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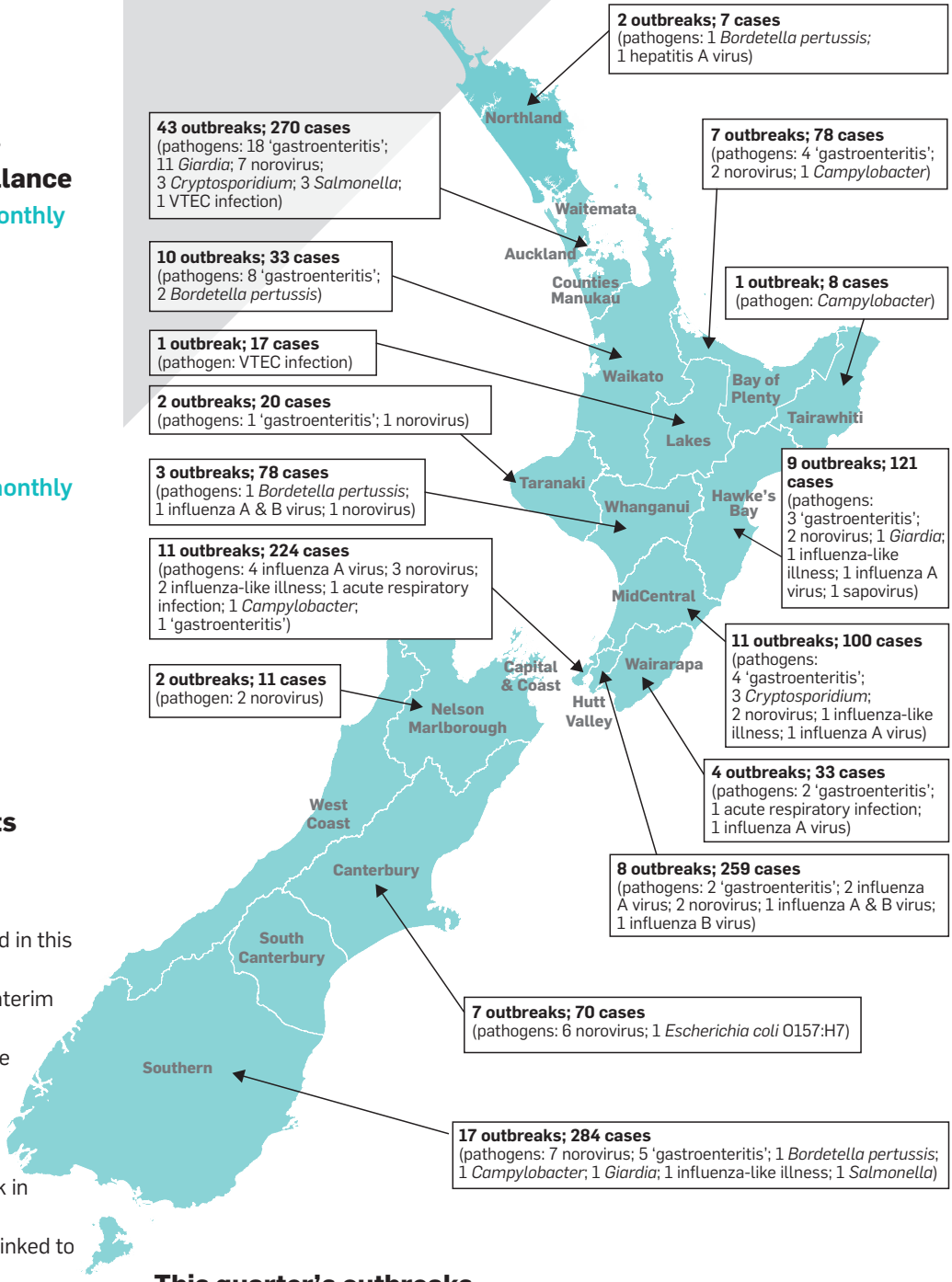
NEW ZEALAND

Public Health Surveillance Report

December 2015: Covering July to September 2015

CONTENTS AND HIGHLIGHTS



This quarter's outbreaks

Notification and outbreak data in this issue are drawn from the July to September quarter of 2015. 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 5 October 2015. Outbreaks reporting exposures in more than one geographic location are assigned to the district health board with the most cases. One outbreak involved more than one pathogen therefore individual pathogen outbreak numbers may not sum to group totals.

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

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1. EDITORIAL

An outbreak of mumps-like illness

This year a rise in notifications for suspected mumps triggered an investigation by Public Health South (PHS). Mumps is caused by mumps virus (a paramyxovirus). Classic symptoms include a prodrome of low-grade fever and headache, followed by swelling of salivary glands, generally the parotids. For 30% of children, mumps can be asymptomatic.[1] Complications include orchitis, oopheritis, and meningitis/encephalitis. The incidence in New Zealand before the MMR (measles, mumps, and rubella) vaccine was introduced is unclear but is presumed to be similar to other developed countries. In the United States (US), prior to the introduction of MMR, mumps incidence was reported to be greater than 100 per 100,000, but dropped dramatically presumably as a result of successful MMR vaccination coverage.[2] In New Zealand, MMR was added to the Immunisation Schedule in the 1990's.[1] Surveillance following this shows a steady drop in mumps notifications. Last year the New Zealand national notification rate for mumps was 0.4 per 100,000.[3]

Currently in New Zealand confirmation of mumps requires serology, culture or the detection of ribonucleic acid (RNA), as stated in the Communicable Disease Manual, 2012.[4] Anyone with a clinically compatible illness can be classified as a probable case, but diagnosis since MMR was introduced has become harder. A large reduction in incidence has reduced the positive predictive value (PPV) of a clinically compatible illness, and emerging evidence suggests the sensitivity of laboratory testing is reduced in vaccinated individuals.

By September 2015, PHS had received 15 notifications of suspected mumps, well above normal. This included two clusters. Dunedin had five notifications over nine days. These people presented with similar clinical illnesses, but no epidemiological reason to suspect mumps (immunised, elderly and no travel history). They reported prodromes with marked fevers, followed by swelling of the salivary glands. In all cases, serology and/or PCR (in one case) were negative. To check whether another virus could be causing a mumps-like illness, the last two suspected cases were investigated further. Both were positive for influenza A (H3N2).

A cluster of three notifications in Queenstown also had similar clinical presentations to each other, but different to those in Dunedin. Like in Dunedin, serology and PCR failed to detect mumps. The last two cases were investigated further and found to be positive for rhinovirus/enterovirus. One was also positive for human parainfluenza virus 3.

The finding of other viruses causing mumps-like illness is consistent with overseas reports (Finland,[5] US,[6] Spain[7]). While mumps virus infection was rarely diagnosed in sporadic cases of parotitis,[5,6] other viruses (most commonly Epstein Barr virus (EBV), human herpes virus 6, parainfluenza viruses, and adenovirus) were detected in 10–51.5% of cases.[5–7] It should be noted that in some cases detection of EBV may represent reactivation rather than primary infection.[8] In 2014 influenza A virus (mostly H3N2) was reported to be causing parotitis in the US and England,[9,10] with influenza A (H3N2) being detected in 16 and mumps virus detected in 9 out of 116 children who had a clinical diagnosis of mumps in England.

Even during an outbreak of mumps, a significant proportion of clinical presentations may be caused by other viruses. During an outbreak in Scotland (2014/15), 29 of 137 specimens (21%) that tested negative for mumps virus were positive for respiratory viruses, including influenza A, influenza B, parainfluenza virus 3, coronaviruses, rhinovirus, and adenovirus. The majority of these patients had parotitis or clinical mumps.[11] During an outbreak in Canada, 14% (12/85) of patients with mumps-negative parotitis had another virus detected, although 7/12 represented EBV reactivation.[8]

The reduced sensitivity of current diagnostic assays in MMR-immunised individuals may contribute to the low rate of laboratory confirmation of clinically compatible presentations during mumps outbreaks.[12–15] Overall the sensitivity of PCR on buccal swabs is 57–79%, but in vaccinated individuals it reduces markedly after the first two days of parotid swelling.[13–15] The sensitivity of mumps IgM is also reduced in vaccinated (9–53%) compared with unvaccinated individuals (80–90%).[15] In the Canadian outbreak, the sensitivity of mumps IgM at the time of clinical presentation was 25%.[13]

Mumps was not always so hard to diagnose. In 1949, a medical text said: "Mumps in its classical form is easily recognised".[16] Before MMR was introduced, parotid or salivary swelling would almost certainly have been mumps, because when the incidence of mumps is high, this clinical presentation has a high PPV. Assuming that the current notification rate (0.4 per 100,000) reflects the incidence of mumps-like illness, when the incidence of mumps was greater than 100 per 100,000 (before MMR was introduced), the PPV for mumps in presentations of parotid or salivary swelling would have been >99%.

Now that community transmission of mumps is rare, this classical clinical presentation with parotitis has a low PPV (although it is still unclear how the reduction of mumps has affected the PPV in orchitis presentations). Given that other viruses can also cause community transmission of mumps-like illnesses, epidemiological links to probable cases should be regarded with suspicion. PCR is the most informative test and samples should be collected for mumps virus and respiratory virus detection as soon as possible after the onset of symptoms. With these changes in mumps epidemiology, the current case definition for mumps may need revisiting.

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

Reported by Naomi Gough, Public Health Physician, Public Health South and James Ussher, Consultant Clinical Microbiologist, Southern Community Laboratories.

2. NOTIFIABLE DISEASE SURVEILLANCE

The following is a summary of disease notifications for the July to September quarter of 2015 and cumulative notifications and rates calculated for a 12-month period (October 2014 to September 2015). 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 is based on information recorded in EpiSurv by public health service staff up to 5 October 2015. 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

Haemophilus influenzae type b

- ***Notifications:*** 6 notifications in the quarter (2014, 0); 11 notifications over the last 12 months (2014, 4), giving a rate of 0.2 cases per 100,000 population, not a statistically significant increase.
- ***Comments:*** there has been a statistically significant quarterly increase from the same quarter last year (no cases). Cases were aged between 3 months and 66 years, with 2 cases aged <5 years. All cases were still under investigation.

Invasive pneumococcal disease

- ***Notifications:*** 165 notifications in the quarter (2014, 170); 467 notifications over the last 12 months (2014, 493), giving a rate of 10.4 cases per 100,000 population (2014, 10.9), not a statistically significant decrease.
- ***Comments:*** there has been a statistically significant quarterly increase from the previous quarter (105 cases). Cases were aged between 1 month and 96 years, with 5 cases aged <2 years.

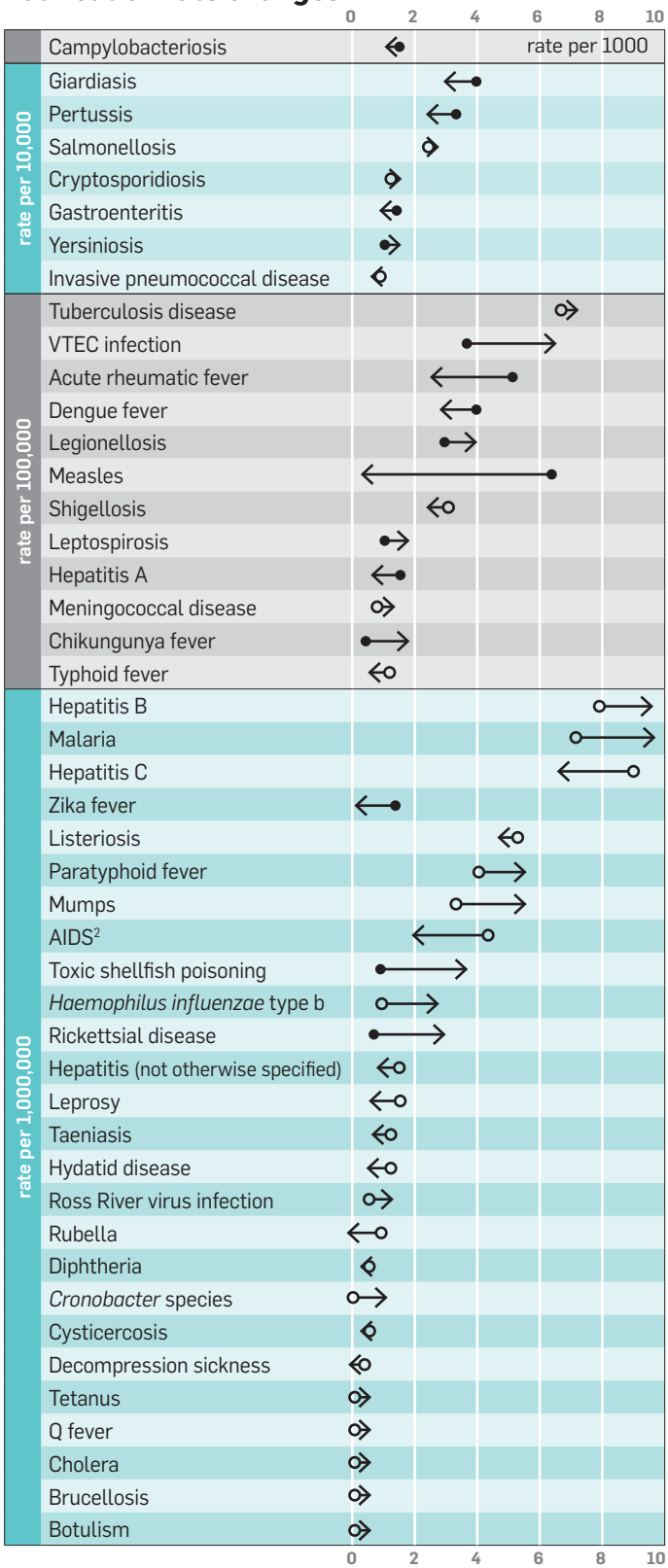
Measles

- ***Notifications:*** 2 notifications in the quarter (2014, 46); 15 notifications over the last 12 months (2014, 283), giving a rate of 0.3 cases per 100,000 population (2014, 6.3), a statistically significant decrease.
- ***Comments:*** there has been a statistically significant quarterly decrease from the same quarter last year (46 cases). No cases were aged <15 months. Both cases were still under investigation.

Mumps

- ***Notifications:*** 12 notifications in the quarter (2014, 6); 23 notifications over the last 12 months (2014, 15), giving a rate of 0.5 cases per 100,000 population (2014, 0.3), not a statistically significant increase.

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 October 2014 to September 2015 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.

- ***Comments:*** there has been a statistically significant quarterly increase from the previous quarter (3 cases). No cases were aged <15 months. One case was confirmed, 5 cases were probable and 6 cases were still under investigation.

Pertussis

- ***Notifications:*** 472 notifications in the quarter (2014, 245); 1176 notifications over the last 12 months (2014, 1450), giving a rate of 26.1 cases per 100,000 population (2014, 32.2), a statistically significant decrease.
- ***Comments:*** there has been a statistically significant quarterly increase from the previous quarter (236 cases) and from the same quarter last year (245 cases).

Enteric infections

Campylobacteriosis

- ***Notifications:*** 1478 notifications in the quarter (2014, 1431); 6460 notifications over the last 12 months (2014, 6717), giving a rate of 143.2 cases per 100,000 population (2014, 148.9), a statistically significant decrease.
- ***Comments:*** there has been a statistically significant quarterly increase from the previous quarter (1082 cases).

Gastroenteritis (acute)

- ***Notifications:*** 130 notifications in the quarter (2014, 234); 591 notifications over the last 12 months (2014, 672), giving a rate of 13.1 cases per 100,000 population (2014, 14.9), a statistically significant decrease.
- ***Comments:*** there has been a statistically significant quarterly decrease from the same quarter last year (234 cases).
- ***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 unless they meet the criteria above and for syndromic reports that come through public health units, including direct reports from the public where the causative pathogen may never be known.

VTEC infection

- ***Notifications:*** 95 notifications in the quarter (2014, 45); 278 notifications over the last 12 months (2014, 165), giving a rate of 6.2 cases per 100,000 population (2014, 3.7), a statistically significant increase.
- ***Comments:*** there has been a statistically significant quarterly increase from the previous quarter (63 cases) and from the same quarter last year (45 cases). The increase may be due to a recent change in laboratory methods in the Auckland region, all faecal specimens are now screened for VTEC using PCR.

Yersiniosis

- ***Notifications:*** 177 notifications in the quarter (2014, 232); 657 notifications over the last 12 months (2014, 575), giving a rate of 14.6 cases per 100,000 population (2014, 12.8), a statistically significant increase.
- ***Comments:*** there has been a statistically significant quarterly increase from the previous quarter (100 cases) and a statistically significant decrease from the same quarter last year (232 cases).

Infectious respiratory diseases

Acute rheumatic fever

- ***Notifications:*** 24 notifications in the quarter (2014, 70); 122 notifications over the last 12 months (2014, 227), giving a rate of 2.7 cases per 100,000 population (2014, 5.0), a statistically significant decrease.
- ***Comments:*** there has been a statistically significant quarterly decrease from the previous quarter (40 cases) and from the same quarter last year (70 cases). Cases were distributed by age as follows: 8 (5–9 years), 10 (10–14 years), and 6 (≥15 years). 22 cases were an initial attack and 2 cases were a recurrent attack of acute rheumatic fever.
- ***Note:*** this information is based on report date and may not reflect the actual onset of acute rheumatic fever. This information should not be used to assess trends in the disease rates over time.

Meningococcal disease

- ***Notifications:*** 31 notifications in the quarter (2014, 17); 57 notifications over the last 12 months (2014, 47) giving a rate of 1.3 per 100,000 population (2014, 1.0), not a statistically significant increase.
- ***Comments:*** there has been a statistically significant quarterly increase from the previous quarter (11 cases) and from the same quarter last year (17 cases). Cases were distributed by age as follows: 7 (<1 year), 7 (1–4 years), 1 (5–9 years) and 16 (≥15 years). All cases were laboratory confirmed. The strain group was identified for 29 cases: group B (21 cases, including 5 group B:P1.7-2,4), group Y (4 cases including 3 group Y:P1.5-1,2-2), group C (2 cases), and group W135 (2 cases). Strain type B:P1.7-2,4 was previously known as the 'NZ epidemic strain'.

Environmental exposures & infections

Cryptosporidiosis

- ***Notifications:*** 276 notifications in the quarter (2014, 194); 672 notifications over the last 12 months (2014, 630), giving a rate of 14.9 cases per 100,000 population (2014, 14.0), not a statistically significant increase.
- ***Comments:*** there has been a statistically significant quarterly increase from the previous quarter (81 cases) and from the same quarter last year (194 cases).

Giardiasis

- ***Notifications:*** 371 notifications in the quarter (2014, 423); 1485 notifications over the last 12 months (2014, 1769), giving a rate of 32.9 cases per 100,000 population (2014, 39.2), a statistically significant decrease.

Legionellosis

- ***Notifications:*** 35 notifications in the quarter (2014, 25); 175 notifications over the last 12 months (2014, 128), giving a rate of 3.9 cases per 100,000 population (2014, 2.8), a statistically significant increase.
- ***Comments:*** there has been a statistically significant quarterly decrease from the previous quarter (58 cases).

7 notifications remain under investigation, a proportion of these will fail to meet the case definition and be classified 'not a case'.

Leptospirosis

- ***Notifications:*** 15 notifications in the quarter (2014, 17); 77 notifications over the last 12 months (2014, 53), giving a rate of 1.7 cases per 100,000 population (2014, 1.2), a statistically significant increase.
- ***Comments:*** There were 14 male cases and 1 female case. 10 cases were recorded as engaged in occupations identified as high risk for exposure. The recorded occupations for these cases were farmer or farm worker (6 cases) and meat process worker (4 cases).

Rickettsial disease

- ***Notifications:*** 4 notifications in the quarter (2014, 1); 12 notifications over the last 12 months (2014, 3), giving a rate of 0.3 cases per 100,000 population, a statistically significant increase.
- ***Comments:*** All 4 cases were murine typhus (caused by *Rickettsia typhi*).

Toxic shellfish poisoning

- ***Notifications:*** no notifications in the quarter (2014, 2); 16 notifications over the last 12 months (2014, 4), giving a rate of 0.4 cases per 100,000 population, a statistically significant increase.

New, exotic & imported infections

Chikungunya fever

- ***Notifications:*** 3 notifications in the quarter (2014, 3); 75 notifications over the last 12 months (2014, 15), giving a rate of 1.7 cases per 100,000 population (2014, 0.3), a statistically significant increase.
- ***Comments:*** All cases were laboratory confirmed and had travelled overseas during the incubation period of the disease. Countries visited were Cook Islands (2 cases) and Fiji (1 case).

Dengue fever

- ***Notifications:*** 19 notifications in the quarter (2014, 32); 139 notifications over the last 12 months (2014, 179), giving a rate of 3.1 cases per 100,000 population (2014, 4.0), a statistically significant decrease.
- ***Comments:*** 16 cases were laboratory confirmed. Overseas travel information was recorded for 18 cases. The most commonly visited countries were Samoa (7 cases), India, Indonesia and Thailand (3 cases each).

Hepatitis A

- ***Notifications:*** 7 notifications in the quarter (2014, 13); 51 notifications over the last 12 months (2014, 73), giving a rate of 1.1 cases per 100,000 population (2014, 1.6), a statistically significant decrease.
- ***Comments:*** Cases were aged between 21 and 67 years. Overseas travel information was recorded for all cases. Of these, 6 (85.7%) case had not travelled overseas during the incubation period of the disease.

Zika fever

- ***Notifications:*** 2 notifications in the quarter (2014, 1); 6 notifications over the last 12 months (2014, 57), giving a rate of 0.1 per 100,000 population (2014, 1.3), a statistically significant decrease.
- ***Comments:*** Both cases had travelled to Samoa during the incubation period of the disease.

3. OTHER SURVEILLANCE REPORTS

No reports this quarter.

4. OUTBREAK SURVEILLANCE

The following is a summary of the outbreak trends for the July to September quarter 2015. Comparisons are made to the previous quarter (April to June 2015), and to the same quarter in the previous year (July to September 2014). Information in this section is based on data recorded in EpiSurv by public health service staff up to 5 October 2015. As the data may be updated over time, this information should be regarded as provisional.

General

- 138 outbreaks notified in this quarter (1613 cases).
- 84 are final reports (1361 cases); 54 are interim reports (252 cases) that have yet to be finalised and closed.

All data that follow relate to final reports only.

- 16.2 cases on average per outbreak, compared with 14.9 cases per outbreak in the previous quarter (15.7 cases per outbreak in the same quarter of last year).
- 17 hospitalisations: influenza-like illness (ILI) (4 cases), *Bordetella pertussis* (3 cases), influenza A (3 cases), norovirus (3 cases), *Cryptosporidium* (2 cases), and influenza A & B (2 cases).
- 8 deaths: influenza A (4), ILI (2), and norovirus (2).
- One outbreak involved more than one pathogen therefore individual pathogen outbreak numbers may not sum to group totals.

Pathogens

- 28 norovirus outbreaks (662 cases).
- 17 'gastroenteritis' outbreaks (159 cases).
- 9 *Giardia* outbreaks (33 cases).
- 8 influenza A virus outbreaks (185 cases).
- 4 *Bordetella pertussis* outbreaks (21 cases).
- 4 *Cryptosporidium* outbreaks (17 cases).
- 4 ILI outbreaks (125 cases).
- 3 *Campylobacter* outbreaks (14 cases).
- 2 influenza A & B virus outbreaks (115 cases).
- 2 *Salmonella* outbreaks (6 cases).
- 2 *Shigella* outbreaks (6 cases).
- 2 VTEC infection outbreaks (21 cases).
- 1 hepatitis A virus outbreak (2 cases).
- 1 sapovirus outbreak (39 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.

- 73 person-to-person, from (non-sexual) contact with an infected person (including droplets): 27 norovirus (657 cases), 13 'gastroenteritis' (109 cases), 9 *Giardia* (33 cases), 8 influenza A virus (185 cases), 4 *B. pertussis* (21 cases), 4 ILI (125 cases), 3 *Cryptosporidium* (14 cases), 2 influenza A & B virus (115 cases), 2 VTEC infection (21 cases), 1 *Campylobacter* (8 cases), and 1 sapovirus (39 cases).
- 17 environmental, from contact with an environmental source (eg, swimming): 7 norovirus (194 cases), 3 'gastroenteritis' (42 cases), 2 *Cryptosporidium* (13 cases), 2 *Giardia* (12 cases), 1 ILI (8 cases), 1 influenza A virus (18 cases), and 1 *Campylobacter* (2 cases).
- 4 waterborne, from consumption of contaminated drinking water: 3 *Giardia* (10 cases) and 1 *Campylobacter* (2 cases).
- 4 zoonotic, from contact with an infected animal: 2 *Campylobacter* (10 cases), 1 *Giardia* (2 cases), and 1 VTEC infection (4 cases).
- 3 foodborne, from consumption of contaminated food or drink (excluding water): 2 'gastroenteritis' (5 cases) and 1 *Campylobacter* (4 cases).
- 7 mode of transmission unknown: 3 'gastroenteritis' (26 cases), 2 *Salmonella* (6 cases), 1 norovirus (5 cases), and 1 hepatitis A virus (2 cases).

Circumstances of exposure

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

- 33 long term care facility: 19 norovirus (555 cases), 6 influenza A virus (164 cases), 5 'gastroenteritis' (51 cases), 2 ILI (25 cases), and 1 sapovirus (39 cases).
- 19 home: 8 *Giardia* (24 cases), 4 *B. pertussis* (21 cases), 3 *Cryptosporidium* (7 cases), 3 'gastroenteritis' (27 cases), and 1 VTEC infection (4 cases).
- 11 childcare centre: 4 'gastroenteritis' (55 cases), 3 norovirus (63 cases), 1 *Campylobacter* (8 cases), 1 *Cryptosporidium* (10 cases), 1 *Giardia* (9 cases), and 1 influenza A virus (7 cases).
- 5 hospital (acute care): 3 norovirus (22 cases) and 2 'gastroenteritis' (17 cases).
- 4 school: 1 ILI (62 cases), 1 influenza A virus (14 cases), 1 influenza A & B virus (62 cases), and 1 norovirus (15 cases).
- 2 farm: 2 *Campylobacter* (6 cases).
- 2 restaurant/café/bakery: 2 'gastroenteritis' (4 cases).
- 1 caterer: 'gastroenteritis' (24 cases).
- 1 other food outlet: norovirus (5 cases).
- 1 workplace: influenza A & B virus (53 cases).
- 2 other setting: 1 *Giardia* (9 cases) and VTEC infection (17 cases).
- 2 outbreaks had two or more exposure settings recorded.
- 5 outbreaks had no exposure settings recorded.

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

- 1 takeaways: 'gastroenteritis' (3 cases).
- 1 private home: *Campylobacter* (4 cases).
- 1 outbreak had no preparation settings recorded.

5. OUTBREAK CASE REPORTS

"Here we go again" A *Legionella pneumophila* serogroup 1 outbreak in Christchurch

From 8 to 14 April 2015 Community and Public Health (CPH) were notified of three *Legionella pneumophila* serogroup 1 (LPSG1) cases, positive on Urinary Antigen Test (UAT). All were hospitalised and lived or worked in Christchurch's southwest. The first case's workplace had an Evaporative Condenser (EC). A contractor had sampled, cleaned and treated the EC by the time CPH was notified. No source was identified for case two and home water sampling proved negative for the third.

Unfortunately the EC contractor who did the tests left the sample sitting for a month before sending it to the lab so CPH interpreted the results with caution. Even with the delay, the sample tested positive for LPSG1. CPH asked the private laboratory to forward the isolates to ESR for sequence-based typing (SBT). Post-remediation testing of the EC was negative, requiring no further action.

On 25 May 2015 another UAT positive case was notified who lived in the same area as the cases notified in April. At an outbreak meeting following this fourth case it was decided to re-interview two other UAT positive cases (notified on 1 April and 17 May) domiciled in other suburbs. Each was asked specifically if they had visited the area concerned. Both had visited the area on a frequent basis. No other sources were identified for these cases.

Three cases tested positive using the polymerase chain reaction technique, and one was confirmed by culture. A full SBT profile of the clinical LPSG1 isolate was 12,9,26,5,3,17,15 and matched the SBT profile of environmental LPSG1 isolates from the workplace EC. The samples from other suspected outbreak cases yielded insufficient genetic material to obtain full SBT profiles, although the partial profiles obtained for two of the three cases matched the outbreak strain (indicating a community acquired exposure from a source other than the suspected EC for this case).

Bringing together an interagency group for a *Legionella* outbreak is paramount to a well-rounded investigation. The group included relevant public health staff, representatives from WorkSafe and Christchurch City Council (CCC), laboratory expertise and representatives from the Institute of Refrigeration Heating & Air Conditioning Engineers of New Zealand. All provided technical expertise and connections to the industry.

The outbreak investigation showed that failing to complete the coroner's recommendations after the 2005 *Legionella* outbreak in Christchurch hindered the investigation and control of the 2015 outbreak. Significant time was spent identifying and auditing water-based cooling systems (WBCS)

in the area, and sampling as needed. Representatives of the industry provided the most comprehensive list of WBCS systems, with CCC and a drive around the area identifying others. Yet the audit could not identify all WBCS. Concern led to discussions about when to hold a media briefing. It was decided to wait until the identified WBCS had been audited. On 12 June 2015, businesses in the Woolston/Hillsborough industrial area were advised of the outbreak and asked to sample and treat their WBCS. With hindsight, an earlier briefing may have mitigated the concerns of some residents in the area.

The first four cases were likely related to the workplace with the EC, and the final two to an unidentified source. Until a register of WBCS and mandatory testing under Australia and New Zealand Standard (A/NZS) 3666.6 are required, outbreaks of this nature will continue to be challenging to investigate and WBCS a risk to public health. CPH has used this outbreak as a lever to progress the coroner's recommendations by working with CCC and Regional Public Health. An approach to the Ministry of Health has led to useful engagement with the Ministry for Business, Innovation and Employment, to consider how best to achieve compliance of industrial cooling towers (under the Building Act 2004).

Reported by Debbie Smith, Health Protection Officer, Dr Ramon Pink, Medical Officer of Health, Community and Public Health, CDHB and David Harte, Environmental Microbiology Laboratory, ESR.

Clostridium perfringens outbreak linked to eating cooked pork

On 12 April 2015 a Wanganui restaurant prepared a lunch to celebrate a birthday and wedding anniversary. The 62 attendees (most living locally) dined buffet-style. Some had contact beforehand but the lunch was the only common factor between all attendees.

On 17 April the Public Health Centre was informed that some attendees had gastroenteritis. Based on menu details, 40 attendees (38 by phone; 2 in person) completed a questionnaire (between days 8 and 10 after the lunch). Results were analysed as a retrospective cohort study.

Of the 40 respondents, 26 people (65%) answered yes to "becoming unwell with at least one symptom of diarrhoea, abdominal pain, nausea, vomiting, within 48 hours of the function". From anecdotal evidence, the overall rate was 53%, indicating that the sampling slightly over-represented those unwell. The median age was 70 (range 20–85 years). Females and males numbered equally. Most had a rapid onset of symptoms:

- median incubation period: 16 hours (range 4–24 hours)
- median duration of illness: 30 hours (range 12 hours to 4 days)
- most-reported symptoms: diarrhoea (100%); abdominal pain (61%), nausea (23%); vomiting: none reported.

Table 1 compares cases by foods eaten. Pork shows the highest risk ratio, though not statistically significant. The green salad shows an elevated risk ratio which is statistically significant. The roast potato (the other food of note) is not statistically significant, and most respondents ate it–case or not.

TABLE 1. Foods eaten by cases and non-cases

Food	Ate this food		Did not eat this food		Risk ratio	CI (95%)	*p*-value
	Case	Not case	Case	Not case			
Pork	25	9	1	5	4.4	0.7–26.7	0.11
Roast potato	26	11	0	2	2.8	0.5–15.3	0.24
Green salad	11	1	15	13	1.7	1.2–2.5	0.01
Beef	19	7	7	7	1.5	0.8–2.6	0.19
Pumpkin	19	8	7	5	1.2	0.7–2.1	0.49
Pasta medley	11	5	15	9	1.1	0.7–1.7	0.41
Carrots	15	8	10	6	1.0	0.6–1.7	0.86
Fish	22	12	4	2	1.0	0.5–1.8	0.92

To avoid division by 0 for those who ate potato, 1 was added to each cell when calculating the risk ratio. Initial analysis used Excel; confidence intervals and *p*-values were calculated using MedCalc online.

Stool specimens from four recovered cases had elevated *Clostridium perfringens* spore counts (>105 CFU/g): two had counts of >2.5 x 10^6 CFU/g (one also containing *C. perfringens* enterotoxin). Other standard tests, including norovirus, were negative.

Strong evidence links the lunch with becoming ill with diarrhoea and abdominal pain. Illness due to *C. perfringens* has features consistent with findings in this event: diarrhoea rather than vomiting, incubation period of 6–24 hours (usually 10–12 hours), and generally short duration.[1] Epidemiological analysis, biological plausibility, and laboratory findings strongly suggest that *C. perfringens* was the causative agent.

The specific food source responsible for the illness was not confirmed, but eating the roast pork and the green salad were closely linked with illness. The pork was the likely source because of the higher risk ratio, and because animal protein foods are most often implicated in *C. perfringens* outbreaks.[2]

In a rolled pork roast bacteria can be rolled into the centre where conditions are anaerobic and heat slow to penetrate.[3] Inadequate temperature control of food after initial cooking likely contributed. Many of the dishes (including the pork) were prepared and cooked the day before, and then reheated and served before the lunch. The cooked dishes were prepared in bulk, making the cooking, cooling, storage and reheating steps more susceptible to temperature inconsistency. One respondent noted that the pork appeared under-cooked. Inspection of the kitchen revealed no significant deficiencies. During later in-house calibration, one thermometer read 8°C below calibrated temperature, but whether this thermometer was used is unknown. This study has limitations: delay in notification, incomplete tracing of all attendees, no information about desserts (served separately to the buffet), and no information from other casual diners that evening. Even so, there is evidence of a link between gastrointestinal illness and pork eaten at the lunch, and this highlights the potential public health threat of *C. perfringens* in foods subject to inadequate temperature management.

The restaurant's manager received an official warning under the Food Act 1981, and recommendations were made to prevent similar incidents. The restaurant is working with local Environmental Health Officers to develop a food control plan.

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

Reported by Margaret Tunbridge, Health Protection Officer and Patrick O'Connor, Medical Officer of Health, MidCentral District Health Board.

6. LABORATORY SURVEILLANCE

Laboratory surveillance of invasive pathogens

Isolates of invasive pathogens from diagnostic laboratories are characterised by the Invasive Pathogen Laboratory (IPL) at ESR to monitor patterns of disease in New Zealand. IPL confirms the identity and determines the strain type of the pathogen. Changes in the occurrence of strains provide information to inform policy decisions, such as if and when to introduce vaccines.

IPL monitors isolates of meningococci, group A streptococci (*Streptococcus pyogenes*), group B streptococci (*S. agalactiae*), pneumococci (*S. pneumoniae*), *Bordetella pertussis* and *Haemophilus influenzae*. The data below reflect only the laboratory samples sent to IPL rather than all the isolates associated with invasive disease.

Meningococci

IPL receives meningococcal isolates and DNA from cases of invasive meningococcal disease, as well as some non-invasive isolates for monitoring. The meningococcal group is determined from both types of sample. Currently isolates are routinely typed by sequencing the polymerase chain reaction (PCR) product from the *porA, fetA* and *fHbp* genes. The PorA type is determined for DNA samples. In 2014, samples from 38 cases were characterised. This was the lowest number since the start of the 1991–2008 epidemic in New Zealand.[1] Up to 30 September 2015 IPL received samples from 49 patients. This was a notable increase over the previous year. Of the samples received, 47 had a meningococcal group determined: group B (34); group Y (5); group C (4); and group W (4).

Group B had a number of different PorA types, with 21% of those being P1.7-2,4 (the PorA type associated with the 1991–2008 epidemic).

Three group W isolates underwent multi-locus sequence typing. Two were analysed as belonging to clonal complex (cc) 11 with PorA type P1.5,2. This complex is known to be hyperinvasive and associated with increased morbidity and mortality.[2] The incidence of endemic MenW:cc11 has increased in South Africa and South America since 2003, and in the United Kingdom since 2009.[3,4] New Zealand has not seen an increase in group W isolates with numbers varying between 0 and 9 since 2004. Clonal complex 11 is also associated with group C meningococci with the PorA type P1.5,2; as yet no group C:P1.5,2 have been identified in New Zealand this year.

Pneumococci

IPL serotypes all isolates of *S. pneumoniae* (from invasive disease) that it receives. IPL also monitors the trends to assess the impact of the pneumococcal vaccine. Quarterly reports are available for invasive pneumococcal disease, and a 2014 Invasive Pneumococcal Disease report describing these trends in greater detail will be available (https://surv.esr.cri.nz/surveillance/IPD.php) in future. IPL received 477 isolates for serotyping in 2014. To September 2015, IPL has received 347 isolates, and the most common serotype is 19A. A more detailed report will be available in future.

Group A streptococci

Group A streptococci (GAS) causes diseases such as pharyngitis, rheumatic fever and necrotising fasciitis. GAS can lead to serious sequelae such as rheumatic heart disease. Typing of GAS is based on the sequence of the emm gene that codes for the M-protein. This protein is a major virulence factor for GAS. Vaccines against GAS using the M-protein antigen are being developed. Surveillance of the New Zealand *emm* types will determine the effectiveness of any potential vaccine. IPL receives isolates from invasive sites and non-invasive sites. The major *emm* types in 2014 were *emm*1, *emm*81 and *emm*82. To September 2015, IPL has received 458 specimens; the major *emm* types identified to date are *emm*82 and *emm*1. A paper on the increase in invasive GAS in New Zealand from 2002 to 2013 has been published.[5] The elderly and Pacific peoples had the highest incidence, and *emm*1 was the main type overall.

Group B streptococci

Group B streptococci (GBS) is a serious cause of disease in new-born infants. Isolates from cases of infection are typed by characterisation of their capsular polysaccharide. The typing scheme recognises 10 different serotypes. The year 2014 saw 227 confirmed cases of GBS. Serotype Ia has steadily declined since 2007, while the non-typable and III serotypes have increased (see supplementary material).

Haemophilus influenzae

H. influenzae was the leading cause of bacterial meningitis in infants before the vaccine was introduced in 1994. Six *H. influenzae* types (a–f) are based on the capsular antigen; type b is the major pathogen. In 2014, IPL received 92 isolates of *H. influenzae.* Of these, 58 came from confirmed cases of invasive disease. Testing identified two cases of *H. influenzae* type b (both in adults). Two other isolates were type f; the rest were non-typable.

Bordetella pertussis

B. pertussis, the causative organism of pertussis, does not need to be isolated to be notified, and PCR is used for most testing. IPL receives cultures of *B. pertussis* from diagnostic laboratories for surveillance purposes. In 2014, IPL received 92 cultures. Of these, 86 were confirmed cases of pertussis. Three serotypes of *B. pertussis* are recognised, with type 1,2 continuing to dominate (73% of the isolates received).[6]

For list of references and supplementary material see www.surv.esr.cri.nz/surveillance/NZPHSR.php

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