

NEW ZEALAND

Public Health Surveillance Report

March 2018: Covering October to December 2017

CONTENTS AND HIGHLIGHTS

1. Editorial

- Increase in *Neisseria meningitidis* group W invasive disease

2. Notifiable disease surveillance

Significant increases in 12-monthly notification rate

- Cryptosporidiosis
- Hepatitis A
- Leptospirosis
- Malaria
- Meningococcal disease
- Mumps
- Pertussis
- Shigellosis
- Typhoid fever
- VTEC/STEC infection

Significant decreases in 12-monthly notification rate

- Campylobacteriosis
- Chikungunya fever
- Gastroenteritis (acute)
- Listeriosis
- Measles
- Zika virus infection

3. Other surveillance reports

- Increase in institutional norovirus outbreaks in the greater Wellington region, 2017

4. Outbreak surveillance

- 198 outbreaks (2924 cases) notified in this quarter
- 134 final reports (2420 cases); 64 interim reports (504 cases)
- 18.1 cases per outbreak on average
- 38 hospitalisations, 5 deaths

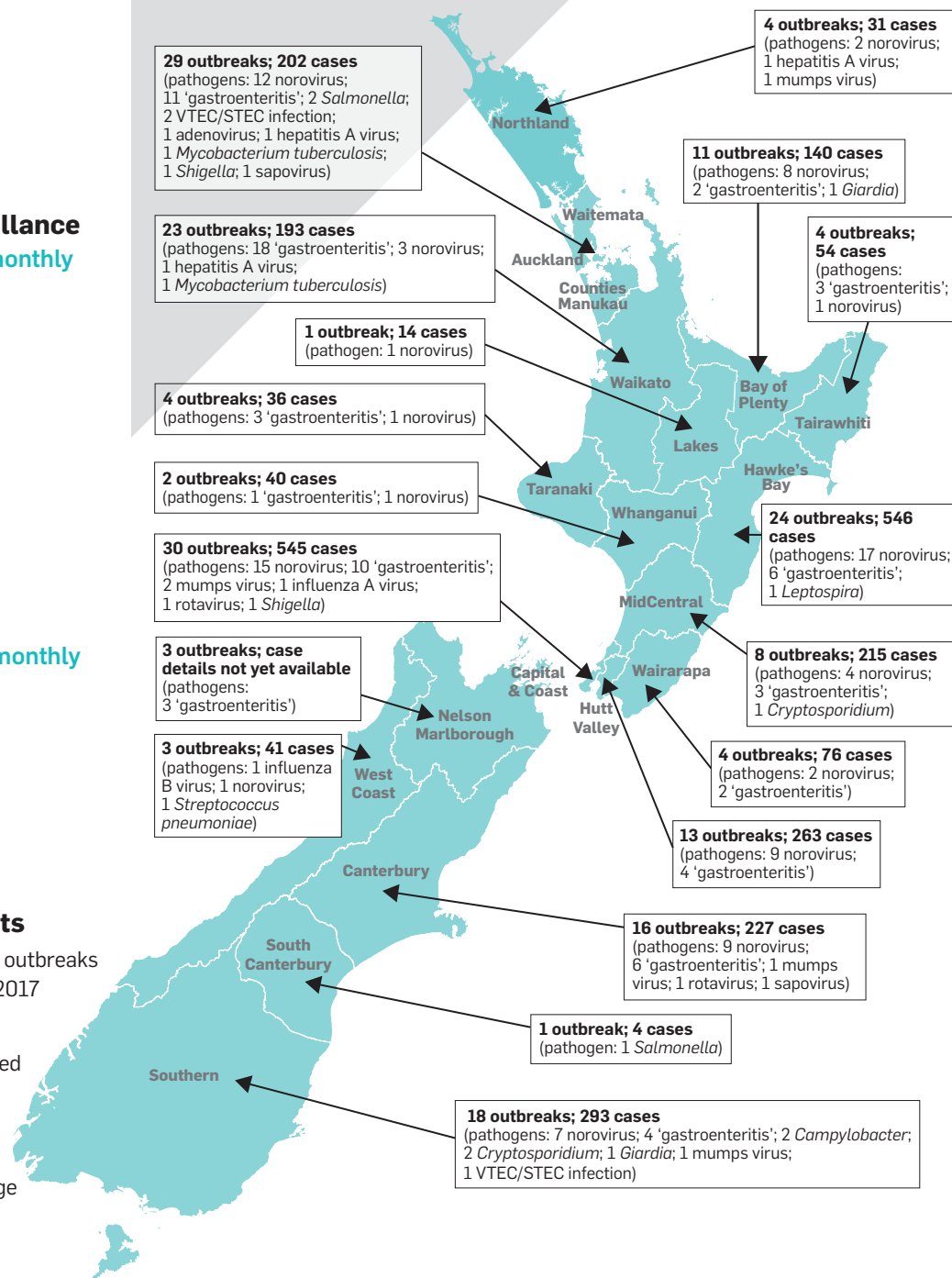
5. Outbreak case reports

- No reports this quarter

6. Laboratory surveillance

- Norovirus surveillance April 2016–December 2017: emergence of GII.P16-GII.4 Sydney_2012

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



This quarter's outbreaks

Notification and outbreak data in this issue are drawn from the October to December quarter of 2017. 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 15 January 2018. Outbreaks reporting exposures in more than one geographic location are assigned to the district health board with the most cases. Five outbreaks involved more than one pathogen therefore individual pathogen outbreak numbers may not sum to group totals.

1. EDITORIAL

Increase in *Neisseria meningitidis* group W invasive disease

A number of countries have reported an increase in *N. meningitidis* group W disease (MenW) in recent years, with many of the cases belonging to a hypervirulent sequence type, ST-11 in clonal complex 11.¹⁻⁴ International surveillance and studies indicate that for this sequence type the clinical illness tends to be more severe and cases may have atypical presentations leading to late diagnoses, possibly explaining the higher case fatality rates recently reported. There are quadrivalent ACWY vaccines available (conjugate and polysaccharide). However, only the polysaccharide vaccine was licensed in most countries until at least 2005 (New Zealand 2014), and this vaccine has no effect on herd immunity, low efficacy in young children, and induces only short-term immunity.^{5,6}

While there were only 12 cases of MenW disease provisionally notified in New Zealand in 2017, this was an increase from 2016 (8 cases) and was significantly higher than average annual notifications for 2012–2015 (2.5 cases). The case fatality rate for 2017 was 25% (3/12), compared with 5% (1/18) for 2012–2016. For 2017, 9 cases were female; ethnicity was reported as European/Other (10 cases) and Māori or Pacific people (1 case each). Cases were reported in children (1 case each for the <1 year and 10–14 years' age groups), young people (3 cases aged 15–24 years), and adults (2 cases aged 55–64 years, 5 cases aged >65 years). Information on immunisation was reported for 8/12 cases with none reported to have received either quadrivalent vaccine.

MenW became the predominant strain in Australia in 2016. Cases increased by over 600% from 2014 (17 cases) to 2016 (108 cases). By 31 October 2017 another 117 cases had been reported, with a case fatality rate of 9.4% (11/117), an increase from the average MenW fatality rate of 6.5% for 2007–2016. For 2017, 36 MenW cases were reported in Aboriginal and Torres Strait Islander people, many associated with an outbreak in Central Australia affecting parts of the Northern Territory and three States.^{1,7} Although MenW cases are more common in adults in Australia, there has been an increased proportion reported in children since 2015. In response to the overall increase and the Central Australia outbreak, time-limited vaccination programmes (quadrivalent conjugate vaccine) have been implemented either for communities affected by the outbreak, or targeting adolescents, or both.⁷

The United Kingdom has also reported an increase in MenW cases, from 22 cases in the 2009/10 epidemiological year to 225 cases in 2016/17, with cases reported from all age groups.² The MenW case fatality rate from 2010/11 to 2012/13 was 13%, higher than the provisional rate of 5.6% for all invasive meningococcal disease for 2016/17.^{2,8} Studies reported an increased rate of atypical, including gastrointestinal, presentations, leading to delayed diagnoses.⁹ The increase led to the quadrivalent conjugate

vaccine replacing the meningococcal C vaccine in the adolescent school-based programme in 2015, and being offered in a catch-up programme for school leavers.²

While the annual number of MenW cases reported from 2009 to 2016 in Canada remains low (3–15 cases), this may be due to quadrivalent conjugate vaccination programmes in some provinces targeting primary or high school students. A change in the sequence type has occurred during this period, with ST-11 becoming predominant in 2014–2016 (75% of isolates tested compared with 25% in 2009–2013).⁴ The incidence of MenW also remains low in the United States (34 cases in 2016), where vaccination with quadrivalent conjugate vaccine has been recommended since 2005 for 11–12 year olds, with a booster at 16 years.¹⁰

Although the number of MenW cases in New Zealand is low, there is an increasing trend in notifications and a recent change in the sequence type similar to the UK, Australia and Canada. The increasing trend and change in sequence type, coupled with the known capacity for MenW to cause severe disease, present atypically and cause outbreaks, requires that clinicians and public health services be alert to ensure early diagnosis and appropriate public health management.

References:

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

Reported by Jill Sherwood, Public Health Physician, Health Intelligence Group, ESR

2. NOTIFIABLE DISEASE SURVEILLANCE

The following is a summary of disease notifications for the October to December quarter of 2017 and cumulative notifications and rates calculated for a 12-month period (January to December 2017). 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.]. Information in this section is based on data recorded in EpiSurv by public health service staff up to 15 January 2018. As the data may be updated over time, this information should be regarded as provisional.

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

Vaccine preventable disease

Hepatitis B

- **Notifications:** 18 notifications in the quarter (2016, 12); 39 notifications over the last 12 months (2016, 34), giving a rate of 0.8 cases per 100,000 population (2016, 0.7), not a statistically significant increase.
- **Comments:** there has been a statistically significant quarterly increase from the previous quarter (6 cases). Cases were aged between 21 and 67 years.

Invasive pneumococcal disease

- Notifications:** 113 notifications in the quarter (2016, 117); 525 notifications over the last 12 months (2016, 480), giving a rate of 11.2 cases per 100,000 population (2016, 10.2), not a statistically significant increase.
- Comments:** there has been a statistically significant quarterly decrease from the previous quarter (208 cases). Cases were aged between 6 days and 97 years, with six cases aged <2 years.

Measles

- Notifications:** 2 notifications in the quarter (2016, 1); 16 notifications over the last 12 months (2016, 103), giving a rate of 0.3 cases per 100,000 population (2016, 2.2), a statistically significant decrease.
- Comments:** Both were probable cases. One case was aged < 15 months and the other was aged 15 months. Both were unvaccinated.

Mumps

- Notifications:** 710 notifications in the quarter (2016, 14); 1359 notifications over the last 12 months (2016, 20), giving a rate of 29.0 cases per 100,000 population (2016, 0.4), a statistically significant increase.
- Comments:** there has been a statistically significant quarterly increase from the previous quarter (471 cases) and from the same quarter last year (14 cases). 479 cases were confirmed, 163 cases were probable and 68 cases were still under investigation. Three cases were aged <15 months and therefore too young to be vaccinated.

Pertussis

- Notifications:** 1125 notifications in the quarter (2016, 328); 2184 notifications over the last 12 months (2016, 1093), giving a rate of 46.5 cases per 100,000 population (2016, 23.3), a statistically significant increase.
- Comments:** there has been a statistically significant quarterly increase from the previous quarter (419 cases) and from the same quarter last year (328 cases). 69 cases were aged <1 year.

Enteric infections

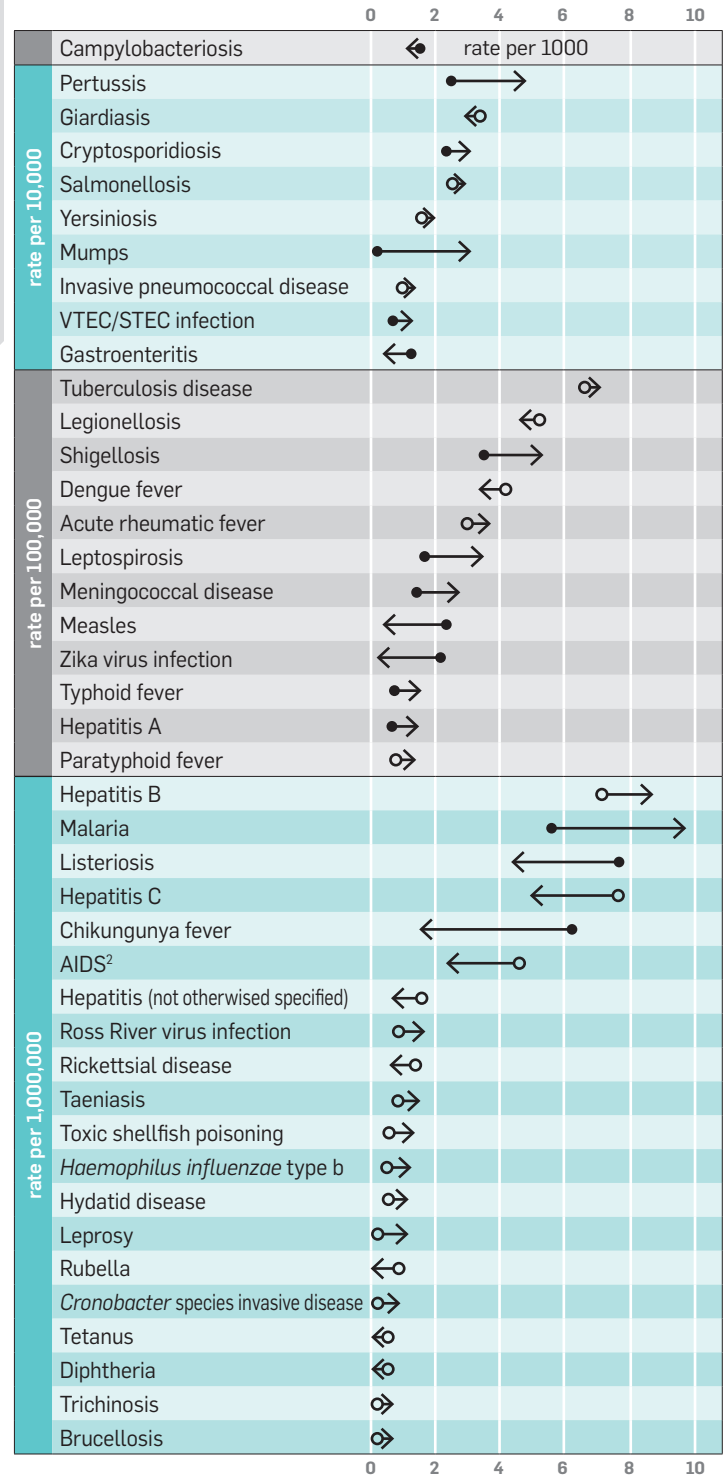
Campylobacteriosis

- Notifications:** 2117 notifications in the quarter (2016, 2753); 6483 notifications over the last 12 months (2016, 7456), giving a rate of 138.2 cases per 100,000 population (2016, 158.9), a statistically significant decrease.
- Comments:** there has been a statistically significant quarterly increase from the previous quarter (1602 cases) and a statistically significant decrease from the same quarter last year (2753 cases).

Gastroenteritis (acute)

- Notifications:** 79 notifications in the quarter (2016, 94); 322 notifications over the last 12 months (2016, 510), giving a rate of 6.9 cases per 100,000 population (2016, 10.9), a statistically significant decrease.

National surveillance data 12-monthly notification rate changes¹



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 January to December 2017 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.

- **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.

Listeriosis

- **Notifications:** 9 notifications in the quarter (2016, 9); 21 notifications over the last 12 months (2016, 36), giving a rate of 0.4 cases per 100,000 population (2016, 0.8), a statistically significant decrease.
- **Comments:** there has been a statistically significant quarterly increase from the previous quarter (2 cases). Cases were aged between 43 and 87 years. None of the cases were pregnancy associated.

VTEC/STEC infection

- **Notifications:** 140 notifications in the quarter (2016, 87); 559 notifications over the last 12 months (2016, 418), giving a rate of 11.9 cases per 100,000 population (2016, 8.9), a statistically significant increase.
- **Comments:** there has been a statistically significant quarterly increase from the same quarter last year (87 cases). This increase is partly due to changes in laboratory testing practices, with increasingly sensitive assays used for the detection of VTEC/STEC.

Yersiniosis

- **Notifications:** 242 notifications in the quarter (2016, 292); 924 notifications over the last 12 months (2016, 858), giving a rate of 19.7 cases per 100,000 population (2016, 18.3), not a statistically significant increase.
- **Comments:** there has been a statistically significant quarterly decrease from the same quarter last year (292 cases).

Infectious respiratory diseases

Meningococcal disease

- **Notifications:** 38 notifications in the quarter (2016, 22); 116 notifications over the last 12 months (2016, 75), giving a rate of 2.5 cases per 100,000 population (2016, 1.6), a statistically significant increase.
- **Comments:** has been a statistically significant quarterly increase from the same quarter last year (22 cases). Cases were distributed by age as follows: 5 (<1 year), 9 (1–4 years), 2 (5–14 years) and 22 (≥15 years). 34 cases were laboratory confirmed and 32 had the strain group identified: group B (19 cases, including NZB:P1.7-2.4 (8 cases)), group C (5 cases), group W (4 cases), and group Y (4 cases). Strain type B:P1.7-2.4 was previously known as the 'NZ epidemic strain'.

Rheumatic Fever

- **Notifications:** 33 notifications in the quarter (2016, 15); 161 notifications over the last 12 months (2016, 136) giving a rate of 3.4 per 100,000 population (2016, 2.9), not a statistically significant increase.

- **Comments:** there has been a statistically significant quarterly increase from the same quarter last year (15 cases). Cases were distributed by age as follows: 1 (1–4 years), 14 (5–14 years) 7 (15–19 years) and 11 (≥20 years). 21 cases were confirmed, 5 probable, 4 suspect and 3 under investigation. All were initial episodes.

Tuberculosis disease

- **Notifications:** 103 notifications in the quarter (2016, 88); 320 notifications over the last 12 months (2016, 294) giving a rate of 6.8 per 100,000 population (2016, 6.3), not a statistically significant increase.
- **Comments:** there has been a statistically significant quarterly increase from the previous quarter (69 cases). 78 cases were laboratory confirmed; 97 cases were new cases and 6 cases were a relapse or reactivation.

Environmental exposures & infections

Cryptosporidiosis

- **Notifications:** 394 notifications in the quarter (2016, 345); 1192 notifications over the last 12 months (2016, 1062), giving a rate of 25.4 cases per 100,000 population (2016, 22.6), a statistically significant increase.

Legionellosis

- **Notifications:** 89 notifications in the quarter (2016, 66); 232 notifications over the last 12 months (2016, 247), giving a rate of 4.9 cases per 100,000 population (2016, 5.3), not a statistically significant decrease.
- **Comments:** there has been a statistically significant quarterly increase from the previous quarter (31 cases). 18 notifications were still under investigation.

Leptospirosis

- **Notifications:** 38 notifications in the quarter (2016, 25); 156 notifications over the last 12 months (2016, 85), giving a rate of 3.3 cases per 100,000 population (2016, 1.8), a statistically significant increase.
- **Comments:** 28 cases were confirmed, 5 were probable and 5 were still under investigation. There were 32 male cases and 6 female cases. 32 cases were recorded as engaged in occupations identified as high risk for exposure. The most commonly recorded occupation for these cases was farmer/farm worker (18 cases).

New, exotic & imported infections

Chikungunya fever

- **Notifications:** 3 notifications in the quarter (2016, 6); 8 notifications over the last 12 months (2016, 28), giving a rate of 0.2 per 100,000 population (2016, 0.6), a statistically significant decrease.
- **Comments:** all 3 cases were laboratory confirmed and had travelled overseas during the incubation period. Countries visited were Fiji, Malaysia and Samoa.

Dengue fever

- **Notifications:** 68 notifications in the quarter (2016, 29); 165 notifications over the last 12 months (2016, 191), giving a rate of 3.5 cases per 100,000 population (2016, 4.1), not a statistically significant decrease.

- Comments:** there has been a statistically significant quarterly increase from the previous quarter (26 cases) and from the same quarter last year (29 cases). All cases were laboratory confirmed and had travelled overseas during the incubation period of the disease. Countries most commonly visited were Samoa (46 cases), India (10 cases) and Thailand (3 cases).

Hepatitis A

- Notifications:** 28 notifications in the quarter (2016, 9); 58 notifications over the last 12 months (2016, 35), giving a rate of 1.2 per 100,000 population (2016, 0.7), a statistically significant increase.
- Comments:** there has been a statistically significant quarterly increase from the previous quarter (8 cases) and the same quarter last year (9 cases). Cases were aged between 2 and 81 years, with 7 cases aged <16 years. Overseas travel or prior travel information was known for 27 (96.4%) cases. Of these, 16 (59.3%) cases had not travelled overseas during the incubation period and had no travel history that could account for their infection.

Malaria

- Notifications:** 10 notifications in the quarter (2016, 3); 43 notifications over the last 12 months (2016, 26), giving a rate of 0.9 per 100,000 population (2016, 0.6), a statistically significant increase.
- Comments:** all cases were laboratory confirmed. Overseas travel or prior travel information was known for all 10 cases. The most commonly visited country was Papua New Guinea (4 cases).

Shigellosis

- Notifications:** 70 notifications in the quarter (2016, 54); 249 notifications over the last 12 months (2016, 174), giving a rate of 5.3 per 100,000 population (2016, 3.7), a statistically significant increase.
- Comments:** overseas travel or prior travel information was known for 62 (88.6%) cases. Of these, 25 (35.7%) cases had not travelled overseas during the incubation period and had no travel history that could account for their infection.

Typhoid fever

- Notifications:** 5 notifications in the quarter (2016, 7); 61 notifications over the last 12 months (2016, 38), giving a rate of 1.3 per 100,000 population (2016, 0.8), a statistically significant increase.
- Comments:** all 5 cases had travelled overseas during the incubation period and the most commonly visited country was India (4 cases).

Zika virus infection

- Notifications:** 0 notifications in the quarter (2016, 1); 11 notifications over the last 12 months (2016, 100), giving a rate of 0.2 per 100,000 population (2016, 2.1), a statistically significant decrease.

3. OTHER SURVEILLANCE REPORTS

Increase in institutional norovirus outbreaks in the greater Wellington region, 2017

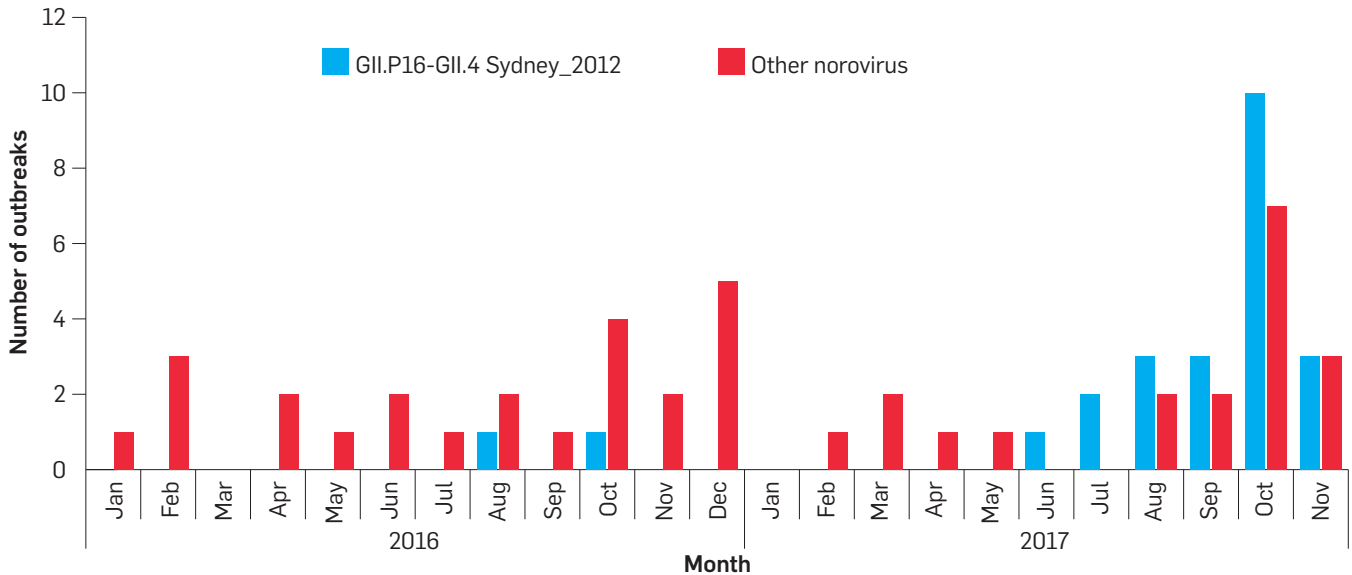
Between January and November 2017 inclusive, Regional Public Health received reports of 86 gastroenteritis outbreaks in the greater Wellington region. In comparison, a median of 56 gastroenteritis outbreaks was reported for the same 11-month period in each of the years 2012–2016. The aim of this analysis is to examine this apparent increase.

From January to November 2017, there were 84 institutional gastroenteritis (IG) outbreaks, 97.7% of the total reported gastroenteritis outbreaks in the period. Implicated institutions comprised early childhood education centres (ECECs, 41), long term care facilities (LTCFs, 31), acute-care hospitals (6), schools (2), a camp (1), a hotel (1), a hostel (1) and a community mental health facility (1). In comparison, IG outbreaks comprised 79.7% (243/305) of gastroenteritis outbreaks reported for January–November in the years 2012–2016 combined. IG outbreaks peaked with 22 reported outbreaks in October 2017; the highest monthly total of reported IG outbreaks during the period 2012–2017.

The outbreak pathogen was identified in 42 of the 84 IG outbreaks; in all except one instance this was norovirus. The most commonly identified norovirus was GII.P16-GII.4 Sydney_2012, identified in 22 (52.4%) of the IG outbreaks. No other single genotype accounted for more than three outbreaks. In the greater Wellington region, GII.P16-GII.4 Sydney_2012 was first associated with an outbreak reported in August 2016 and was subsequently identified infrequently. From mid-2017, GII.P16-GII.4 Sydney_2012 was implicated in a progressively increasing number of outbreaks, peaking in October 2017 as the implicated pathogen in 10 outbreaks; 7 in LTCFs, 2 in ECECs, and 1 in a mental health facility (Figure 1).

The increased number of norovirus IG outbreaks in January–November 2017 appeared to be due to the emergent GII.P16-GII.4 Sydney_2012 strain. Excluding the 22 IG outbreaks in which this novel GII.4 variant had been identified, there were 19 other IG outbreaks linked to norovirus. This is similar to the typical number of IG outbreaks identified between January and November in each year from 2012 to 2016 (median 21 outbreaks, range 13–25). It is not possible to determine the extent to which GII.P16-GII.4 Sydney_2012 replaced, rather than added to, other norovirus genotypes because 50% of the IG outbreaks from January to November 2017 had no pathogen detected and therefore the distribution of norovirus genotypes could not be determined. In comparison, 41.5% of IG outbreaks from 2012 to 2016 had no pathogen detected.

The 22 IG outbreaks associated with GII.P16-GII.4 Sydney_2012, comprising 540 persons, had a higher mean number of cases per outbreak and a longer mean outbreak duration (calculated as the interval between the illness

FIGURE 1. Norovirus gastroenteritis outbreaks in institutions reported in the greater Wellington region, January 2016–November 2017, by genotype

onset date in the first and last outbreak case) than IG outbreaks reported between 2012 and 2017 and found to have other norovirus genotypes: 25.7 vs. 24.4 cases and 12.4 vs. 11.9 days respectively; these differences were not statistically significant. Considering outbreaks specifically in LTCFs, GII.P16-GII.4 Sydney_2012 outbreaks again had a non-significantly higher mean number of cases and a non-significantly longer outbreak duration than LTCF IG outbreaks due to other noroviruses.

This analysis suggests that the increase in gastroenteritis outbreaks reported in the greater Wellington region in 2017 was due to an increase in norovirus outbreaks occurring in institutions, and the genotyping data available suggests that this increase was, at least partially, due to the emergence of GII.P16-GII.4 Sydney_2012 in the region. Among IG outbreaks with detected norovirus, its emergence appears to have added to and not replaced other noroviruses in the region. Data suggesting larger outbreak size and longer duration of GII.P16-GII.4 Sydney_2012 outbreaks were not statistically significant. Emergence of GII.P16-GII.4 Sydney_2012 has been demonstrated internationally. In France, this recombinant norovirus was one of three emergent or re-emergent strains responsible for an early increase in norovirus outbreaks during the 2016–17 winter season. GII.P16-GII.4 Sydney_2012 had not previously been detected in France, yet accounted for 24% of norovirus outbreaks in the 2016–17 winter.¹ Monitoring for the emergence of this norovirus variant should continue in other regions, and information and support should be made available for vulnerable institutions. Pathogen detection should be attempted in IG outbreaks to support norovirus surveillance.

Reference

1. Bidalot M, Théry L, Kaplon J, et al. Emergence of new recombinant noroviruses GII.p16-GII.4 and GII.p16-GII.2, France, winter 2016 to 2017. *Euro Surveill.* 2017; 22(15): 30508.

Reported by Craig Thornley, Medical Officer of Health, Regional Public Health, and Joanne Hewitt, Norovirus Reference Laboratory, ESR.

4. OUTBREAK SURVEILLANCE

The following is a summary of the outbreak trends for October to December 2017. Comparisons are made to the previous quarter (July to September 2017), and to the same quarter in the previous year (October to December 2016). Information in this section is based on data recorded in EpiSurv by public health service staff up to 15 January 2018. As the data may be updated over time, this information should be regarded as provisional.

General

- 198 outbreaks notified in this quarter (2924 cases).
- 134 are final reports (2420 cases); 64 are interim reports (504 cases) that have yet to be finalised and closed.

All data that follow relate to final reports only.

- 18.1 cases on average per outbreak, compared with 18.2 cases per outbreak in the previous quarter (14.7 cases per outbreak in the same quarter of last year).
- 38 hospitalisations: norovirus (31), 'gastroenteritis' (3), *Cryptosporidium* (1), *Salmonella* (1), *Salmonella* / VTEC/STEC infection (1), and *Shigella* (1).
- 5 deaths: norovirus (5).
- 2 outbreaks involved more than one pathogen therefore individual pathogen outbreak numbers may not sum to group totals.

Pathogens

- 76 norovirus outbreaks (1886 cases).
- 42 'gastroenteritis' outbreaks (457 cases).
- 3 *Cryptosporidium* outbreaks (8 cases).
- 2 *Campylobacter* outbreaks (9 cases).
- 2 *Giardia* outbreaks (5 cases).
- 2 mumps virus outbreaks (5 cases).
- 2 *Salmonella* outbreaks (9 cases).

- 2 VTEC/STEC infection outbreaks (9 cases).
- 1 hepatitis A outbreak (3 cases).
- 1 influenza A outbreak (14 cases).
- 1 influenza B outbreak (20 cases).
- 1 *Shigella* outbreak (2 cases).
- 1 sapovirus outbreak (5 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.

- 118 person-to-person, from (non-sexual) contact with an infected person (including droplets): 73 norovirus (1862 cases), 34 'gastroenteritis' (425 cases), 2 *Giardia* (5 cases), 2 mumps virus (5 cases), 2 *Salmonella* (9 cases), 2 VTEC/STEC infection (9 cases), 1 *Campylobacter* (7 cases), 1 hepatitis A (3 cases), 1 influenza A virus (14 cases), 1 influenza B virus (20 cases), and 1 sapovirus (5 cases).
- 11 environmental, from contact with an environmental source (eg, swimming): 3 norovirus (84 cases), 3 'gastroenteritis' (14 cases), 2 *Campylobacter* (9 cases), 2 *Cryptosporidium* (5 cases), and 1 hepatitis A virus (3 cases).
- 14 foodborne, from consumption of contaminated food or drink (excluding water): 7 'gastroenteritis' (25 cases), 5 norovirus (32 cases), 1 *Campylobacter* (7 cases), and 1 *Salmonella* (2 cases).
- 6 zoonotic: 3 *Cryptosporidium* (8 cases), 2 *Campylobacter* (9 cases), and 1 VTEC/STEC infection (2 cases).
- 1 waterborne, from consumption of contaminated drinking water: *Giardia* (3 cases).
- 4 mode of transmission unknown: 3 'gastroenteritis' (17 cases) and 1 *Shigella* (2 cases).

Circumstances of Exposure

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

- 66 long term care facility: 49 norovirus (1342 cases), 16 'gastroenteritis' (209 cases), 1 influenza A virus (14 cases), and 1 sapovirus (5 cases).
- 6 private home: 2 *Giardia* (5 cases), 2 norovirus (10 cases), 1 *Cryptosporidium* (3 cases), and 1 *Salmonella* (2 cases).
- 19 childcare centre: 10 'gastroenteritis' (130 cases), 8 norovirus (171 cases), and 1 *Shigella* (2 cases).
- 11 hospital (acute care): 7 norovirus (230 cases), 3 'gastroenteritis' (15 cases), and 1 influenza B virus (20 cases).
- 9 restaurant/café/bakery: 6 'gastroenteritis' (20 cases) and 3 norovirus (13 cases).
- 7 other institution: 3 norovirus (61 cases), 2 'gastroenteritis' (56 cases), 1 *Cryptosporidium* (3 cases), and 1 mumps virus (2 cases).
- 2 camp: 1 *Campylobacter* (7 cases) and 1 norovirus (33 cases).

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- 2 farm: 1 *Campylobacter* (2 cases) and 1 *Cryptosporidium* (2 cases).
- 2 workplace: 1 hepatitis A virus (3 cases) and 1 norovirus (82 cases).
- 1 hostel/boarding house: mumps virus (3 cases).
- 1 hotel/motel: 'gastroenteritis' (7 cases).
- 1 school: 'gastroenteritis' (8 cases).
- 1 takeaways; 'gastroenteritis' (2 cases).
- 3 other setting: 1 'gastroenteritis' (3 cases), 1 norovirus (5 cases), 1 *Salmonella* (7 cases), and 1 VTEC/STEC infection (7 cases).
- 1 outbreak had two or more exposure settings recorded.
- 4 outbreaks had no exposure settings recorded.

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

- 7 restaurant/café/bakery: 4 norovirus (18 cases) and 3 'gastroenteritis' (9 cases).
- 1 home: *Salmonella* (2 cases).
- 1 hospital (acute care): 'gastroenteritis' (5 cases).
- 1 other institution: norovirus (14 cases).
- 4 outbreaks had no preparation settings recorded.

5. OUTBREAK CASE REPORTS

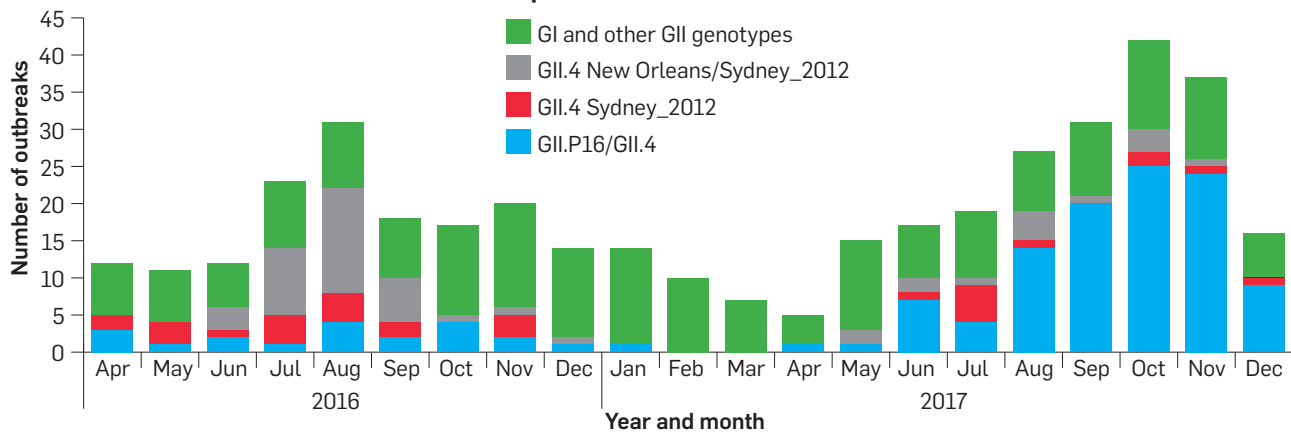
No reports this quarter.

6. LABORATORY SURVEILLANCE

Norovirus surveillance April 2016–December 2017: emergence of GII.P16-GII.4 Sydney_2012

Noroviruses, a diverse group of viruses that evolve through antigenic drift and/or recombination events, are the most frequently reported agent associated with gastroenteritis outbreaks. While norovirus infection is not a notifiable disease, norovirus is notified as 'acute gastroenteritis' when the case is part of a suspected common source outbreak or a person in a high risk category (e.g. food handler, early childcare worker). The ESR Norovirus Reference Laboratory carries out laboratory surveillance of norovirus outbreaks for the New Zealand Ministry of Health.

This report describes the norovirus genotype and outbreak setting data associated with norovirus outbreaks reported from April 2016 to December 2017 – a total of 398 ESR laboratory-confirmed norovirus outbreaks. For genotyping, fragments of the open reading frame (ORF)1 and of ORF2 (that code for the RNA polymerase and VP1 capsid protein respectively) are both sequenced to allow for the identification of recombinant noroviruses. Recombination typically occurs at the ORF1 and ORF2 junction. This means that a polymerase of one norovirus can recombine with the capsid of another norovirus to produce a novel recombinant norovirus strain.

FIGURE 2. Number and genotype of ESR laboratory-confirmed norovirus outbreaks in New Zealand by month, April 2016–December 2017

From April 2016 to December 2017, 75 (19.1%) norovirus sequences identified from outbreaks belonged to genogroup I (GI), and 322 (80.9%) sequences belonged to genogroup II (GII). Both GI and GII genotypes were identified from one outbreak. Seven different capsid GI genotypes and 11 different capsid GII genotypes were identified, plus several recombinants.

The genotype GII.4, responsible for six global pandemics in the last two decades, was the predominant (205/398, 51.5% outbreaks) genotype identified. Three co-circulating GII.4 variants, all derived from recombination events¹, were identified: GII.Pe-GII.4 Sydney_2012 (33/398, 8.3%), GII.4 New Orleans_2009-GII.4 Sydney_2012 (49/398, 12.3%) and the novel recombinant GII.P16-GII.4 Sydney_2012 (123/398, 30.9%). While norovirus GII.Pe-GII.4 Sydney_2012 has been circulating globally and in New Zealand since 2012, GII.P16-GII.4 Sydney_2012 (i.e. GII.16 in the polymerase region, GII.4 Sydney_2012 in the capsid region) was first detected in New Zealand in August 2015 and then identified infrequently between April and November 2016 (Figure 2). The GII.P16-GII.4 Sydney_2012 variant then re-emerged in May 2017, increasing in proportion to other noroviruses between August and December 2017. Between August and December 2017, the GII.P16-GII.4 variant accounted for the majority (92/153, 60.1%) of all genotyped norovirus outbreaks. The number of outbreaks associated with GII.P16-GII.4 Sydney_2012 peaked in October 2017, accounting for 25/42 (59.5%) norovirus outbreaks in that month. The re-emergence in 2017 and associated increase in reported gastroenteritis outbreaks of this novel recombinant in New Zealand in the last quarter of 2017, is similar to that observed with the GII.Pe-GII.4 Sydney_2012 variant in 2012. In October 2012, a large increase in norovirus outbreaks was reported and the GII.Pe-GII.4 Sydney_2012 variant replaced the previously predominant norovirus, GII.4 New Orleans_2009.² Interestingly, the

recombinant GII.4 New Orleans_2009-GII.4 Sydney_2012, first identified in New Zealand in February 2013 was associated with only seven outbreaks prior to June 2016, but was responsible for 26 gastroenteritis outbreaks in the Canterbury District Health Board region of New Zealand between June and September 2016. This compares with a total of six outbreaks caused by this GII.4 variant in other District Health Boards.

Other frequently identified noroviruses from April 2016 to December 2017 included GI.3 (31/398, 7.8%), GI.Pb-GI.6 (20/398, 5.0%), GII.P17-GII.17 (18/398, 4.5%) and the GII recombinants, GII.P7-GII.6 (15/398, 3.8%), GII.P12-GII.3 (19/398, 4.8%) and GII.P16-GII.2 (44/398, 11.1%). Other noroviruses with a GII.16 polymerase type (GII.P16) were GII.P16-GII.13 (four outbreaks) and GII.P16-GII.3 (one outbreak) capsid types.

The outbreak settings reported for the 398 outbreaks included long-term care facilities (236/398, 59.3%), childcare centres (52/398, 13.1%), acute-care hospitals (41/398, 10.3%) and commercial food operators (25/398, 6.3%). GII.4 variants were more often reported for the healthcare setting (i.e. long-term care facilities and acute-care hospitals) than were non-GII.4 noroviruses (62.6% of 278 compared to 26.7% of 120 outbreaks).

The emergence of GII.P16-GII.4 Sydney_2012 in Asia, South America, USA, Europe and Australia has been reported, showing that this GII.4 variant is now circulating globally³⁻⁷ Continued global norovirus surveillance is required to further monitor GII.P16-GII.4 Sydney_2012, and other emerging and circulating noroviruses, particularly as the effect of changes in the RNA polymerase and capsid of noroviruses on transmission and virulence remain unclear.⁸⁻⁹

References:

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

Reported by Joanne Hewitt, Norovirus Reference Laboratory, Health Group, ESR.

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