



# PERTUSSIS REPORT

Jul-Sep 2013

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Data contained within this quarterly report is based on information recorded on EpiSurv by public health service (PHS) staff as at 7 October 2013. Changes made to EpiSurv data after this date will not be reflected in this report. The results presented may be further updated and should be regarded as provisional.

## Summary

In the third quarter of 2013 (July to September 2013), 847 new cases of pertussis were notified, including 257 confirmed cases, 430 probable cases, 54 suspect cases and 106 cases still under investigation. More cases were reported in the last quarter compared to the numbers reported over the previous quarter (April to June 2013, 762 cases). Sixty-two (7.3%) of the notified cases were aged less than 1 year. Highest rates were seen in the youngest age groups (0-9 years). Fifty cases were hospitalised and no deaths were reported.

High numbers in the last quarter (excluding cases under investigation) were reported from Canterbury (143 cases), Nelson Marlborough (138 cases), Counties Manukau (70 cases), Southern (58 cases), and Waitemata (55 cases) DHBs. Highest rates in the last quarter were recorded in Nelson Marlborough (98.1 per 100 000, 138 cases), followed by West Coast (91.2 per 100 000, 30 cases) DHBs. The overall quarterly rate was 16.7 per 100 000 with 741 cases.

In September 280 cases of pertussis were notified, including 86 confirmed cases, 120 probable cases, 11 suspect cases, and 63 cases still under investigation. The number of cases in September has increased compared to the previous month (270 cases). Seventeen (6.1%) of the notified cases were aged less than 1 year. Nineteen cases were hospitalised and no deaths were reported.

High numbers of cases (excluding cases under investigation) in September 2013 were reported from Canterbury (48 cases), Southern (25 cases), Nelson Marlborough (23 cases), West Coast (22 cases), and Counties Manukau (19 cases) DHBs. Highest rates were recorded in West Coast (66.9 per 100 000, 22 cases), followed by Nelson Marlborough (16.3 per 100 000, 23 cases) DHBs. The overall June rate was 4.9 per 100 000 with 217 cases.

This report summarises pertussis notifications for 2013 (quarterly and a monthly summary). It 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 on the last page. 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 27 September). While notifications for the second quarter in 2013 have fallen below those seen in 2012, they still remain well above 2010 and 2011 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. One death has been reported since the beginning of this year. Figure 5 (appendix) shows weekly pertussis notifications for confirmed, suspect and probable cases only for 2010, 2011, 2012 and 2013. Note the total number of notifications may change as cases are investigated further and some are found not to meet the case definition.

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

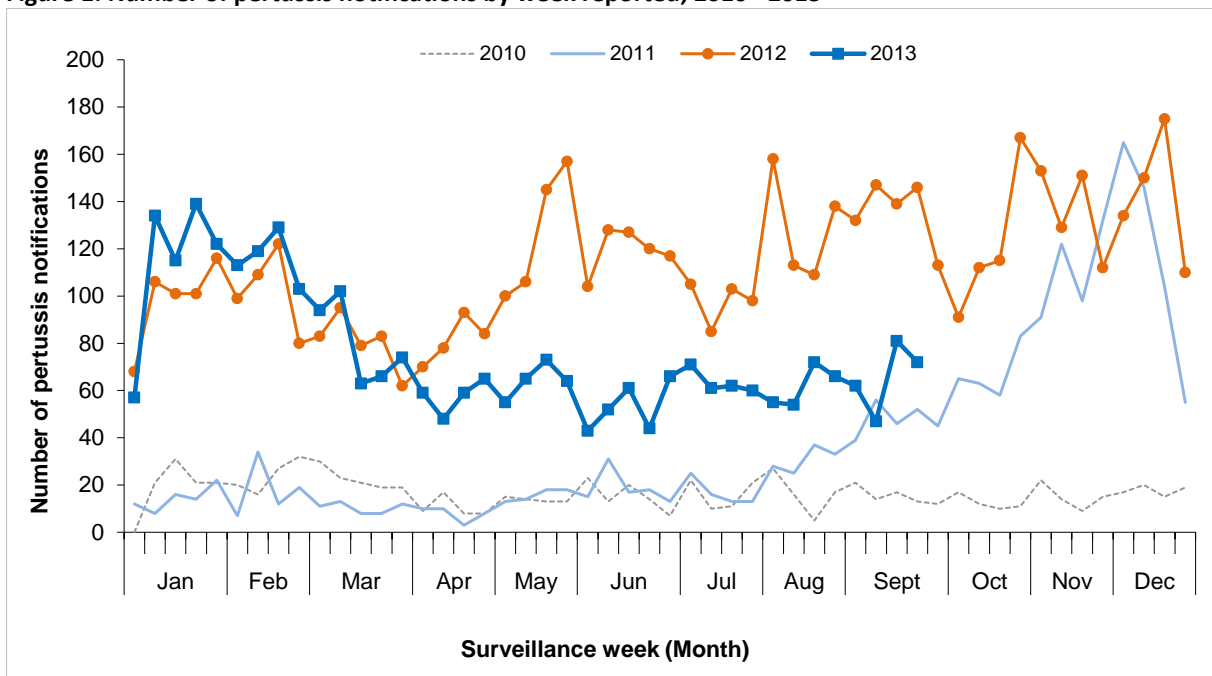
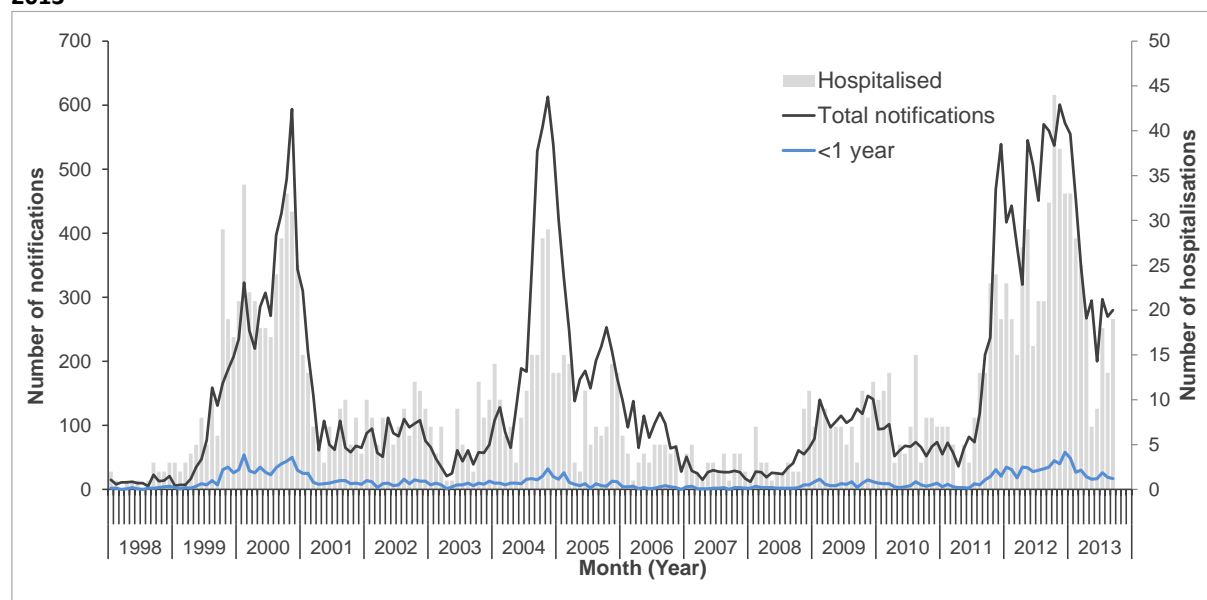


Figure 2 shows pertussis notifications and hospitalisations by calendar month, and notifications in those aged less than 1 year between 1 January 1998 and 30 September 2013. A four to five-year cycle can be seen with large peaks in notifications in years 2000 and 2004 and a much smaller peak in 2009. However, notifications had been rising again since August 2011 followed by a decreasing trend which has been seen since the start of 2013. 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 during the period 1997-2012

**Figure 2: Pertussis notifications and hospitalisations by calendar month-year since 1998 up to 30 September 2013**

In the following pages 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 June. Pertussis rates varied across age groups. Of the cases reported in the third quarter in 2013, infants aged less than one year had the highest rate (92.4 per 100 000 population, 56 cases), followed by the 1 to 4 years (44.6 per 100 000 population, 112 cases), and 5 to 9 years (30.2 per 100 000 population, 88 cases) age groups.

Of the 741 cases in the third quarter in 2013, 4 (1.4%) were infants under 6 weeks of age. Figure 3 shows the cumulative notification rate of pertussis cases by age group and ethnicity in 2013.

**Table 1: Pertussis cases and rates by age group in Quarter three: Jul-Sep and September 2013**

Age group (Years)	Quarter three: Jul-Sep 2013			September 2013	
	All cases	Rates <sup>1</sup>	Hosp	New Cases	Hosp
<1	56	92.4	24	13	6
1 to 4	112	44.6	3	25	1
5 to 9	88	30.2	1	30	1
10 to 14	55	19.0	0	21	0
15 to 19	30	9.6	0	9	0
20 to 29	48	7.6	3	14	1
30 to 39	91	16.3	1	28	1
40 to 49	100	16.0	3	31	1
50 to 59	77	13.5	2	20	1
60 to 69	48	11.2	3	17	1
70+	35	8.3	6	8	2
Unknown	1	-	0	1	0
<b>Overall</b>	<b>741</b>	<b>16.7</b>	<b>46</b>	<b>217</b>	<b>15</b>

<sup>1</sup>Rate of pertussis cases per 100 000 population calculated using 2012 mid-year population estimates.

**Hosp:** hospitalisation counts

## Ethnicity

Pertussis cases and rates by ethnicity are shown in Table 2. Of the pertussis cases with known ethnicity, the European group had the highest numbers reported in September 2013 (145 cases). Of the cases in the third quarter in 2013, the ethnic-specific cumulative rates were highest for the Pacific Peoples ethnic group (18.7 per 100 000, 50 cases), followed by European or Other (16.0 per 100 000, 493 cases) and Māori (14.1 per 100 000, 91 cases). Figure 3 shows the Pacific Peoples had the highest notification rates in the less than 1 year age group, followed by Māori. MELAA had the highest notification rate in the 1-4 years age group; however, the rate is based on a count less than five so may be unstable.

**Table 2: Pertussis cases and rates by ethnicity (prioritised) in Quarter three: Jul-Sep and September 2013**

Ethnicity	Quarter three: Jul-Sep 2013						September 2013		
	All cases (Rates <sup>1</sup> )	Hosp <sup>3</sup> (% <sup>2</sup> )	<1 year <sup>4</sup> (Rates <sup>1</sup> )	New Cases	Hosp <sup>3</sup>	<1 year <sup>4</sup>			
Maori	91 (14.1)	8 (8.8)	18 (110.2)	23	1	4			
Pacific Peoples	50 (18.7)	13 (26.0)	13 (212.0)	15	7	6			
Asian	25 (6.1)	4 (16.0)	3 -	6	1	0			
MELAA	4 -	0 -	0 -	0	0	0			
European or Other	493 (16.0)	16 (3.2)	19 (59.2)	145	2	1			
Unknown	78 -	5 -	-	28	4	2			
<b>Overall</b>	<b>741 (16.7)</b>	<b>46 (6.2)</b>	<b>53 (72.6)</b>	<b>217</b>	<b>15</b>	<b>13</b>			

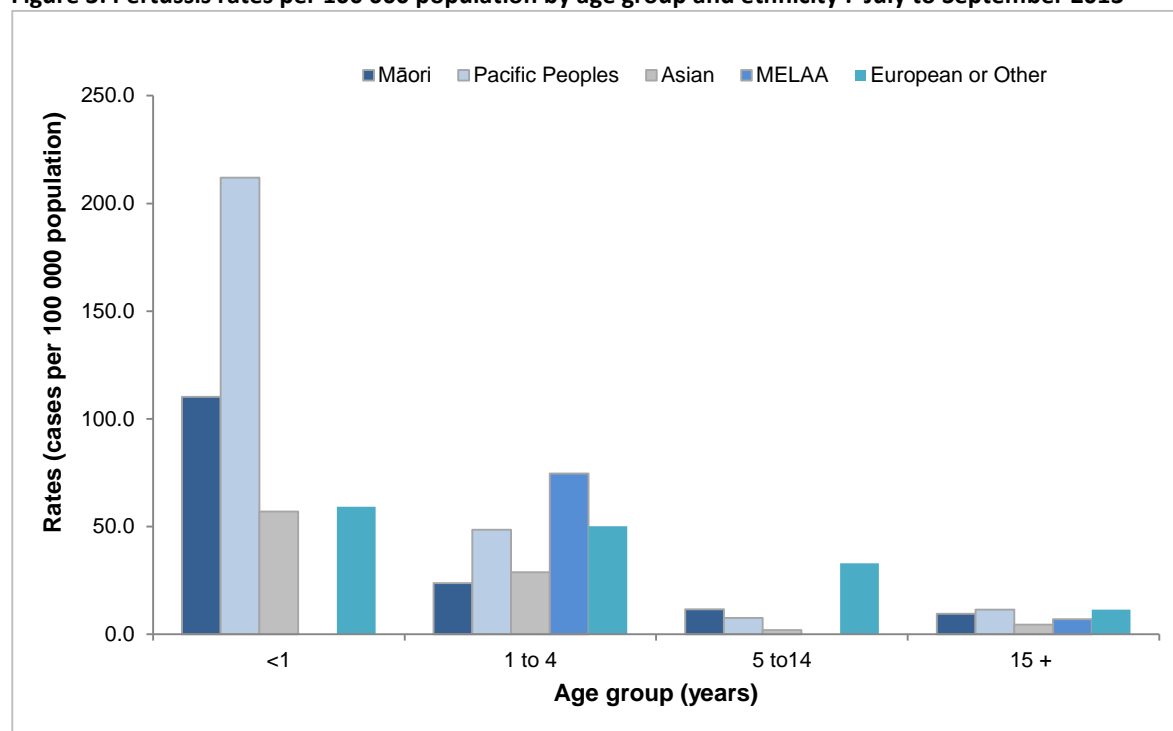
<sup>1</sup>Value in brackets denotes rate of pertussis cases per 100 000 population calculated using usually resident populations (Census 2006).

<sup>2</sup>Percentage of hospitalised notifications by ethnic group

<sup>3</sup>Number of hospitalised notifications by ethnic group

<sup>4</sup>Cases in the less than 1 year age group

**Figure 3: Pertussis rates per 100 000 population by age group and ethnicity : July to September 2013**



**Note:** Denominator data used to determine rates are based on the proportion of people in each ethnic group from the estimated resident 2006 census population applied to the 2012 mid-year population estimates from Statistics New Zealand.

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 high in the European ethnic group. Rates are for all notifications.

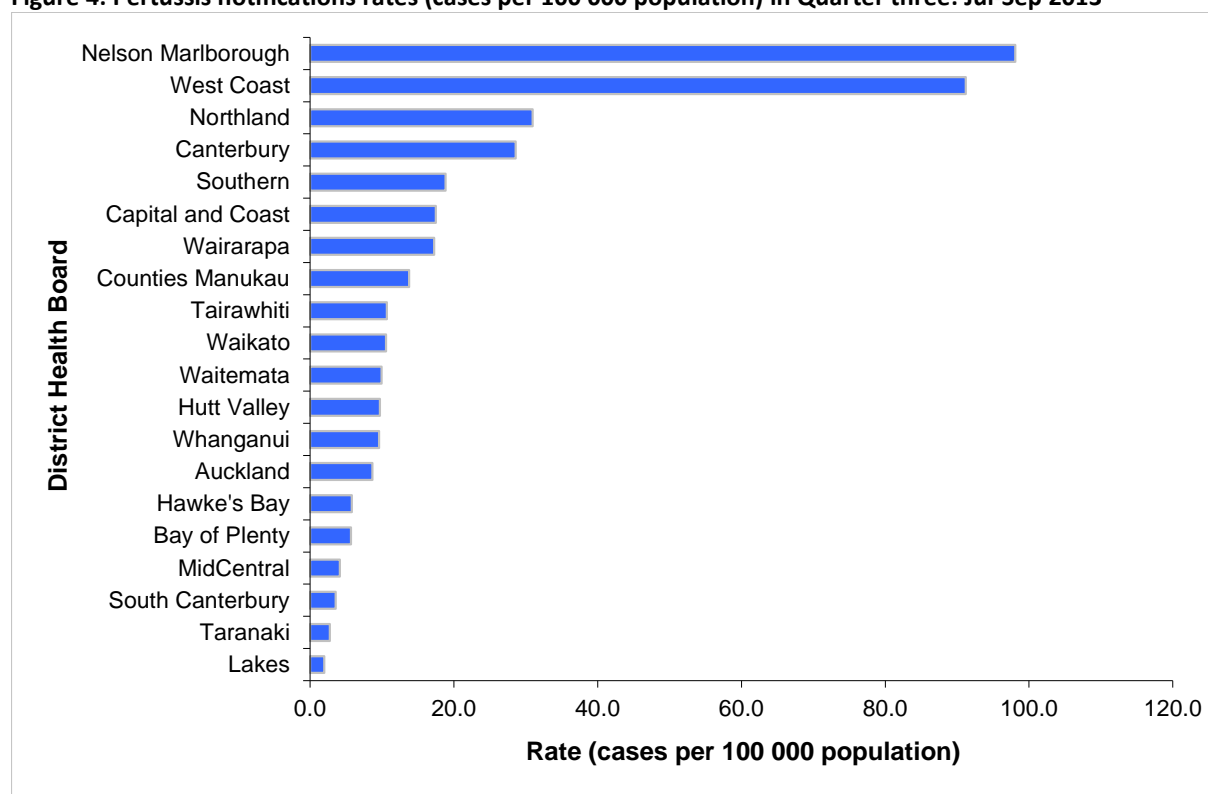
## Hospitalisations and Deaths

The distribution of hospitalisations by age group, ethnicity, and DHB is described in Table 1, Table 2 and Table 5, respectively. In September, 15 hospitalisations were recorded. There have been 46 hospitalisations reported in EpiSurv in the third quarter of 2013. Twenty-four (52.2%) of these were infants aged less than one year including three cases aged less than six weeks. Of the 620 cases with known ethnicity and hospitalisation status, the ethnic-specific proportions of hospitalisations were as follows: Pacific Peoples (30.2%, 13/43), Asian (18.2%, 4/22), Māori (9.3%, 8/86), and European or Other (3.4%, 16/466). No hospitalisations were reported for the MELAA ethnic group. No deaths have been reported in the third quarter of 2013.

## Geographic distribution

The rates of pertussis notifications by DHB can be seen in Figure 4 (and Table 5 in appendix). In September, high numbers of cases were reported in Canterbury (48 cases), Southern (25 cases), Nelson Marlborough (23 cases), and West Coast (22 cases) DHBs. Highest rates in the third quarter of 2013 were recorded in Nelson Marlborough (98.1 per 100 000, 138 cases), followed by West Coast (91.2 per 100 000, 30 cases), Northland (31.0 per 100 000, 49 cases), Canterbury (28.6 per 100 000, 143 cases), and Southern (18.8 per 100 000, 58 cases) DHBs. High numbers of notifications were reported from Canterbury (143 cases), Nelson Marlborough (138 cases), Counties Manukau (70 cases), and Southern (58 cases) DHBs. Cases in the under 1 year age group by DHB are shown in Table 5 (appendix). 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 population) in Quarter three: Jul-Sep 2013**



**Note:** Cumulative rates were calculated using 2012 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 September and the third quarter in 2013, respectively. Of the 86 confirmed cases reported in September, 56 (65.1%) had a known vaccination status. Of these 26 were not vaccinated. Five cases had received one dose of vaccine, two cases had received two doses of vaccine, six cases had received three doses, seven cases had received four doses, and five cases reported having completed pertussis vaccination. A further five cases reported being vaccinated but no dose information was available.

**Table 3: Immunisation status of confirmed pertussis cases notified in September 2013**

Age Group	Total cases	Vaccinated							Not vaccinated	Unknown
		One dose	Two doses	Three doses	Four doses	Five doses	(no dose info)			
<6wks	1	0	0	0	0	0	0	0	1	0
6wks - 2mths	5	3	0	0	0	0	0	0	2	0
3-4 mths	1	0	1	0	0	0	0	0	0	0
5mths - 3yrs	10	0	1	4	1	0	0	0	3	1
4 - 10yrs	22	0	0	2	6	1	2	2	9	2
11+ yrs	47	2	0	0	0	4	3	3	11	27
Unknown	0	0	0	0	0	0	0	0	0	0
<b>Total</b>	<b>86</b>	<b>5</b>	<b>2</b>	<b>6</b>	<b>7</b>	<b>5</b>	<b>5</b>	<b>5</b>	<b>26</b>	<b>30</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 257 confirmed cases with known age reported during the third quarter of 2013, 161 (62.6%) had a known vaccination status (Table 4). Of these 161 cases, 69 were not vaccinated, including three cases aged less than 6 weeks and thus not eligible for vaccination. Sixteen cases had received one dose of vaccine, five cases had received two doses, 21 cases had received three doses, 22 cases had received four doses, and 11 cases reported having completed pertussis vaccination. A further 17 cases reported being vaccinated but no dose information was available.

**Table 4: Immunisation status of confirmed pertussis cases notified in April to June 2013**

Age Group	Total cases	Vaccinated							Not vaccinated	Unknown
		One dose	Two doses	Three doses	Four doses	Five doses	(no dose info)			
<6wks	3	0	0	0	0	0	0	0	3	0
6wks - 2mths	11	8	0	0	0	0	0	0	3	0
3-4 mths	5	0	3	0	0	0	0	0	2	0
5mths - 3yrs	30	0	2	16	1	0	0	0	10	1
4 - 10yrs	58	0	0	4	19	2	8	8	19	6
11+ yrs	150	8	0	1	2	9	9	9	32	89
Unknown	0	0	0	0	0	0	0	0	0	0
<b>Total</b>	<b>257</b>	<b>16</b>	<b>5</b>	<b>21</b>	<b>22</b>	<b>11</b>	<b>17</b>	<b>17</b>	<b>69</b>	<b>96</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

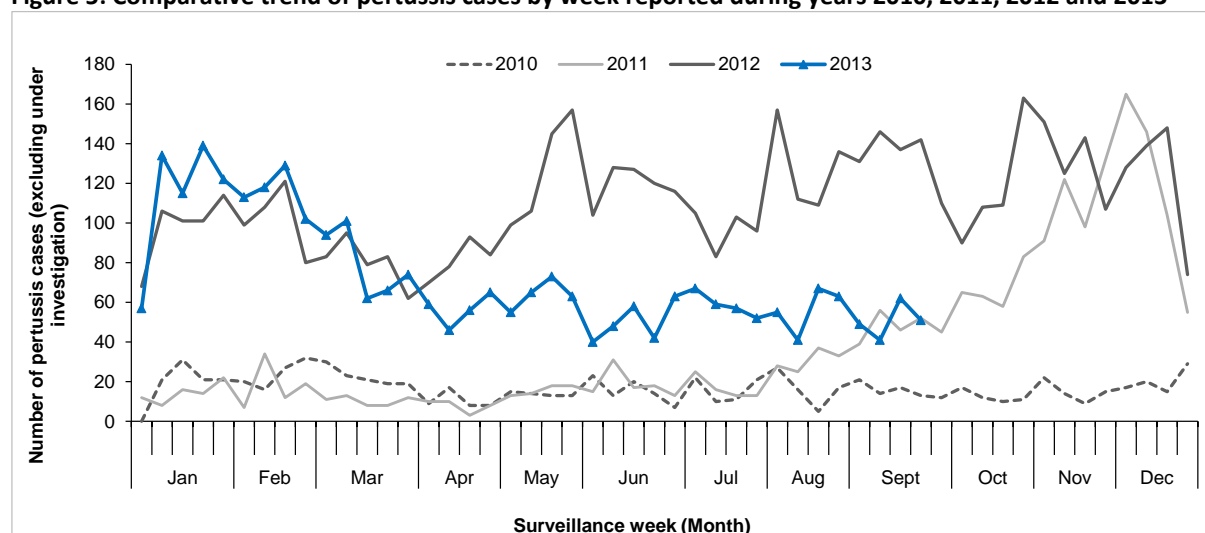
Table 5: Pertussis cases and rates by DHB in Quarter three: Jul-Sep and September 2013

DHB	Quarter three: Jul-Sep 2013				September 2013		
	All cases	Rates <sup>1</sup>	Hosp	<1 year <sup>2</sup>	New Cases	Hosp	<1 year <sup>2</sup>
Northland	49	31.0	4	9	14	2	4
Waitemata	55	9.9	6	4	15	3	1
Auckland	40	8.7	4	3	11	1	0
Counties Manukau	70	13.8	22	13	19	9	5
Waikato	39	10.5	0	0	11	0	0
Lakes	2	1.9	0	0	2	0	0
Bay of Plenty	12	5.7	1	1	4	0	0
Tairāwhiti	5	10.7	0	0	3	0	0
Taranaki	3	2.7	0	2	0	0	0
Hawke's Bay	9	5.8	1	1	2	0	0
Whanganui	6	9.6	1	1	1	0	0
MidCentral	7	4.1	0	2	2	0	0
Hutt Valley	14	9.7	0	0	6	0	0
Capital and Coast	52	17.5	1	5	9	0	0
Wairarapa	7	17.2	0	0	0	0	0
Nelson Marlborough	138	98.1	3	9	23	0	1
West Coast	30	91.2	0	0	22	0	0
Canterbury	143	28.6	3	4	48	0	2
South Canterbury	2	3.5	0	0	0	0	0
Southern	58	18.8	0	2	25	0	0
<b>Total</b>	<b>741</b>	<b>16.7</b>	<b>46</b>	<b>56</b>	<b>217</b>	<b>15</b>	<b>13</b>

<sup>1</sup>Rate of pertussis cases per 100 000 population calculated using 2012 mid-year population estimates.

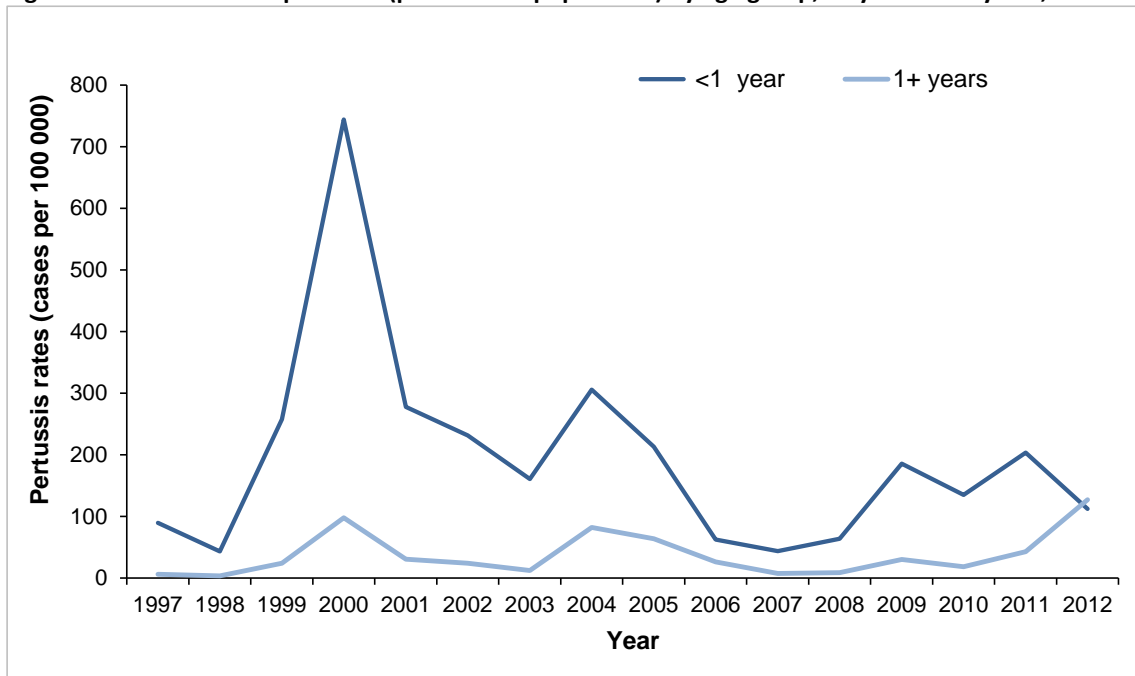
<sup>2</sup>Cases in the less than 1 year age group

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



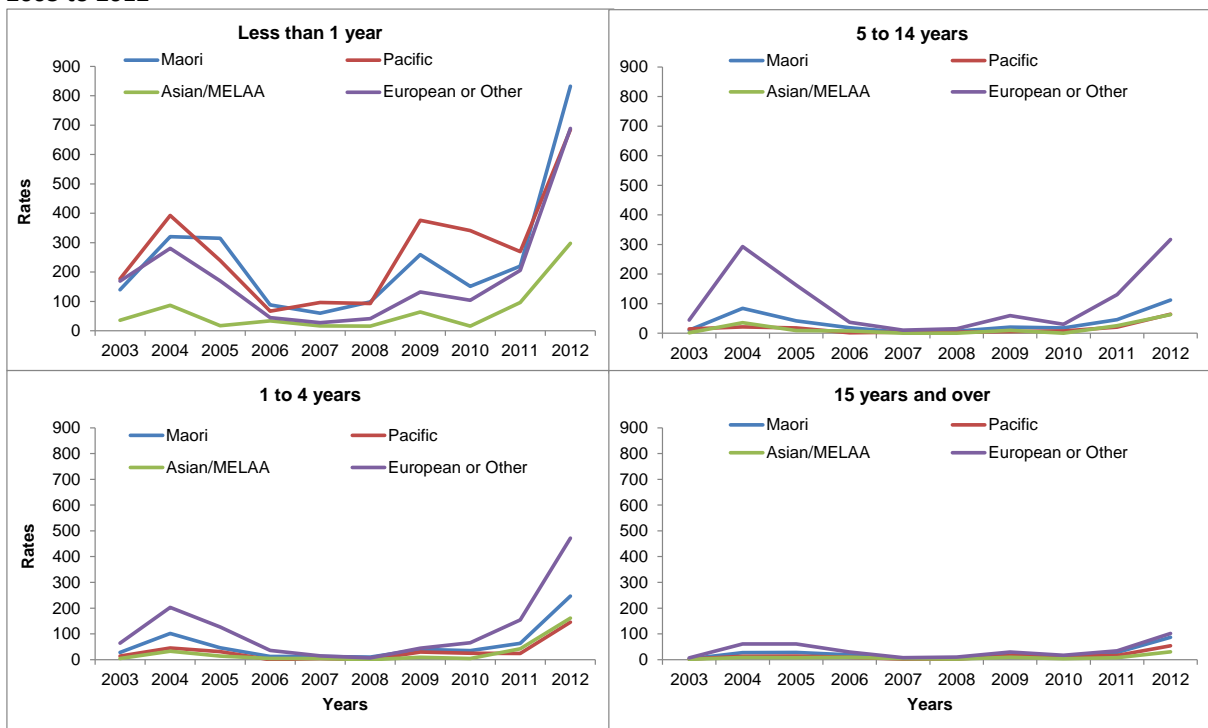
**Note:** Includes confirmed, probable and suspect cases only.

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 denominator data based on the proportion of people in each ethnic group from the estimated resident 2006 census population applied to the applicable mid-year population estimates from Statistics New Zealand



Figure 8: Monthly pertussis rates (cases per 100 000 population) by DHB, since January 2012

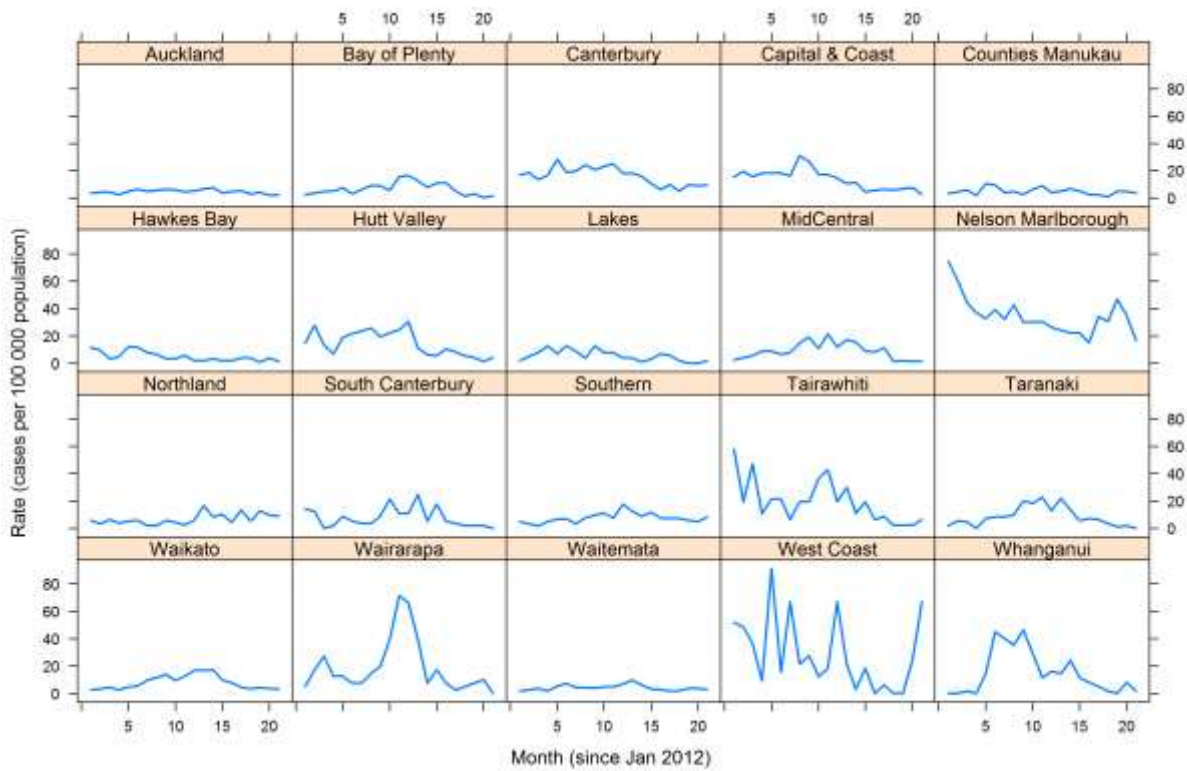
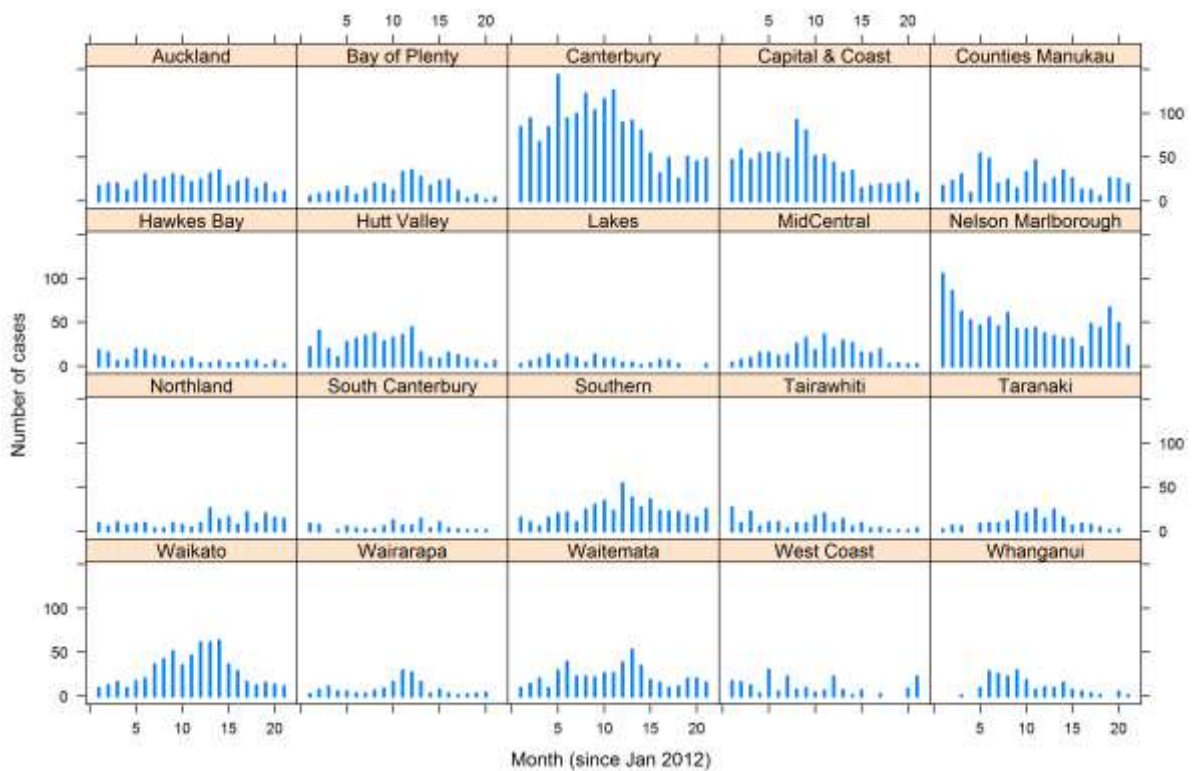


Figure 9: Monthly pertussis cases by DHB, since January 2012



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

**Case classification for pertussis notification in New Zealand up to 30 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>.