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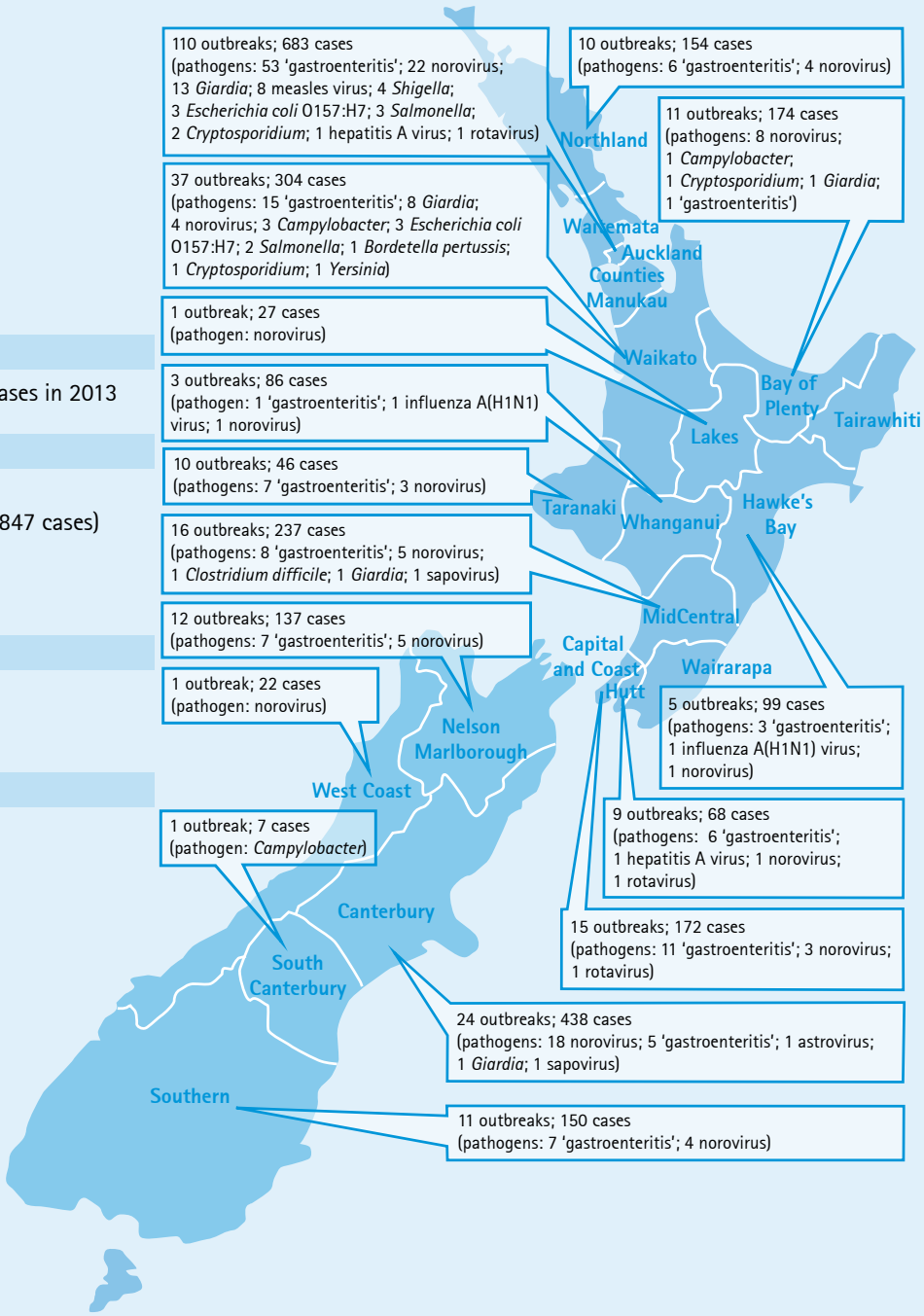
New Zealand Public Health Surveillance Report

June 2014: Covering January to March 2014

Contents & Highlights

This Quarter's Outbreaks

Notification and outbreak data in this issue are drawn from the January to March quarter of 2014. The outbreak map on this page consists of all outbreak information, final and interim. The total number of outbreaks and cases by region and outbreaks by pathogen are reported, as notified up to 3 April 2014. Outbreaks reporting exposures in more than one geographic location are assigned to the district health board with the most cases. Four outbreaks involved more than one pathogen therefore individual pathogen outbreak numbers may not sum to group totals.



The latest reports from Sexually Transmitted Infections Surveillance, Antimicrobial Resistance, Virology and Enteric Reference Laboratories are available at www.surv.esr.cri.nz

1. Editorial

A summary of the key trends in notifiable diseases for 2013

A total of 17,711 notifiable disease cases were notified through EpiSurv, New Zealand's notifiable disease database in 2013, compared with 19,932 in 2012. During 2013 there was one change to the notifiable disease schedule under the Health Act 1956: the addition of Middle East respiratory syndrome in September.

From 2012 to 2013, there were decreases in the rates of most vaccine-preventable diseases, in particular measles and pertussis. There were mixed trends among the enteric diseases, with increases in the rates of cryptosporidiosis and verotoxin- or shiga toxin-producing *Escherichia coli* (VTEC/STEC) infection, and decreases in campylobacteriosis and acute gastroenteritis. For other diseases, there was a significant increase in the notification rate for dengue fever, while the notification rate for leptospirosis decreased significantly from 2012.

Enteric diseases

There were increases in both cryptosporidiosis and VTEC/STEC infection from 2012 to 2013, with 1348 cases of cryptosporidiosis notified in 2013 (30.1 per 100,000 population) compared with 877 cases in 2012 (19.8 per 100,000). This was also the highest annual total since cryptosporidiosis was made notifiable in 1996. A high autumn peak in notified cases was observed in 2013 in addition to the usual spring peak. There were 98 outbreaks of *Cryptosporidium* spp. involving 547 cases reported during 2013 (compared with 47 outbreaks involving 164 cases in 2012). An increase in VTEC/STEC infection notified cases was also observed, with 207 cases in 2013 (4.6 per 100,000) compared with 147 cases in 2012 (3.3 per 100,000). A high autumn peak was also observed for VTEC/STEC infection.

Campylobacteriosis accounted for 39% of all notifications in 2013 (6837 cases), despite a significant decrease in the 2013 rate (152.9 per 100,000) compared with the 2012 rate (158.3 per 100,000, 7016 cases). The total number of campylobacteriosis cases for 2013 was less than half the number of cases seen during the peak in 2006 (15,873 cases). A decrease in notified cases was also observed for acute gastroenteritis, with 558 cases in 2013 (12.5 per 100,000) compared with 735 cases in 2012 (16.6 per 100,000).

Vaccine-preventable diseases

There were decreases in the notification rates for the following vaccine-preventable diseases: invasive pneumococcal disease, measles, meningococcal disease, mumps and pertussis. In particular, measles and pertussis rates decreased significantly from 2012 to 2013. Eight cases of measles were notified during 2013, compared with 68 cases in 2012. The 2013 notification rate for pertussis remains high (79.2 per 100,000 population, 3539 cases) but has decreased significantly since 2012 (133.0 per 100,000, 5898 cases). Pertussis was the second most commonly reported notifiable disease after campylobacteriosis.

Exotic diseases

There was a significant increase in the notification rate for dengue fever in 2013 (2.4 per 100,000, 106 cases) compared with 2012 (1.7 per 100,000, 76 cases). All cases had a history of overseas travel prior to infection.

Seven cases of hydatid disease were reported in 2013 compared with one case in 2012. Two cases had acquired the infection overseas, four cases had evidence of a past infection and for one case the source of infection had not yet been established.

Eleven cases of leprosy were notified during 2013 compared with two cases in 2012. Nine cases had a history of overseas travel prior to infection.

All cases of arboviral disease (Chikungunya fever and Ross River virus), cysticercosis and taeniasis notified in 2013 had an overseas exposure prior to infection. Four cases of murine typhus (a rickettsial disease) were reported in 2013 and three of these cases had acquired the infection locally.

Outbreaks

In 2013, there was a decrease in the number of reported outbreaks and associated cases (652 outbreaks, 7137 cases) compared with 2012 (719 outbreaks, 10,500 cases) but the figures were similar to 2011 (581 outbreaks, 7796 cases). Over the 10-year period from 2004 to 2013, there has been an increasing trend in the number of outbreaks reported.

The most common pathogens implicated in outbreaks in 2013 were norovirus (169 outbreaks, 3685 cases), *Cryptosporidium* spp. (98 outbreaks, 547 cases) and *Giardia* spp. (78 outbreaks, 333 cases). Five outbreaks (85 cases) involved both *Cryptosporidium* spp. and *Giardia* spp.

More than 90% of outbreaks reported in 2013 had person-to-person transmission recorded as a mode of transmission. The most common exposure settings were private homes (224 outbreaks, 758 cases) and long-term care facilities (145 outbreaks, 3133 cases).

For a more detailed report see www.surv.esr.cri.nz/surveillance/annual_surveillance.php

Reported by the Health Intelligence Team, Health Programme, ESR.

2. Notifiable Disease Surveillance

The following is a summary of disease notifications for the January to March quarter of 2014 and cumulative notifications and rates calculated for a 12-month period (April 2013 to March 2014). For comparative purposes notification numbers and rates are presented in brackets for the same periods in the previous year. A robust method of constructing 95% confidence intervals is used to determine 'statistically significant differences' throughout this report unless otherwise stated [see Newcombe RG and Altman DG 2000. Proportions and their differences. In: Statistics with Confidence. BMJ Books, Bristol.]. Data contained within this report are based on information recorded in EpiSurv by public health service staff up to 3 April 2014. As this information may be updated over time, these data should be regarded as provisional.

National surveillance data tables are available at www.surv.esr.cri.nz

VACCINE PREVENTABLE DISEASE

Invasive Pneumococcal Disease

- *Notifications:* 77 notifications in the quarter (2013, 77); 480 notifications over the last 12 months (2013, 495), giving a rate of 10.7 cases per 100,000 population (2013, 11.2), not a statistically significant decrease.
- *Comments:* there has been a statistically significant quarterly decrease from the previous quarter (119 cases). Cases were aged between 2 days and 97 years, with 5 cases aged less than 2 years.

Measles

- *Notifications:* 113 notifications in the quarter (2013, 1); 120 notifications over the last 12 months (2013, 13), giving a rate of 2.7 cases per 100,000 population (2013, 0.3), a statistically significant increase.
- *Comments:* there has been a statistically significant quarterly increase from the previous quarter (7 cases) and from the same quarter last year (1 case). 83 cases were laboratory confirmed.

Mumps

- *Notifications:* 13 notifications in the quarter (2013, 8); 28 notifications over the last 12 months (2013, 27), giving a rate of 0.6 cases per 100,000 population (2013, 0.6), not a statistically significant increase.
- *Comments:* there has been a statistically significant quarterly increase from the previous quarter (3 cases). 4 cases were laboratory confirmed.

Pertussis

- *Notifications:* 375 notifications in the quarter (2013, 1354); 2560 notifications over the last 12 months (2013, 6013), giving a rate of 57.3 cases per 100,000 population (2013, 135.6), a statistically significant decrease.
- *Comments:* there has been a statistically significant quarterly decrease from the previous quarter (609 cases) and from the same quarter last year (1354 cases).

ENTERIC INFECTIONS

Campylobacteriosis

- *Notifications:* 1820 notifications in the quarter (2013, 1634); 7023 notifications over the last 12 months (2013, 6437), giving a rate of 157.1 cases per 100,000 population (2013, 145.2), a statistically significant increase.
- *Comments:* there has been a statistically significant quarterly decrease from the previous quarter (2286 cases) and a statistically significant increase from the same quarter last year (1634 cases).

Gastroenteritis (acute)

- *Notifications:* 163 notifications in the quarter (2013, 139); 582 notifications over the last 12 months (2013, 717), giving a rate of 13.1 cases per 100,000 population (2013, 16.2), a statistically significant decrease.
- *Note*: this is not a notifiable disease per se except in persons with a suspected common source or with a high risk occupation. The term 'gastroenteritis' provides a catch-all category for enteric diseases that are not notifiable and for syndromic reports that come through public health units, including direct reports from the public where the causative pathogen may never be known.

Salmonellosis

- *Notifications:* 283 notifications in the quarter (2013, 352); 1074 notifications over the last 12 months (2013, 1091), giving a rate of 24.0 cases per 100,000 population (2013, 24.6), not a statistically significant decrease.
- *Comments:* there has been a statistically significant quarterly decrease from the same quarter last year (352 cases).

VTEC Infections

- *Notifications:* 57 notifications in the quarter (2013, 59); 203 notifications over the last 12 months (2013, 164), giving a rate of 4.5 cases per 100,000 population (2013, 3.7), a statistically significant increase.
- *Comments:* there has been a statistically significant quarterly increase from the previous quarter (17 cases).

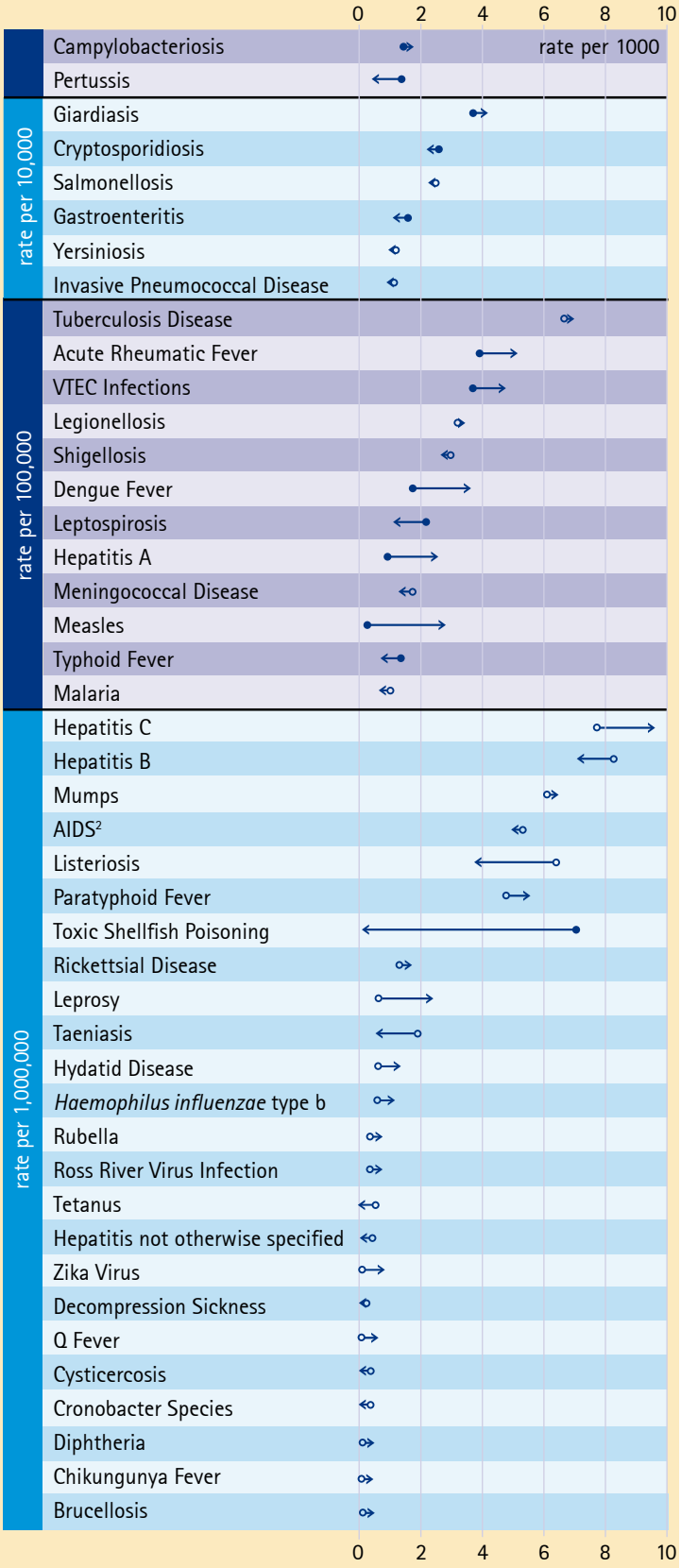
INFECTIOUS RESPIRATORY DISEASES

Acute Rheumatic Fever

- *Notifications:* 57 notifications in the quarter (2013, 37); 221 notifications over the last 12 months (2013, 176), giving a rate of 4.9 cases per 100,000 population (2013, 4.0), a statistically significant increase.
- *Comments:* there was a statistically significant quarterly increase from the same quarter last year (37 cases). Cases were distributed by age as follows: 1 (1–4 years), 17 (5–9 years), 24 (10–14 years), and 15 (15 years and over). 52 cases were an initial attack of acute rheumatic fever and 5 cases were recurrent attacks.

National Surveillance Data

12-Monthly Notification Rate Changes[1]



Notifications per 1000 or 10,000 or 100,000 or 1,000,000 population

Rate Change Symbol Key:

- > Rate increase from the previous 12-month period
- < Rate decrease from the previous 12-month period
- ● Statistically significant rate change
- ○ Statistically non-significant rate change

[1] Rates are calculated for the 12-month period April 2013 to March 2014 and compared to previous 12-month rates.

[2] Data provided by the AIDS Epidemiology Group, University of Otago. Note: changes in the 12-month notification rate should be interpreted with caution as this often reflects late notifications.

Tuberculosis Disease

- *Notifications:* 94 notifications in the quarter (2013, 68); 304 notifications over the last 12 months (2013, 294) giving a rate of 6.8 per 100,000 population (2013, 6.6), not a statistically significant increase.
- *Comments:* there has been a statistically significant quarterly increase from the same quarter last year (68 cases); 71 cases were laboratory confirmed; 93 cases were new cases and 1 case was a relapse or reactivation.

ENVIRONMENTAL EXPOSURES & INFECTIONS

Cryptosporidiosis

- *Notifications:* 84 notifications in the quarter (2013, 386); 1046 notifications over the last 12 months (2013, 1153), giving a rate of 23.4 cases per 100,000 population (2013, 26.0), a statistically significant decrease.
- *Comments:* there has been a statistically significant quarterly decrease from the previous quarter (284 cases) and the same quarter last year (386 cases).

Legionellosis

- *Notifications:* 32 notifications in the quarter (2013, 41); 144 notifications over the last 12 months (2013, 142), giving a rate of 3.2 cases per 100,000 population (2013, 3.2), not a statistically significant decrease.
- *Comments:* there has been a statistically significant quarterly decrease from the previous quarter (57 cases). 10 notifications remain under investigation, a proportion of these will fail to meet the case definition and be classified 'not a case'.

Leptospirosis

- *Notifications:* 11 notifications in the quarter (2013, 11); 59 notifications over the last 12 months (2013, 101), giving a rate of 1.3 cases per 100,000 population (2013, 2.3), a statistically significant decrease.
- *Comments:* there were 5 male and 6 female cases. 7 cases were recorded as having an occupation identified as high risk for exposure. The recorded occupations were farm worker (6 cases) and meat process worker (1 case).

Toxic Shellfish Poisoning

- *Notifications:* 1 notification in the quarter (2013, 1); 1 notification over the last 12 months (2013, 31), a statistically significant decrease.

NEW, EXOTIC & IMPORTED INFECTIONS

Dengue Fever

- *Notifications:* 80 notifications in the quarter (2013, 24); 162 notifications over the last 12 months (2013, 84), giving a rate of 3.6 cases per 100,000 population (2013, 1.9), a statistically significant increase.
- *Comments:* there has been a statistically significant quarterly increase from the previous quarter (32 cases) and from the same quarter last year (24 cases). 72 cases were laboratory confirmed. All cases had travelled or resided overseas during the incubation period of the disease. The most commonly visited countries were Fiji (40 cases), Cook Islands (12 cases), and Vanuatu (9 cases).

Hepatitis A

- *Notifications:* 40 notifications in the quarter (2013, 16); 115 notifications over the last 12 months (2013, 45), giving a rate of 2.6 cases per 100,000 population (2013, 1.0), a statistically significant increase.
- *Comments:* there has been a statistically significant quarterly increase from the previous quarter (18 cases) and from the same quarter last year (16 cases). Cases were aged between 11 months and 84 years, with 16 cases aged less than 16 years. Overseas travel information was recorded for 27 (67.5%) cases. Of these, 12 (44.4%) cases had not travelled overseas during the incubation period of the disease.

Malaria

- *Notifications:* 5 notifications in the quarter (2013, 15); 37 notifications over the last 12 months (2013, 48), giving a rate of 0.8 cases per 100,000 population (2013, 1.1), not a statistically significant decrease.
- *Comments:* there has been a statistically significant quarterly decrease from the same quarter last year (15 cases). All cases had malaria parasites in a blood film and had travelled or resided overseas during the incubation period of the disease. The countries visited or resided in were India, Indonesia, Peru, and Uganda. The country was not specified for one case.

Shigellosis

- *Notifications:* 40 notifications in the quarter (2013, 47); 130 notifications over the last 12 months (2013, 136), giving a rate of 2.9 cases per 100,000 population (2013, 3.1), not a statistically significant decrease.
- *Comments:* there has been a statistically significant quarterly increase from the previous quarter (23 cases). Overseas travel or prior travel information was recorded for 21 cases. Of these, 5 (23.8%) cases had not travelled overseas during the incubation period and had no prior history of travel that could account for their infection.

Typhoid Fever

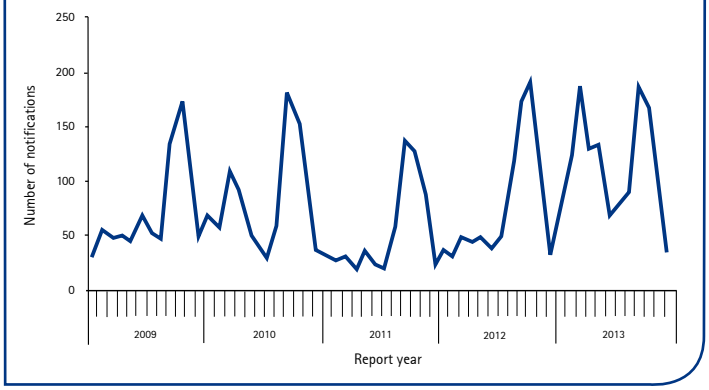
- *Notifications:* 18 notifications in the quarter (2013, 28); 40 notifications over the last 12 months (2013, 62), giving a rate of 0.9 cases per 100,000 population (2013, 1.4), a statistically significant decrease.
- *Comments:* Overseas travel information was recorded for all cases. Of these, 5 (27.8%) cases had not travelled overseas during the incubation period.

3. Other Surveillance Reports

Record number of cryptosporidiosis outbreaks and cases in 2013

Cases of cryptosporidiosis notified to EpiSurv rose from 877 cases in 2012 to 1348 cases in 2013 (a rate of 30.1 per 100,000 population). This is the highest annual total since cryptosporidiosis became notifiable in 1996. Figure 1 shows cryptosporidiosis cases by month from 2009 to 2013. Notifications show a distinct seasonal pattern with the highest number reported in spring and an additional smaller peak in autumn. In 2010 and 2013 the autumn peak was much larger than in other years.

Figure 1. Cryptosporidiosis notifications by month 2009–2013



The highest notification rates in 2013 were in more rural areas, including Hawkes Bay, South Canterbury, Lakes and Waikato DHBs (87.5, 66.7, 60.2 and 57.7 per 100,000 population respectively). In Capital & Coast and Hutt Valley DHBs, an increase in cryptosporidiosis cases in the first half of the year was reported, compared with previous years.[1]

The highest number of notifications was reported for children aged 1–4 years (418 cases, 168.7 per 100,000), adults aged 30–39 years (210 cases, 37.5 per 100,000) and children aged 5–9 years (185 cases, 62.1 per 100,000). More than half (53.6%) of the total cases were children aged less than 15 years. The majority of notified cases were in the European or Other ethnic group (1050 cases, 35.4 per 100,000).

The most common risk factors associated with cryptosporidiosis cases in 2013 were recreational contact with water (44.9%), contact with farm animals (44.2%), contact with other symptomatic people (36.3%) and contact with faecal matter (36.1%). Only 8.5% of cases reported overseas travel during the incubation period as a risk factor.

In 2013, 98 outbreaks of cryptosporidiosis were reported, involving 547 cases. This is the highest number of outbreaks since reporting began in 2001, and compares with 47 outbreaks involving 164 cases in 2012. Seven of the 2013 outbreaks involved more than one implicated pathogen: *Giardia* spp. was also identified in five outbreaks and *Campylobacter* spp. was identified in two outbreaks. The most common modes of transmission (primary and secondary) reported for *Cryptosporidium* spp. outbreaks in 2013 were person-to-person (86 outbreaks, 471 cases) and environmental transmission (41 outbreaks, 298 cases). Of the environmental outbreaks, 25 (61.0%) were associated with exposure to a potentially contaminated swimming pool or spa pool.

These high rates of cryptosporidiosis over the past year highlight the importance of key disease prevention messages such as:

- Toileting and showering before swimming pool use and not swimming during (and for two weeks after) an episode of diarrhoea.
- Hand-washing after contact with animals, going to the toilet or changing nappies, caring for people with cryptosporidiosis, and before and after food preparation.
- Boiling or filtering water from rivers, streams, shallow wells or the roof before consumption.

For list of references see – www.surv.esr.cri.nz/surveillance/NZPHSR.php

Reported by the Health Intelligence Team, Health Programme, ESR.

4. Outbreak Surveillance

The following information is a summary of the outbreak trends for New Zealand from data collected in the last quarter (January to March 2014). Comparisons are made to the previous quarter (October to December 2013), and to the same quarter in the previous year (January to March 2013). Note that the outbreak data in this section are notified to ESR by the Public Health Services.

General

- 275 outbreaks notified in this quarter (2782 cases).
- 135 are final reports (1935 cases); 140 are interim reports (847 cases) that have yet to be finalised and closed.

All data that follow relate to final reports only.

- 14.3 cases on average per outbreak, compared with 9.3 cases per outbreak in the previous quarter (11.6 cases per outbreak in the same quarter of last year).
- 41 hospitalisations: influenza A(H1N1) virus (15 cases), norovirus (11 cases), *Campylobacter* (5 cases), *Bordetella pertussis* (2 cases), *Escherichia coli* O157:H7 (2 cases), measles virus (2 cases), rotavirus (2 cases), 'gastroenteritis' (1 case), and hepatitis A virus (1 case).
- 7 deaths: norovirus (4 cases) and 'gastroenteritis' (3 cases).
- Three outbreaks involved more than one pathogen therefore individual pathogen outbreak numbers may not sum to group totals.

Pathogens

- 47 norovirus outbreaks (1243 cases).
- 36 'gastroenteritis' outbreaks (439 cases).
- 23 *Giardia* outbreaks (65 cases).
- 4 *Campylobacter* outbreaks (14 cases).
- 4 *Cryptosporidium* outbreaks (13 cases).
- 4 *E. coli* O57:H7 (11 cases).
- 3 rotavirus outbreaks (22 cases).
- 3 *Salmonella* outbreaks (8 cases).
- 3 *Shigella* outbreaks (6 cases).
- 2 influenza A(H1N1) virus outbreaks (79 cases).
- 2 measles virus outbreaks (8 cases).
- 2 sapovirus outbreaks (37 cases).
- 1 astrovirus outbreak (77 cases).
- 1 *B. pertussis* outbreak (5 cases).
- 1 *Clostridium difficile* outbreak (3 cases).
- 1 hepatitis A virus outbreak (6 cases).
- 1 *Yersinia* outbreak (4 cases).

Modes of Transmission

Note that reporting allows for multiple modes of transmission to be selected. In some instances no modes of transmission are selected for outbreaks notified to ESR.

- 121 person-to-person, from (non-sexual) contact with an infected person (including droplets): 45 norovirus (1239 cases), 30 'gastroenteritis' (420 cases), 20 *Giardia* (58 cases), 4 *E. coli* O157:H7 (11 cases), 4 *Cryptosporidium* (13 cases), 3 rotavirus (22 cases), 3 *Salmonella* (8 cases), 3 *Shigella* (6 cases), 2 *Campylobacter* (5 cases), 2 influenza A(H1N1) virus (79 cases), 2 measles virus (8 cases), 2 sapovirus (37 cases), 1 astrovirus (77 cases), 1 *B. pertussis* (5 cases), 1 *C. difficile* (3 cases), and 1 hepatitis A virus (6 cases).
- 21 environmental, from contact with an environmental source (eg, swimming): 10 norovirus (228 cases), 5 *Giardia* (13 cases), 2 *Cryptosporidium* (6 cases), 2 'gastroenteritis' (66 cases), 1 *Salmonella* (2 cases), and 1 sapovirus (14 cases).
- 19 foodborne, from consumption of contaminated food or drink (excluding water): 9 'gastroenteritis' (23 cases), 2 *Campylobacter* (9 cases), 2 *Giardia* (7 cases), 2 *Shigella* (4 cases), 1 *E. coli* O157:H7 (3 cases), 1 norovirus (13 cases), 1 rotavirus (3 cases), and 1 *Salmonella* (2 cases).
- 13 zoonotic, from contact with an infected animal: 8 *Giardia* (26 cases), 2 *E. coli* O157:H7 (5 cases), 2 *Salmonella* (6 cases), and 1 *Yersinia* (4 cases).
- 7 waterborne, from consumption of contaminated drinking water: 5 *Giardia* (16 cases), 1 *E. coli* O157:H7 (2 cases), and 1 *Salmonella* (4 cases).
- 1 'other' mode: *Giardia* (2 cases).
- 3 mode of transmission unknown: 2 norovirus (4 cases) and 1 'gastroenteritis' (4 cases).

Circumstances of Exposure

Common 'settings' where the exposures occurred are identified below.

- 40 long term care facility: 26 norovirus (899 cases), 13 'gastroenteritis' (264 cases), 1 astrovirus (77 cases), and 1 sapovirus (14 cases).
- 39 home: 20 *Giardia* (58 cases), 4 *E. coli* O157:H7 (11 cases), 3 *Campylobacter* (12 cases), 3 *Cryptosporidium* (10 cases), 3 *Salmonella* (8 cases), 2 'gastroenteritis' (12 cases), 1 *B. pertussis* (5 cases), 1 hepatitis A virus (6 cases), 1 *Shigella* (2 cases), and 1 *Yersinia* (4 cases).
- 17 childcare centre: 9 'gastroenteritis' (116 cases), 5 norovirus (128 cases), 2 rotavirus (19 cases), and 1 hepatitis A virus (6 cases).
- 12 restaurant/café/bakery: 7 'gastroenteritis' (22 cases), 3 norovirus (18 cases), 1 *Campylobacter* (2 cases), and 1 rotavirus (3 cases).
- 8 hospital (acute care): 6 norovirus (118 cases), 1 *C. difficile* (3 cases), 1 measles virus (4 cases), and 1 sapovirus (23 cases).
- 3 hotel/motel: 2 *Shigella* (4 cases) and 1 norovirus (14 cases).
- 2 takeaways: 2 norovirus (4 cases).
- 2 temporary or mobile food service: 2 'gastroenteritis' (4 cases).
- 1 airline: measles virus (4 cases).
- 1 camp site: influenza A(H1N1) virus (15 cases).
- 1 community, church, sports gathering: measles virus (4 cases).
- 1 fast food restaurant: 'gastroenteritis' (5 cases).
- 1 farm: *Giardia* (5 cases).
- 1 hostel/boarding house: influenza A(H1N1) virus (64 cases).
- 1 other institution: norovirus (11 cases).
- 1 school: norovirus (35 cases).
- 1 supermarket/delicatessen: 'gastroenteritis' (2 cases).
- 8 'other setting': 5 *Giardia* (13 cases), 1 'gastroenteritis' (14 cases), 1 influenza A(H1N1) virus (64 cases), and 1 *Salmonella* (4 cases).
- 7 outbreaks had two or more exposure settings recorded.
- 2 outbreaks had no exposure settings recorded.

Common 'settings' where food was prepared in foodborne outbreaks are identified below.

- 7 restaurant/café/bakery: 5 'gastroenteritis' (12 cases), 1 norovirus (13 cases), and 1 rotavirus (3 cases).
- 4 home: 1 *Campylobacter* (7 cases), 1 *E. coli* O157:H7 (3 cases), 1 *Giardia* (5 cases), and 1 *Salmonella* (2 cases).
- 1 fast food restaurant: 'gastroenteritis' (5 cases).
- 1 hotel/motel: *Shigella* (2 cases).
- 1 temporary or mobile food service: 'gastroenteritis' (2 cases).
- 5 outbreaks had no preparation settings recorded.

5. Outbreak Case Reports

Measles outbreaks – an update

Since 21 January 2014 there has been a series of measles outbreaks in the Auckland region and at 31 March, a total of 84 confirmed cases had been notified. The location and number of confirmed cases (for outbreaks of five or more cases) since 2009 is shown in Table 1.

Table 1. List of confirmed measles outbreaks by location, 2009–2014

Year	Location	Number of cases	Duration in weeks
2009	Dunedin	31	14
2009	Christchurch	126	15
2010	Northland	31	8
2011	Auckland	20	9
2011	Hawke's Bay	24	13
2011/12	Auckland	446	56
2011	Waikato	13	4
2011	Dunedin	18	6
2011	Rotorua	5	3
2013	Bay of Plenty	14	5
2014	Auckland	84	13

Measles became a notifiable disease in New Zealand on 6 June 1996. There were 54 notifications in 1996 and an outbreak in 1997 with over 1900 notifications (1224 confirmed and 732 probable cases), with 68% of the confirmed cases coming from the Auckland region. Following an intensive national immunisation campaign, the number of confirmed cases fell to an annual average of 16 cases between 1998 and 2008.

Measles is not endemic in New Zealand and all the outbreaks since 2009 can be traced to infected people returning from overseas. In January 2009, unimmunised New Zealand children who visited Southeast Asia with their family developed measles while overseas and introduced the infection to Otago on their return. This resulted in 31 confirmed cases and was the first significant measles outbreak recorded on EpiSurv since 1997. From January 2009 to December 2013, 11 outbreaks were recorded on EpiSurv and involved 812 people in seven different public health regions. The majority of cases were in the North Island and over 90% of cases have occurred in urban areas which highlights the role of personal contact in spreading the virus.

The first cases reported in the two Auckland outbreaks in 2011 had returned from visiting Southeast Asia.[1] The onset dates of the first cases, who were all on the same flight, were several days before notification and the start of public health control measures. A greater proportion of young children were affected in the epidemic of 2009 compared with the 2014 epidemic. The reduction may be related to higher immunisation coverage rates of infants at 18 months which increased from 74% in the year to December 2009 to 84% in the year to December 2013. The recommended age for the initial measles vaccine became 15 months in 1990 and in 1992 a second dose was introduced at 11 years of age. In 2001 the age for the second dose was reduced to 4 years because of a high number of cases in children aged 5–9 years reported in the 1997 outbreak. A school-based catch-up programme was introduced for children aged between 5 and 10 years. During this period there was considerable adverse publicity about possible adverse effects of MMR immunisation generated by the 1998 Lancet article by Wakefield et al,[2] which was later withdrawn.

The 2005 Immunisation Coverage Survey[3] estimated that about 77% of 2 year old children were appropriately immunised. This was far short of the 95% coverage necessary to prevent periodic outbreaks of measles.

The immunisation status of confirmed cases as recorded on EpiSurv is shown in Table 2. The immunisation status of older children and adults

is based on patient or parent memory but the immunisation status of infants born after 2005 can be verified on the National Immunisation Register (NIR). In the current outbreak there has been a significant increase in the proportion of the confirmed cases in teenagers 66.3% (95% CI 56.6–74.9) compared with 46.5% (95% CI 38.9–54.3) in 2009. The decrease in the proportion of under-4 year olds from 21.6% to 10.2% is not significant.

Table 2. Number of confirmed measles cases and proportion immunised by age group and outbreak year

	Outbreak year			
	2009		2013/14	
Age group	Total cases	% of cases immunised	Total cases	% of cases immunised
<15 months	12	33.3	6	0.0
15 months–3 years	23	69.6	4	25.0
4–9 years	27	14.8	5	0.0
10–14 years	44	25.6	24	26.3
15–19 years	29	32.1	41	45.2
20–24 years	5	20.0	8	16.7
25+ years	17	85.7	10	0.0
Total	157	37.5	98	28.4

Data extracted from EpiSurv on 5 April 2014.

Measles outbreaks were a regular event in all countries before the introduction of an effective measles vaccine. It is considered that people born in New Zealand before 1969 will have acquired immunity through infection. However as the incidence of measles infections has dropped, immunity now depends on immunisation. The proportion of unimmunised people who have developed infection in these outbreaks shows that there are communities of unimmunised people. A multicomponent approach is required to improve immunisation coverage to 95% of the whole population necessary to achieve measles eradication which is the goal of the World Health Organization.[4] Health care professionals should be made more aware of the importance of controlling measles and more effective community education should promote the higher levels of immunisation. This is especially important for people travelling to areas where measles outbreaks continue to recur.

For list of references see – www.surv.esr.cri.nz/surveillance/NZPHSR.php

Reported by John Holmes, Health Intelligence Team, Health Programme, ESR.

Legionellosis cases linked to a motel spa pool

A case of legionellosis in a 79-year old male was reported to Community and Public Health's (CPH) Christchurch office on 28 March 2013. The serotype was identified as *Legionella pneumophila* serogroup 1. An environmental investigation of the case's home did not find any possible source of infection. It was noted, however, that he had travelled to Hokitika during the incubation period of the illness, so staff at CPH's Greymouth office carried out an environmental investigation of the motel where he had stayed. Samples of water were taken and the hot water cylinder temperatures were checked, but no potential source of infection was found. The spa pool was not checked at this visit.

Six months later, another case of the same *Legionella* strain was notified in a 65-year old female from Hokitika. An environmental investigation of her home found no potential source of infection, but on further questioning, she admitted regularly using the spa pool at a nearby motel – the same motel where the first case had stayed six months earlier. During a subsequent interview, the first case told a health protection officer that he had used the motel's spa pool on several occasions during his stay, although he had not been specifically questioned about it or volunteered the information when first interviewed.

The motel concerned has a communal spa pool near its reception, housed in a separate building. It is available for the use of guests and local residents and some locals use it regularly on a 'pay as you go' basis. The motel owner had not been trained in basic spa pool maintenance and although chlorination did occur, the owner was unaware of the methods required to calculate a correct dosage. Filtration consisted of a sand filter, and no records of backwashing or maintenance were available.

The motel owner was keen to discover the cause of the illnesses and agreed to the spa pool water being tested. Samples were sent to ESR's *Legionella* Laboratory and significant amounts of *L. pneumophila* serogroup 1 were isolated (47,000 cfu/L), as well as evidence of other bacteria, which confirmed the pool's lack of maintenance. On advice from CPH's staff, the owner closed the pool and initiated a thorough cleaning programme. He also contacted plumbers to assess options for ongoing maintenance and monitoring, underwent training and developed maintenance records. Follow up sampling one month after the clean up showed no trace of *L. pneumophila* and the visit also established that up-to-date maintenance records were being kept.

Legionellosis can be a serious disease and can be fatal, especially in the elderly. Both of these cases required hospitalisation. Although this was a small outbreak, its setting could have potentially caused a much more serious outbreak. Hokitika is a tourist town and other cases of illness in out-of-town visitors who used the pool may have gone undetected, because of their transient nature. It is also possible that other regular users of the spa pool contracted the disease, but this does not seem to have happened since no further local cases associated with this spa pool have been notified, despite increased surveillance.

Skilled investigation and good relationships between CPH's Christchurch and Greymouth offices were vital in identifying the common source of infection and preventing further exposure. Work with the spa pool owner achieved the desired outcome of a well-maintained spa pool that is safe for users. As a result of this outbreak, information about the risk of legionellosis from spa pools and correct spa pool maintenance was also provided to other motel/hotel owners on the West Coast.

Spa pools are available at many hotels and motels throughout New Zealand. They may also be used by local residents, particularly in areas where public spa facilities do not exist. Spa pools should always be considered as a source of *Legionella* infection. Older people, who are more likely to have musculoskeletal problems, may use spa pools for symptom relief and they are also potentially more susceptible to legionellosis.[1,2]

For list of references see – www.surv.esr.cri.nz/surveillance/NZPHSR.php

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6. Laboratory Surveillance

Laboratory surveillance of invasive pathogens

Isolates of meningococci, group A streptococci (*Streptococcus pyogenes*), group B streptococci (*S. agalactiae*), pneumococci (*S. pneumoniae*), *Bordetella pertussis* and *Haemophilus influenzae* from diagnostic laboratories are characterised by the Invasive Pathogen Laboratory (IPL) at ESR to monitor patterns of disease in New Zealand. The laboratory confirms the identity of an isolate and determines the strain type of the pathogen. Changes in the occurrence of strains provide information to inform policy decisions, such as the introduction of vaccines.

The data below reflect only the laboratory samples sent to IPL rather than all the isolates associated with invasive disease. We also note that the increased use of molecular detection methods and the decreased use of culture methods will influence our ability to monitor strain types going forward.

Meningococci

Serology and PCR methods are used to identify the meningococcal group of an isolate or sample of DNA. Vaccines against meningococcal groups A, C, Y and W135 are available, so this identification provides important information for action regarding immunisation. The laboratory also identifies the variant types of meningococci by gene sequencing. This information monitors the meningococcal strain populations causing infection in New Zealand, and identified the strain that caused the epidemic which ran until 2007. The number of meningococcal infections has now fallen to pre-epidemic levels. In 2013 IPL received samples from 61 notified cases and strain-typed 56 of these cases into the following groups: group B, 30 cases (including 11 'epidemic strain'); group C, 17 cases; group W135, 5 cases and group Y, 4 cases.

S. pnemoniae

Despite there being over 90 different pneumococcal serotypes worldwide, most invasive infections are caused by a limited number. In 2008 a 7-valent conjugate vaccine (Prevenar®) was added to the immunisation schedule but was replaced in 2011 by a 10-valent vaccine (Synflorix®). Vaccination has significantly reduced the incidence of IPD, especially in the young. Continued surveillance of serotypes will monitor the effect of the vaccine and identify any significant changes that would necessitate reassessing the vaccine composition. In 2013 IPL received 489 isolates for serotyping compared with 509 in 2012; the most common serotype was 19A.

Group A streptococci (GAS)

GAS (*S. pyogenes*) causes a range of diseases including pharyngitis, rheumatic fever and necrotising fasciitis. The organism can have different virulence factors that contribute to this spectrum of diseases. GAS typing is based on M-protein, a surface protein that is a major virulence factor and immunogen. Early serological M-typing has been replaced by sequencing the M protein (*emm*) gene. There are over 120 different *emm* types but certain types dominate. M-protein is the target for a potential vaccine against GAS, so understanding the distribution of *emm* types in New Zealand will help determine how useful a vaccine would be. In 2013 IPL received 666 isolates for *emm* typing from confirmed cases, compared with 486 in 2012. The major *emm* types were *emm1* (13%) and *emm92* (4%), as in previous years. Seven isolates came from rheumatic fever cases, 25 were 'query rheumatic fever' and 34 were from rheumatic fever contacts.

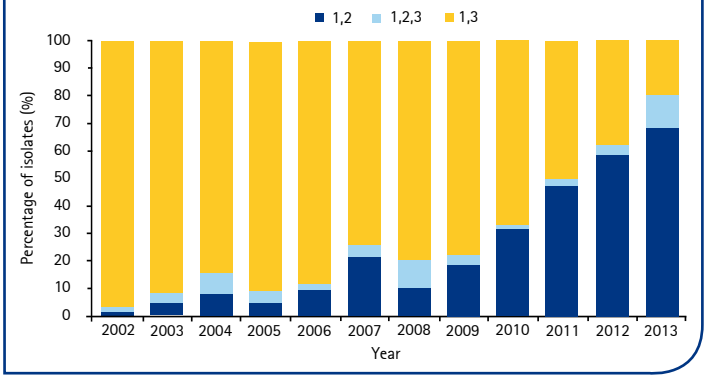
Group B streptococci (GBS)

GBS (*S. agalactiae*) infection is a serious cause of disease in newborn infants with 0.5 cases of early onset infection per 1000 live births. The organism is part of the commensal flora in 10–30% of women and acquired by a baby during birth. In New Zealand a risk-based approach for administering antibiotics is applied. GBS is characterised by its capsular polysaccharide serotype (10 are currently recognised: Ia, Ib II-IX), which are determined by a rapid latex agglutination test. In 2013 IPL received 230 isolates for testing, with serogroups III and Ia accounting for 48% of the isolates. In 2012, serogroups III and Ia made up 50% of the isolates.

Bordetella pertussis

Periodic increases in pertussis notifications are seen in a number of developed countries. The latest increase in New Zealand began in 2011, peaked in 2012 and continued to decline in 2013, although notifications remained above the pre-2011 level. Isolation of the causative organism, *B. pertussis*, is not necessary for notification and most testing is done by PCR. IPL still receives some isolates and types them into three serotypes: 1,2; 1,3 and 1,2,3. In 2013 284 cultures were received, with serotype 1,2 being the dominant serotype (66%). In the last 10 years a shift from serotype 1,3 to 1,2 (Figure 2) has been observed in the isolates received by IPL.

Figure 2. Serotype of *B. pertussis* isolates received by IPL



Haemophilus influenza

This is a common respiratory pathogen that can cause meningitis, conjunctivitis and otitis media. Isolates from sterile sites are sent to IPL for surveillance purposes. The capsular antigen is a principal virulence determinant and is differentiated into types a–f. *H. influenzae* type b (Hib) was the leading cause of bacterial meningitis in infants, but the introduction of the Hib vaccine in 1994 has significantly reduced the number of infections. IPL received 75 cultures for typing in 2013 (compared with 73 in 2012), which were: type b, 2; type d, 1; type f, 7 and 57 were nontypable. The two serotype b isolates were from a vaccinated child (14 years) and an adult (57 years).

For more detailed reports see www.surv.esr.cri.nz/surveillance/annual_surveillance.php

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Mycology

Tables detailing the biannual summary of opportunistic mycoses and aerobic actinomycetes in New Zealand are available at www.surv.esr.cri.nz/surveillance/NZPHSR.php

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Contributions to this publication are invited in the form of concise reports on surveillance issues or outbreak investigations.

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