

# PERTUSSIS REPORT

April–June 2015

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Data contained within this quarterly report is based on information recorded on EpiSurv by public health service staff as at 10 August 2015. 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 second quarter (April–June) of 2015, 235 cases of pertussis were notified, including 109 confirmed, 110 probable, 12 suspect, and 4 cases still under investigation. The number of cases reported in the second quarter was higher than the previous quarter (January–March 2015, 209 cases). Eighteen (7.7%) of the notified cases were aged less than 1 year. Sixteen cases were hospitalised and no deaths were reported. Weekly notifications during the second quarter were considerably lower than for the second quarter of 2012 and 2013 and similar to 2014 (Figure 1).

The highest number of cases (excluding cases still under investigation) was reported by Counties Manukau DHB (35 cases), followed by Waitemata (34 cases) DHB. The overall rate was 5.1 per 100,000 (231 cases). The DHB with the highest rate was Capital & Coast DHB (9.8 per 100,000, 29 cases), followed by Nelson Marlborough (7.7 per 100,000, 11 cases) and Counties Manukau (6.9 per 100,000, 35 cases) DHBs.

Since 1 January 2015, 444 cases of pertussis have been notified, including 236 confirmed, 189 probable, 15 suspect, and 4 cases still under investigation. Thirty-nine (8.8%) of the notified cases were aged less than 1 year. Thirty-four cases were hospitalised and no deaths were reported.

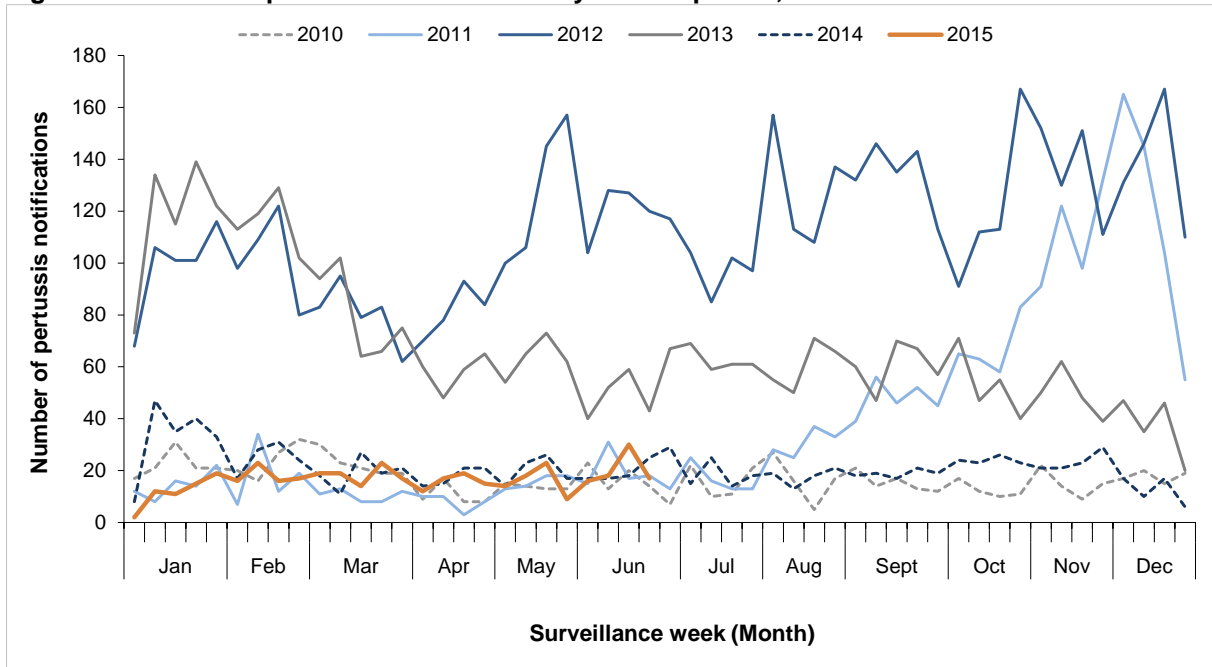
The highest number of cumulative cases (excluding cases still under investigation) was reported by Waitemata DHB (68 cases), followed by Capital & Coast (66 cases) and Counties Manukau (65 cases) DHBs. The overall cumulative rate was 9.8 per 100,000 (440 cases). The DHB with the highest cumulative rate was Capital & Coast DHB (22.2 per 100,000, 66 cases), followed by Northland (14.5 per 100,000, 24 cases) and Counties Manukau (12.8 per 100,000, 65 cases) DHBs.

This report summarises pertussis notifications for the second quarter of 2015 (quarterly and a cumulative 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.

### Trends in pertussis notifications

Figure 1 shows total pertussis notifications by week for 2010–2015 (to week ending 26 June). In 2015, notifications in the second quarter were considerably lower than those for the same quarter in 2012 and 2013. Since week 34 in 2011 (ending 26 August) notifications increased more or less consistently until week 12 in 2013, since then notifications have decreased. The highest weekly notification count occurred during weeks 44 (in October) and 51 (in December) of 2012. Figure 5 (Appendix) shows pertussis notifications for confirmed, suspect and probable cases only by week for 2010–2015. Note the total number of notifications may change as cases are investigated further and some are found not to meet the case definition.

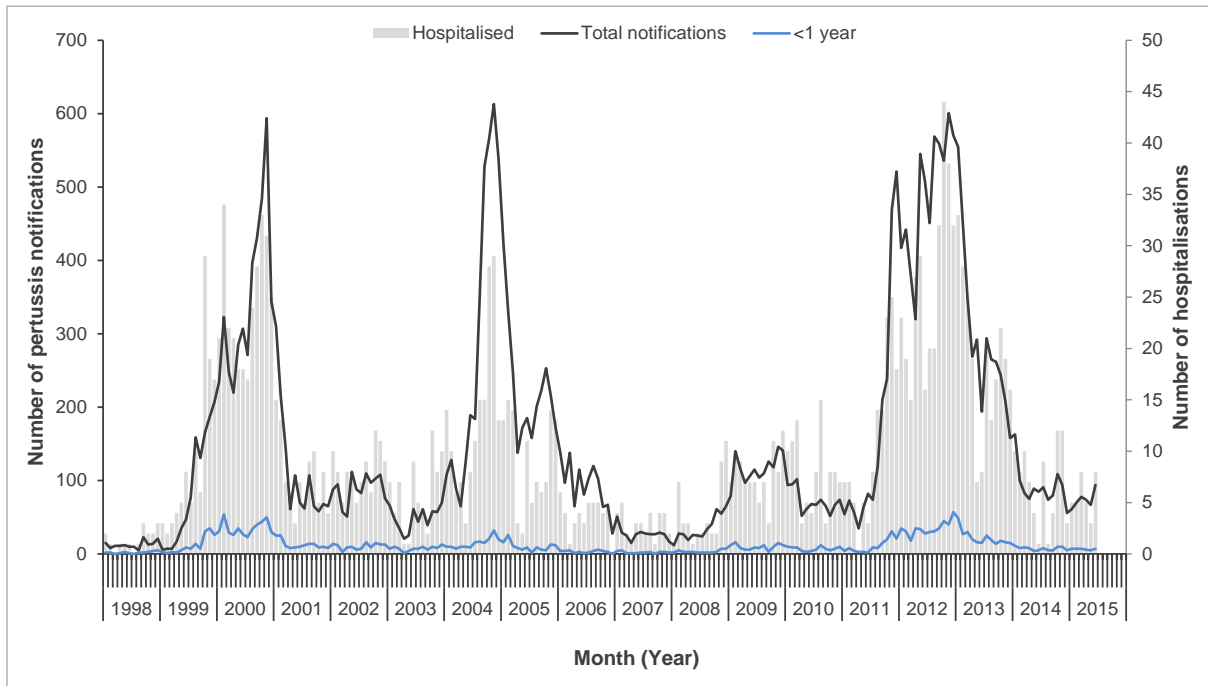
**Figure 1: Number of pertussis notifications by week reported, 2010–2015**



Note: Includes confirmed, probable, suspect cases and notifications still under investigation.

Figure 2 shows pertussis notifications and hospitalisations by calendar month, and notifications in those aged less than 1 year between January 1998 and June 2015. 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. Notifications began rising again in August 2011 and persisted through 2012 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 1997–2014.

**Figure 2: Number of pertussis notifications and hospitalisations by calendar month-year, 1998–2015**



Note: Includes confirmed, probable, suspect cases and notifications still under investigation.

In the following pages, all analyses include confirmed, probable and suspect cases only. Notifications that are still under investigation are excluded.

## Age

Table 1 shows pertussis notifications and rates by age, including new cases for the second quarter. Pertussis rates varied across age groups. Infants aged less than 1 year had the highest cumulative rate (64.5 per 100,000 population, 38 cases), followed by the 1–4 years (20.0 per 100,000 population, 50 cases) age group.

Of the 440 cases notified since January 2015, six (15.8%) were infants aged less than 6 weeks. Figure 3 shows the cumulative notification rate of pertussis cases by age group and ethnicity in 2015.

**Table 1: Number of pertussis notifications and rate (cases per 100,000 population) by age group, 2015**

Age group (years)	2015 <sup>1</sup>				Apr–Jun 2015	
	All cases <sup>2</sup>	Rate <sup>3</sup>	Hosp <sup>4</sup>	% <sup>5</sup>	New cases <sup>2</sup>	Hosp <sup>4</sup>
<1	38	64.5	18	47.4	17	8
1–4	50	20.0	1	2.0	28	1
5–9	47	15.3	0	0.0	25	0
10–14	38	12.8	1	2.6	24	0
15–19	23	7.3	0	0.0	14	0
20–29	53	8.6	0	0.0	24	0
30–39	33	6.0	4	12.1	15	1
40–49	53	8.5	4	7.5	26	2
50–59	62	10.4	2	3.2	28	1
60–69	25	5.4	1	4.0	16	1
70+	18	4.1	3	16.7	14	2
Overall	440	9.8	34	7.7	231	16

<sup>1</sup> Cumulative notifications January–June 2015.

<sup>2</sup> Includes confirmed, probable and suspect cases only.

<sup>3</sup> Rate of pertussis cases per 100,000 population calculated using 2014 mid-year population estimates. Where fewer than five cases have been notified a rate has not been calculated.

<sup>4</sup> Number of notifications that were hospitalised.

<sup>5</sup> Percentage of notifications that were hospitalised.

## Ethnicity

Pertussis notifications and rates by ethnicity are shown in Table 2. Of the pertussis cases with known ethnicity, the European or Other ethnic group had the highest numbers reported in the second quarter of 2015 (109 cases).

The ethnic group with the highest cumulative notification rate was Pacific peoples (25.9 per 100,000, 27 cases), followed by the Māori (16.9 per 100,000, 77 cases) and Asian (10.0 per 100,000, 10 cases) ethnic groups.

**Table 2: Number of pertussis notifications and rate (cases per 100,000 population) by ethnicity (prioritised), 2015**

Ethnicity	All cases <sup>2</sup>	Rate <sup>3</sup>	2015 <sup>1</sup>				Apr–Jun 2015		
			Hosp <sup>4</sup>	% <sup>5</sup>	<1 year <sup>6</sup>	Rate <sup>3</sup>	New cases <sup>2</sup>	Hosp <sup>4</sup>	<1 year <sup>6</sup>
Māori	77	11.4	13	16.9	15	98.5	37	5	7
Pacific peoples	27	9.7	7	25.9	5	91.2	16	3	3
Asian	10	1.9	1	10.0	1	-	6	0	0
MELAA	1	-	0	0.0	0	-	0	0	0
European or Other	210	7.0	8	3.8	7	24.2	109	5	4
Unknown	115	-	5	-	10	-	63	3	3
Overall	440	9.8	34	7.7	38	64.5	231	16	17

<sup>1</sup> Cumulative notifications January–June 2015.

<sup>2</sup> Includes confirmed, probable and suspect cases only.

<sup>3</sup> Rate of pertussis cases per 100,000 population. Denominator data used to determine disease rates for ethnic groups are based on the proportion of people in each ethnic group from the estimated resident 2013 Census population applied to the 2014 mid-year population estimates from Statistics New Zealand. Where fewer than five cases have been notified a rate has not been calculated.

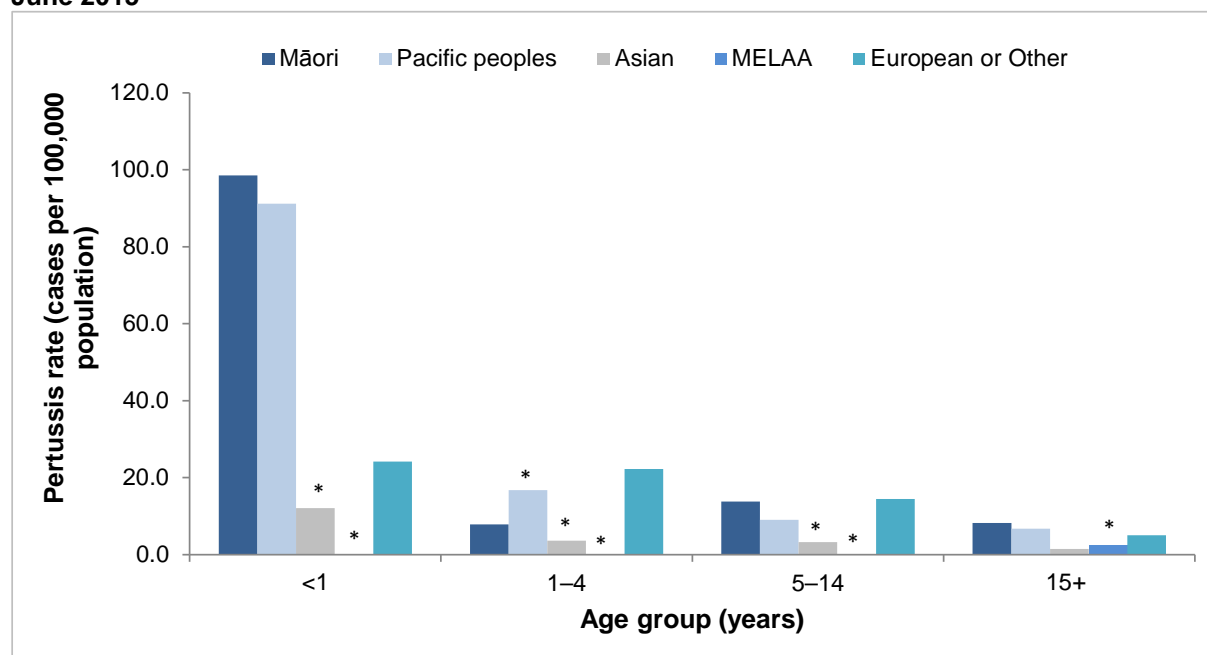
<sup>4</sup> Number of notifications that were hospitalised.

<sup>5</sup> Percentage of notifications that were hospitalised.

<sup>6</sup> Number of notifications in the <1 year age group.

MELAA: Middle Eastern/Latin American/African.

**Figure 3: Pertussis rate (cases per 100,000 population) by age group and ethnicity, January–June 2015**



Note: Notifications January–June 2015, includes confirmed, probable and suspect cases only. Denominator data used to determine disease rates for ethnic groups are based on the proportion of people in each ethnic group from the estimated resident 2013 Census population applied to the 2014 mid-year population estimates from Statistics New Zealand.

\* Rate based on fewer than five cases.

MELAA: Middle Eastern/Latin American/African.

Figure 7 (Appendix) shows the trend of pertussis notification rates (cases per 100,000 population) by age group and ethnicity for years 2003–2014. 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 or Other ethnic group.

### Hospitalisations and deaths

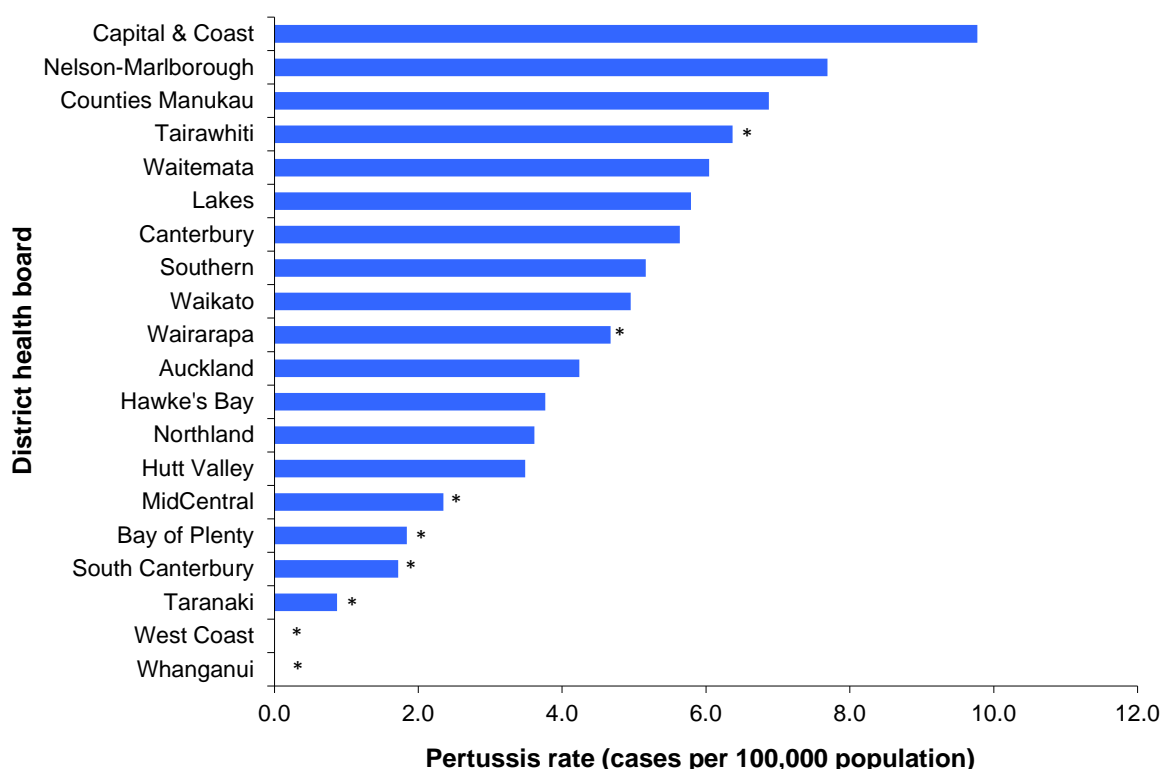
The distribution of hospitalisations by age group, ethnicity, and DHB is described in Table 1, Table 2 and Table 5. During the second quarter of 2015 there were 16 hospitalisations recorded in EpiSurv. Of these, eight (50.0%) were infants aged less than one year including one case aged less than 6 weeks. Of the 156 cases with known ethnicity and hospitalisation status, the ethnic-specific proportions of hospitalisations were as follows: Pacific peoples (23.1%, 3/13), Māori (14.3%, 5/35), European or Other (4.8%, 5/105).

No deaths were reported in the second quarter of 2015.

### District health board

The rates of pertussis notifications by DHB are shown in Figure 4 (and Table 5 in Appendix). In the second quarter, the highest number of cases was reported in Counties Manukau DHB (35 cases), followed by Waitemata (34 cases) and Canterbury (29 cases) DHBs. The highest notification rate was recorded in Capital & Coast DHB (9.8 per 100,000, 29 cases), followed by Nelson Marlborough (7.7 per 100,000, 11 cases) and Counties Manukau (6.9 per 100,000, 35 cases) DHBs. Cases in the less than 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 rate (cases per 100,000 population) by district health board, April–June 2015**



Note: Notifications for April–June 2015, includes confirmed, probable and suspect cases only. Rate of pertussis cases per 100,000 population calculated using 2014 mid-year population estimates.

\* Rate based on fewer than five cases.

## Vaccination status of confirmed notifications

The vaccination status for confirmed pertussis cases is shown in Table 3 and 4 for the second quarter and 2015, respectively. Of the 109 confirmed cases reported during in the second quarter of 2015, 72 (66.1%) had a known vaccination status (Table 3). Of these, 31 were not vaccinated, including one case aged less than 6 weeks and thus not eligible for vaccination. Eight cases had received one dose of vaccine, three cases had received two doses, 11 cases had received three doses, eight cases had received four doses, and five cases reported having completed pertussis vaccination. A further six cases reported being vaccinated but no dose information was recorded.

**Table 3: Vaccination status and age group of confirmed pertussis notifications, April–June 2015**

Age group	Total cases	One dose	Two doses	Three doses	Four doses	Five doses	Vaccinated (no dose info)	Not vaccinated	Unknown
<6wks <sup>2</sup>	1	0	0	0	0	0	0	1	0
6wks–2mths	6	4	0	0	0	0	0	2	0
3–4mths	6	3	2	0	0	0	0	1	0
5mths–3yrs	13	0	0	7	0	0	0	5	1
4–10yrs	19	1	0	4	7	0	1	5	1
11+yrs	64	0	1	0	1	5	5	17	35
Total	109	8	3	11	8	5	6	31	37

<sup>1</sup> Children aged <6 weeks are not eligible for immunisation.

Note: Vaccination status has been extracted from EpiSurv. Health professionals may use a range of sources to update vaccination status including the National Immunisation Register, parental recall and Well Child book records.

Of the 236 confirmed cases reported during January to June of 2015, 154 (65.3%) had a known vaccination status (Table 4). Of these, 67 were not vaccinated, including six cases aged less than 6 weeks and thus not eligible for vaccination. Eleven cases had received one dose of vaccine, nine cases had received two doses, 27 cases had received three doses, 18 cases had received four doses, and eight cases reported having completed pertussis vaccination. A further 14 cases reported being vaccinated but no dose information was recorded.

**Table 4: Vaccination status and age group of confirmed pertussis notifications, 2015<sup>1</sup>**

Age group	Total cases	One dose	Two doses	Three doses	Four doses	Five doses	Vaccinated (no dose info)	Not vaccinated	Unknown
<6wks <sup>2</sup>	6	0	0	0	0	0	0	6	0
6wks–2mths	13	4	0	0	0	0	1	8	0
3–4mths	10	3	5	0	0	0	0	2	0
5mths–3yrs	31	2	0	18	0	0	0	10	1
4–10yrs	45	1	3	7	15	1	2	12	4
11+yrs	131	1	1	2	3	7	11	29	77
Total	236	11	9	27	18	8	14	67	82

<sup>1</sup> Cumulative notifications January–June 2015.

<sup>2</sup> Children aged <6 weeks are not eligible for immunisation.

Note: Immunisation status has been extracted from EpiSurv. Health professionals may use a range of sources to update immunisation status including the National Immunisation Register, parental recall and Well Child book records.

## Appendix

Table 5: Number of pertussis notifications and rate (cases per 100,000 population) by district health board, 2015

District health board	2015 <sup>1</sup>					Apr–Jun 2015		
	All cases <sup>2</sup>	Rate <sup>3</sup>	Hosp <sup>4</sup>	% <sup>5</sup>	<1 year <sup>6</sup>	New cases <sup>2</sup>	Hosp <sup>4</sup>	<1 year <sup>6</sup>
Northland	24	14.5	3	12.5	5	6	1	2
Waitemata	68	12.1	4	5.9	5	34	3	1
Auckland	30	6.4	3	10.0	3	20	3	0
Counties Manukau	65	12.8	11	16.9	9	35	4	6
Waikato	26	6.8	3	11.5	1	19	2	1
Lakes	9	8.7	1	11.1	1	6	0	0
Bay of Plenty	8	3.7	1	12.5	1	4	0	0
Tairāwhiti	4	-	0	0.0	1	3	0	0
Taranaki	4	-	0	0.0	0	1	0	0
Hawke's Bay	10	6.3	2	20.0	3	6	1	2
Whanganui	0	-	0	0.0	0	0	0	0
MidCentral	15	8.8	0	0.0	0	4	0	0
Hutt Valley	7	4.9	1	14.3	1	5	0	0
Capital & Coast	66	22.2	3	4.5	5	29	1	3
Wairarapa	5	11.7	0	0.0	1	2	0	0
Nelson Marlborough	15	10.5	0	0.0	1	11	0	1
West Coast	1	-	0	0.0	0	0	0	0
Canterbury	48	9.3	2	4.2	0	29	1	0
South Canterbury	2	-	0	0.0	0	1	0	0
Southern	33	10.6	0	0.0	1	16	0	1
<b>Overall</b>	<b>440</b>	<b>9.8</b>	<b>34</b>	<b>7.7</b>	<b>38</b>	<b>231</b>	<b>16</b>	<b>17</b>

<sup>1</sup> Cumulative notifications January–June 2015.

<sup>2</sup> Includes confirmed, probable and suspect cases only.

<sup>3</sup> Rate of pertussis cases per 100,000 population calculated using 2014 mid-year population estimates, rates have not been calculated where fewer than five cases were notified.

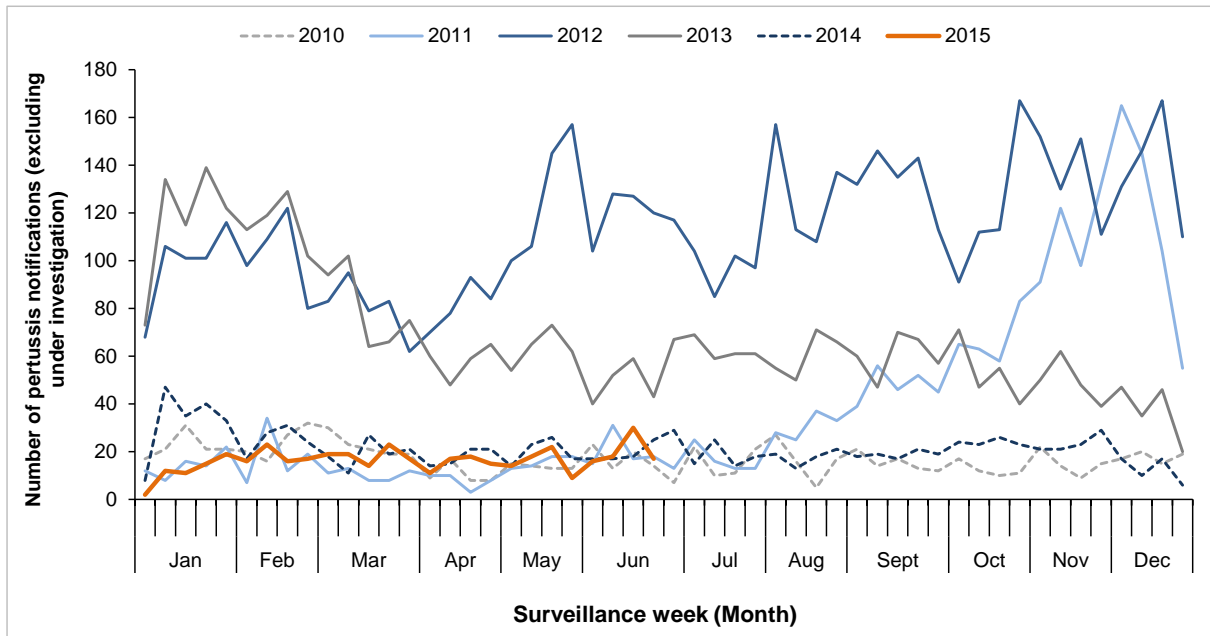
<sup>4</sup> Number of notifications that were hospitalised.

<sup>5</sup> Percentage of notifications that were hospitalised.

<sup>6</sup> Number of cases in the <1 year age group.

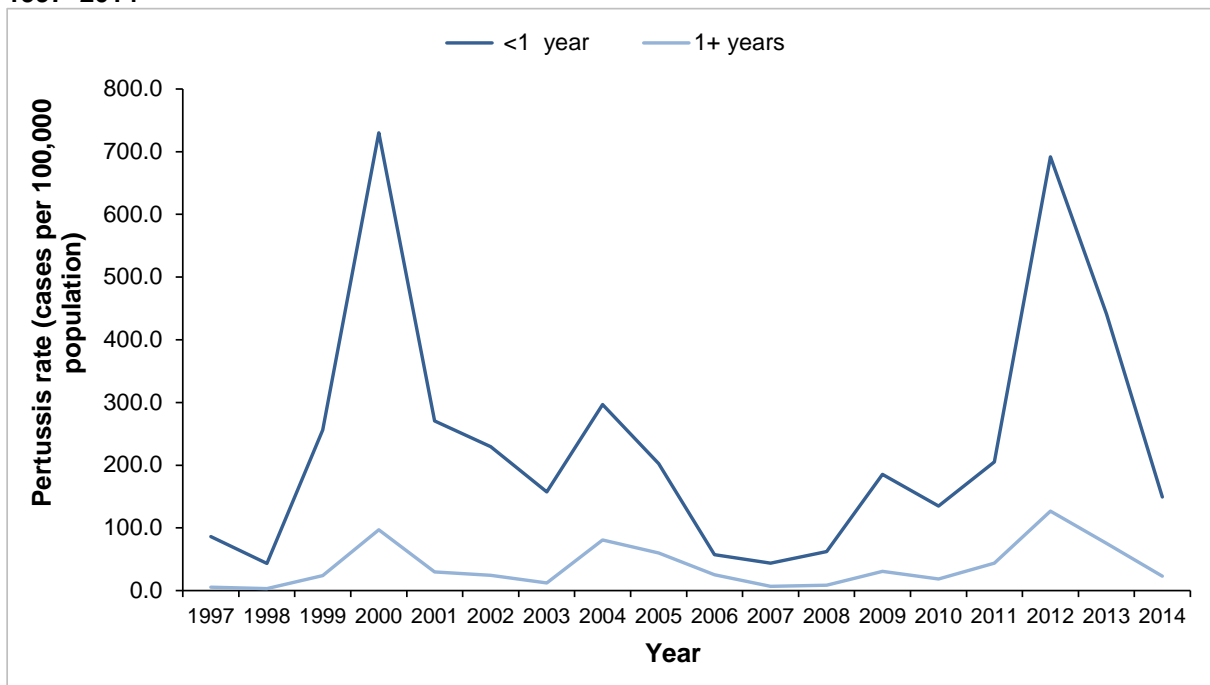


**Figure 5: Comparative trend of the number of pertussis notifications by week reported, 2010–2015**



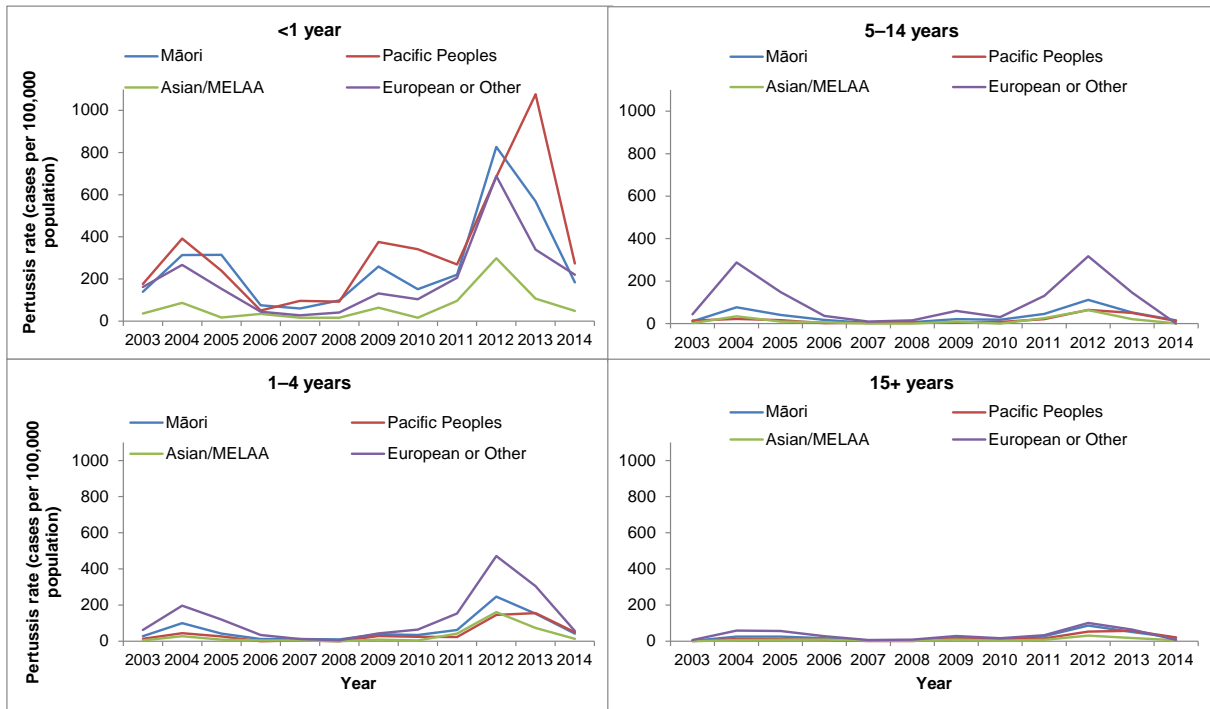
Note: Includes confirmed, probable and suspect cases only.

**Figure 6: Pertussis rate (cases per 100,000 population) by age group (<1 year vs. 1+ years), 1997–2014**



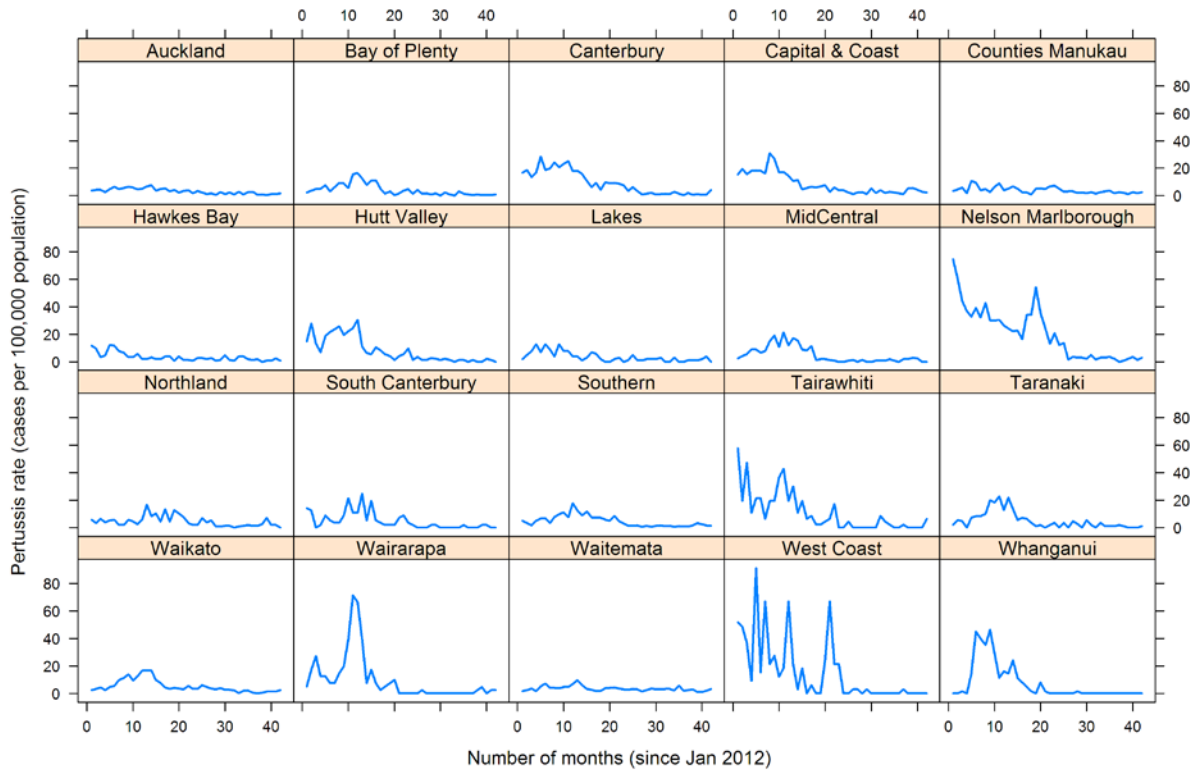
Note: Includes confirmed, probable and suspect cases only. Rate of pertussis cases per 100,000 population calculated using mid-year population estimates.

**Figure 7: Trends in pertussis rates (cases per 100,000 population) by age group and ethnicity, 2003–2014**



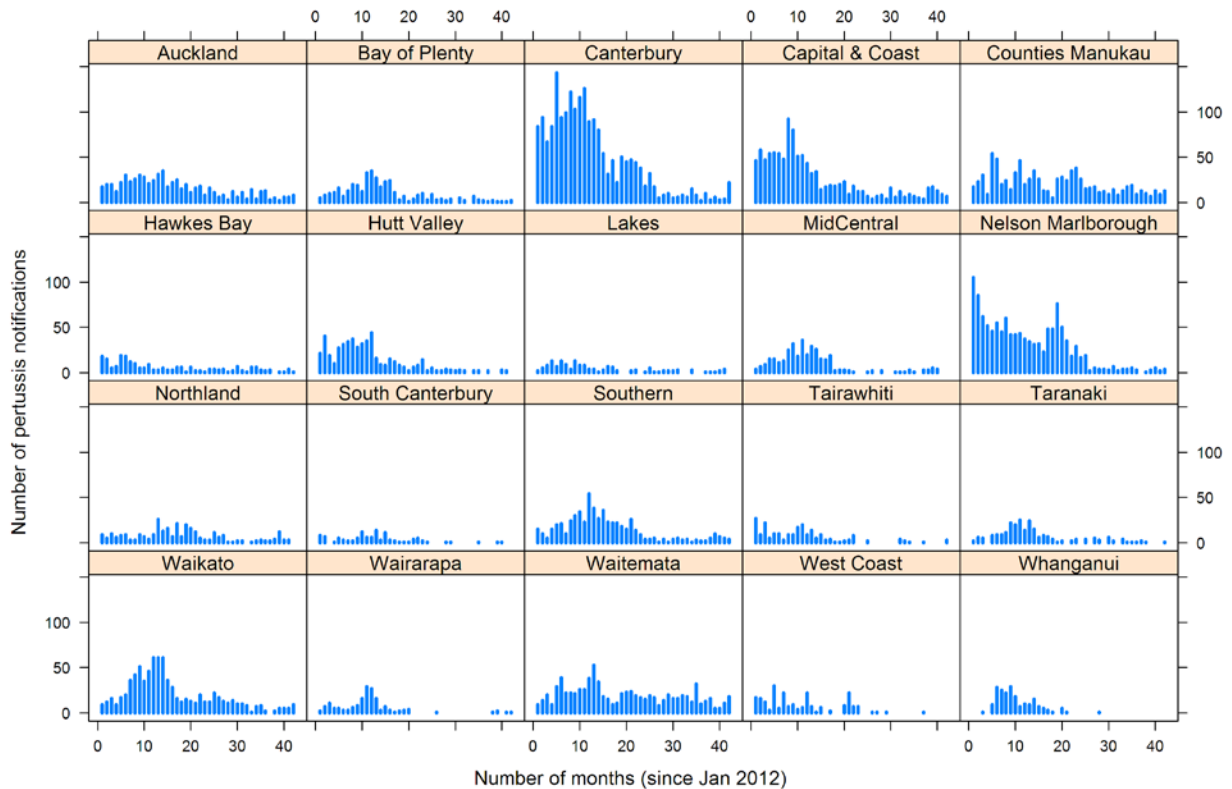
Note: Includes confirmed, probable and suspect cases only. Rate of pertussis cases per 100,000 population calculated using mid-year population estimates.

**Figure 8: Monthly pertussis rate (cases per 100,000 population) by district health board, since January 2012**



Note: Includes confirmed, probable and suspect cases only.

**Figure 9: Monthly pertussis cases by district health board, since January 2012**



Note: Includes confirmed, probable and suspect cases 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 5 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 5 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>