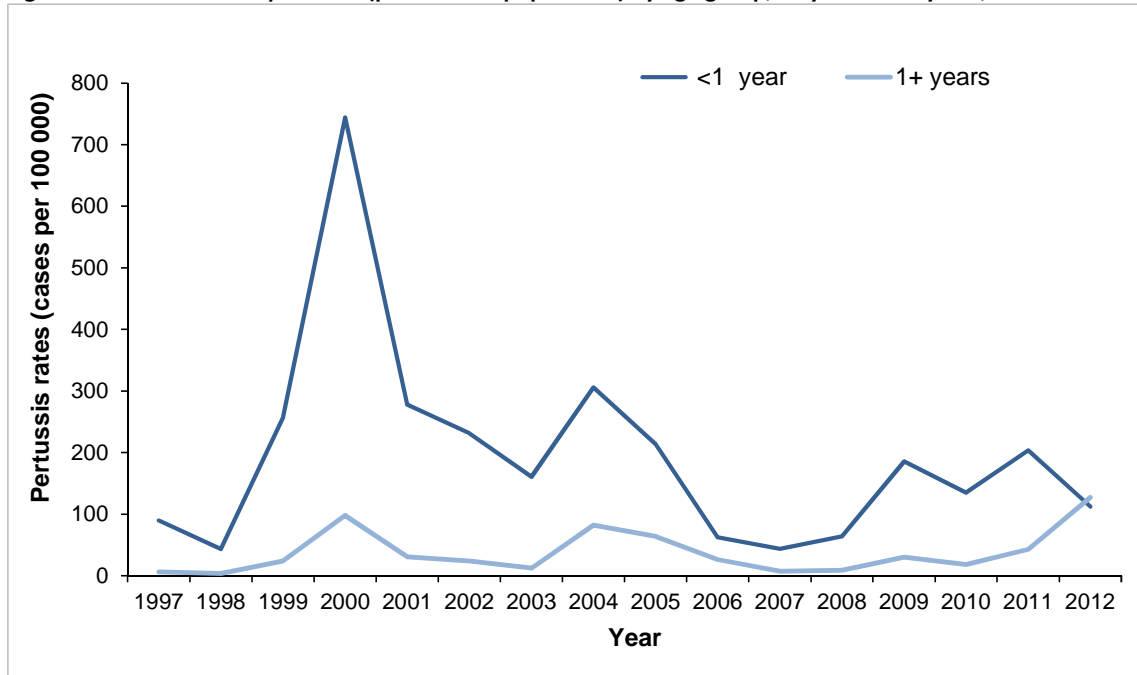
\*Cases in the less than 1 year age group

**Figure 5: Comparative trend of pertussis cases by week reported during years 2010, 2011, 2012 and 2013**



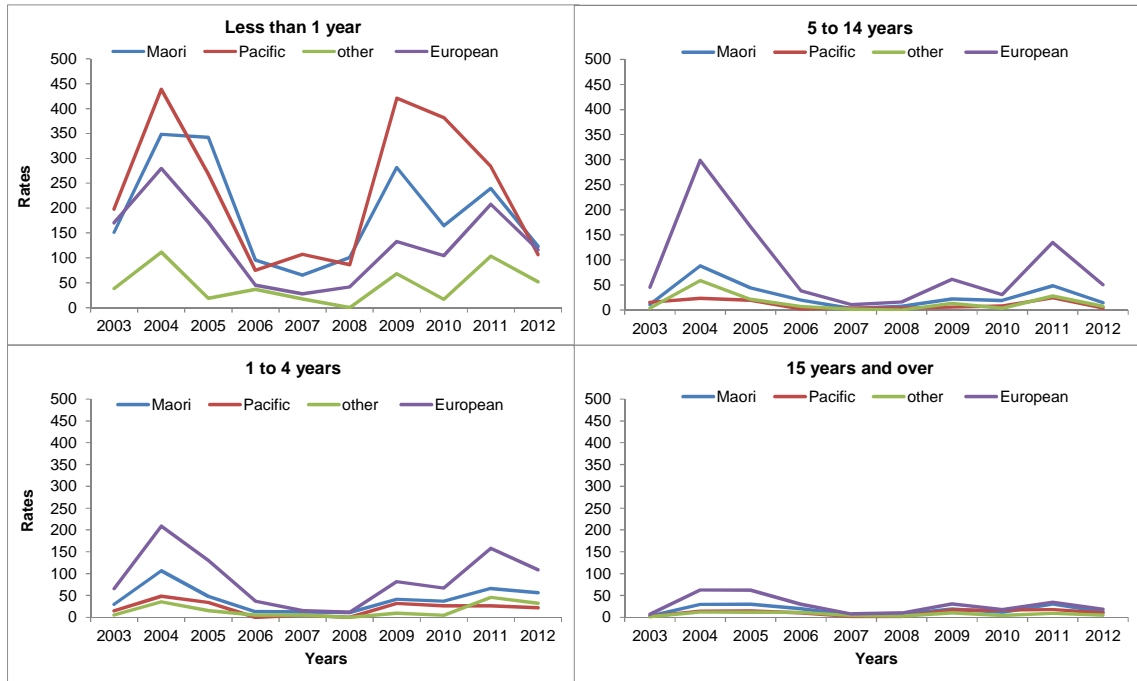
**Note:** Includes confirmed, probable and suspect cases only.

Figure 6: Annual rates of pertussis (per 100 000 population) by age group, <1 year vs. 1+ years, 1997-2012



Note: Rate of pertussis notified cases per 100 000 population calculated using mid-year population estimates.

Figure 7: Trends in cumulative pertussis rates (per 100 000 population) by age group and ethnicity, 2003 to 2012



Note: Rate of pertussis notified cases per 100 000 population (includes cases under investigation) calculated using mid-year population estimates



Figure 8: Monthly pertussis rates (cases per 100 000 population) by DHB, since January 2011

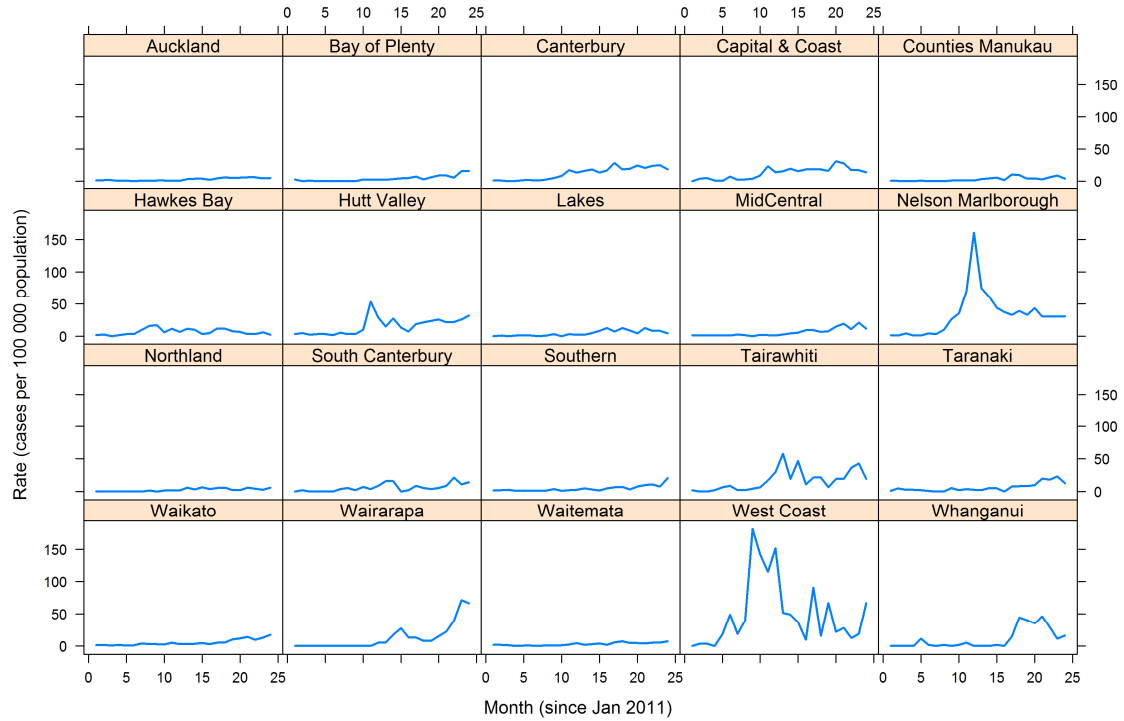
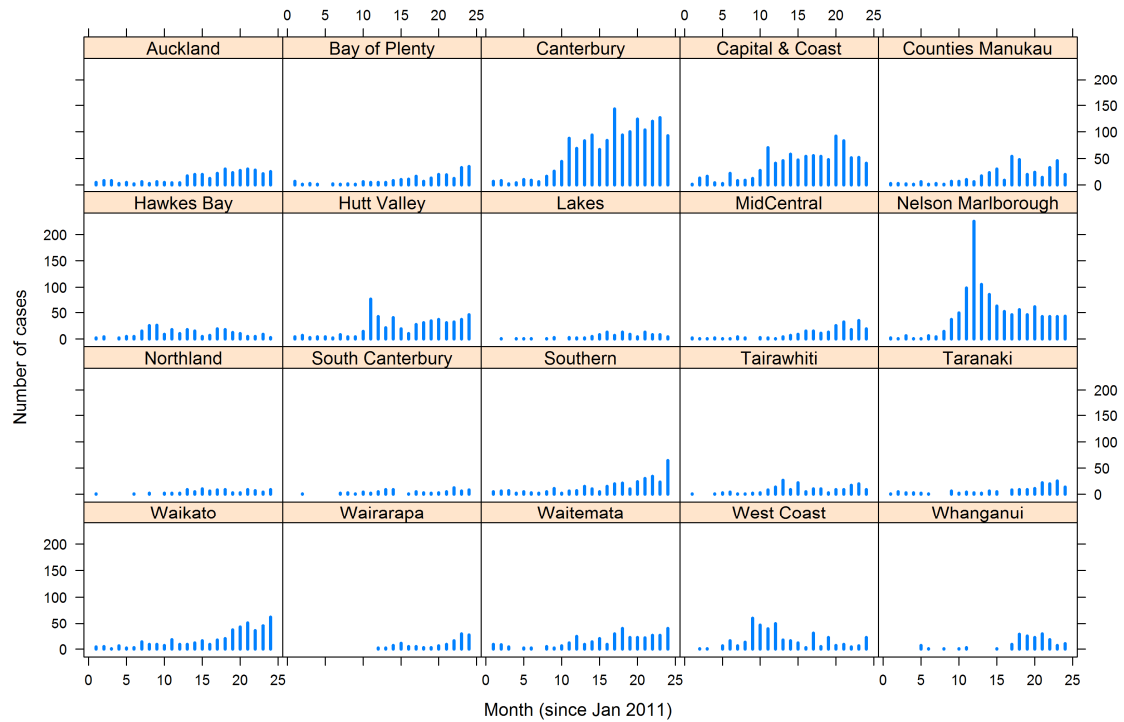


Figure 9: Monthly pertussis cases by DHB, since January 2011



Note: cases include confirmed, probable, and suspect only.

**Case classification for pertussis notification in New Zealand to 31 May 2012**

<b>Confirmed</b>	A clinically compatible illness that is laboratory confirmed by isolation of <i>Bordetella pertussis</i> from a pernasal swab, or epidemiologically linked to a confirmed case.
<b>Probable</b>	Cough lasting longer than two weeks and one or more of the following: <ul style="list-style-type: none"> <li>• Paroxysmal cough</li> <li>• Cough ending in vomiting or apnoea</li> <li>• Inspiratory whoop for which there is no other known cause.</li> </ul>
<b>Suspect</b>	In children under five years of age, any paroxysmal cough with whoop, vomiting or apnoea for which there is no other known cause.
<b>Other</b>	Status recorded as <i>under investigation</i> or suspect case.
<b>Notifications</b>	Include confirmed cases, probable, and other as specified above.

**Case classification for pertussis notification in New Zealand from 31 May 2012**

<b>Confirmed</b>	A clinically compatible illness that is laboratory confirmed by isolation of <i>B. pertussis</i> or detection of <i>B. pertussis</i> nucleic acid, preferably from a nasopharyngeal swab, or is epidemiologically linked to a confirmed case.
<b>Probable</b>	A clinically compatible illness with a high <i>B. pertussis</i> IgA test or a significant increase in antibody levels between paired sera at the same laboratory OR A cough lasting longer than two weeks and with one or more of the following, for which there is no other known cause: <ul style="list-style-type: none"> <li>• Paroxysmal cough</li> <li>• Cough ending in vomiting or apnoea</li> <li>• Inspiratory whoop</li> </ul>
<b>Suspect</b>	In children under five years of age any paroxysmal cough with whoop, vomiting or apnoea for which there is no other known cause.
<b>Under investigation</b>	A case that has been notified, but information is not yet available to classify it as suspect, probable or confirmed.
<b>Notifications</b>	Include confirmed cases, probable, suspect and under investigation as specified above.

This report is available at: <http://www.surv.esr.cri.nz/surveillance/PertussisRpt.php>.