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New Zealand Public Health Surveillance Report

December 2012: Covering July to September 2012

Contents & Highlights

1. Editorial

- Climate change and waterborne diseases in New Zealand and the role of primary care in the early detection of common source waterborne disease outbreaks

2. Notifiable Disease Surveillance

Significant Increases in 12-Monthly Notification Rate

- Campylobacteriosis
- Cryptosporidiosis
- Dengue Fever
- Hepatitis A
- Leptospirosis
- Measles
- Pertussis
- Shigellosis

Significant Decreases in 12-Monthly Notification Rate

- Giardiasis
- Hepatitis B
- Meningococcal Disease
- Mumps
- Rubella
- Salmonellosis

3. Other Surveillance Reports

- The impact of laboratory practices on the isolation of pathogenic *Yersinia* species in New Zealand

4. Outbreak Surveillance

- 207 outbreaks (2303 cases) notified in this quarter
- 135 'final' reports (1971 cases); 72 'interim' reports (332 cases)
- 14.6 cases per outbreak on average
- 24 hospitalisations, 12 deaths

5. Outbreak Case Reports

- An outbreak of waterborne gastroenteritis in Darfield, Canterbury, July to August 2012
- Norovirus outbreak associated with imported oysters

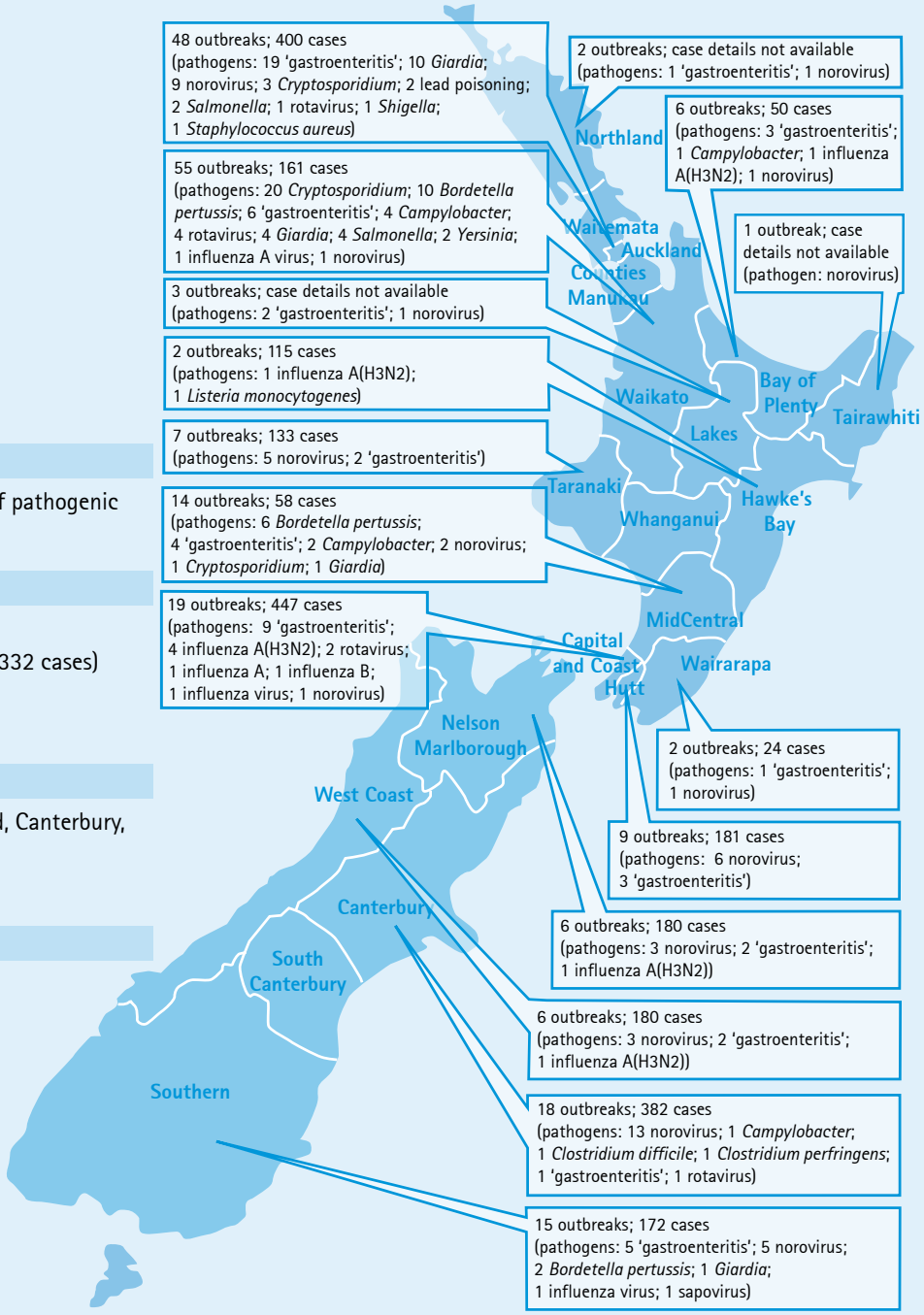
6. Laboratory Surveillance

- Annual survey of MRSA, 2011

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 July to September quarter of 2012. The outbreak map on this page consists of all outbreak information, final and interim. The total number of outbreaks and cases by region and outbreak pathogen are reported, as notified up to 3 October 2012. Outbreaks reporting exposures in more than one geographic location are assigned to the district health board with the most cases. Three outbreaks involved more than one pathogen therefore individual pathogen outbreak numbers may not sum to totals.



1. Editorials

Climate change and waterborne diseases in New Zealand and the role of primary care in the early detection of common source waterborne disease outbreaks

Waterborne diseases can occur when humans ingest or come into contact with water that contains pathogenic organisms. Pathogens can enter water supplies from human and animal wastes. Both surface- and ground- waters can become contaminated via inadequately treated wastewater, animal manure, runoff from land and urban environments. Treatment plants can be used to remove, or inactivate, pathogens in the water. However, should the source of an untreated or inadequately treated drinking water supply become contaminated, the water is likely to be unsafe.

Untreated or inadequately treated drinking-water contaminated with pathogens presents a significant risk to human health. The presence of *Escherichia coli* in drinking-water indicates recent faecal contamination of the water. If *E. coli* is present, there is also a greater risk of pathogens being present. In 2010–2011, a total of approximately 77% of New Zealanders were served by registered community drinking-water supplies serving more than 100 people. Of these, 97% were served by drinking-water supplies that complied with the *E. coli* criteria (<1 *E. coli* per 100 mL) and 79% with the protozoal requirements of the *Drinking-Water Standards for New Zealand 2005*.[1,2]

In 2011, 45 waterborne outbreaks with 141 associated cases were reported. The most commonly reported pathogens were *Giardia* spp. 44.4%, *Campylobacter* spp. 20.0%, *Cryptosporidium* spp. 15.6% and *Salmonella* spp. 11.1%. The most common contributing factor linked to waterborne outbreaks was an untreated drinking-water supply (80.0%), followed by an inadequately treated water supply (37.8%) and source water quality inferior to normal (13.3%).[4] The overall burden of endemic drinking-waterborne gastrointestinal disease in New Zealand has been estimated at 18,000 to 34,000 cases per year.[3]

There is increasing evidence that climate change-related alterations in temperature, rainfall (including extreme weather events), surface water availability and water quality could affect the burden of water-related diseases.[5,6] Bates et al.[5] identify that higher water temperatures and changes in rainfall will affect water quality and exacerbate many forms of water pollution, with negative impacts on ecosystems, human health and water system reliability. Extreme droughts will reduce water flows and levels, increasing concentrations of pathogens from contaminated effluent discharges. Conversely, heavy rainfall can cause microbial contamination of surface water bodies and shallow groundwaters due to polluted surface runoff and discharges of untreated sewage from over-flowing combined sewage systems. This may increase the total microbial load in watercourses and raw water reservoirs.[7]

Recent systematic reviews[8-10] have examined the relationships among climate variables, common risk factors, waterborne pathogens and outbreaks of waterborne diseases. The review by the European Centre for Disease Prevention and Control[8] reported associations between certain gastrointestinal diseases and air temperature, water temperature and precipitation events. Cann et al.[9] found evidence to suggest that outbreaks of waterborne infectious disease follow extreme water-related climatic events. Contamination of the drinking-water supply accounted for 53.7% of outbreaks following extreme water-related weather events. Rizak and Hrudey[10] also found that heavy rainfall or runoff, as well as treatment process and system changes, are common risk factors for drinking-water disease outbreaks.

The recent waterborne disease outbreak in Darfield along with other recent outbreaks are examples of the greater challenges water suppliers will face in ensuring provision of safe water as the predicted climate change-related alterations in climate variables become more pronounced. To help water suppliers meet these challenges, a vulnerability assessment tool has been developed, which aims to provide support for communities in understanding why their water supply may be vulnerable to heavy rain events and severe drought, and how they may reduce their vulnerability. The tool forms part of an ESR-led research project to develop a Health Analysis and Information For Action (HAIFA) resource system.[11] This project aims to help provide central, regional and local authorities with scientifically robust methods and tools to respond to potential infectious disease risks associated with climate change. The HAIFA resource system will also contain an exemplar set of environmental health indicators that were developed as a tool to assess, monitor and quantify the impacts of climate change on food- and water- borne diseases and to aid in the design and targeting of interventions.[12]

With the predicted climate change-related alterations in rainfall and other climate-related factors it seems likely that more outbreaks related to contaminated water will be seen in the future. Waterborne disease surveillance data are useful for detection of outbreaks and for evaluating the current approaches for providing safe drinking- and recreational- water. It is likely, however, that many waterborne outbreaks are unrecognised and/or underreported, particularly in isolated and rural localities, and among transient populations. Ideally, an early warning system based on syndromic surveillance to identify clusters of gastrointestinal illness would be useful for detecting outbreaks at an earlier stage. Since syndromic surveillance does not depend on laboratory diagnoses, any links to water, food or any other environmental exposure can be investigated when cases are more likely to correctly remember exposures. Although the current notification system in New Zealand focusses on disease rather than syndromic surveillance, an opportunity exists for primary care physicians to play a pivotal role in the early detection of waterborne disease outbreaks.

The likelihood that case clusters will be detected and associated with water depends on many factors, including the severity of illness, consultation patterns and further enquiry, and investigation by the primary caregiver, including exposure history taking and a knowledge of local environmental conditions. Outbreaks of acute diseases, particularly those characterised by a short incubation period, are more readily identified than those associated with disease from chronic, low-level exposure to a toxin or chemical. Early detection of recreational waterborne disease outbreaks in populations living in large catchments can be difficult. Timely recognition of an outbreak facilitates both clinical and appropriate environmental sampling to identify an aetiological agent and early actions to reduce exposures. Routine testing for the common bacterial organisms may not suffice in suspected waterborne events and specific requests (eg, for protozoa or viruses) may be necessary. Laboratory protocols for routine faecal specimen screening vary, therefore, it is important to know your local laboratory's protocols and specify on request forms, clinical details and reason for testing. Primary care physicians however can assist in early detection of outbreaks through notification to the medical officer of health on suspicion of a cluster of gastrointestinal illness rather than waiting for laboratory confirmation.

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

Reported by Tammy Hambling and Don Bandaranayake, Health Intelligence Team, ESR.

2. Notifiable Disease Surveillance

The following is a summary of disease notifications for the July to September quarter of 2012 and cumulative notifications and rates calculated for a 12-month period (October 2011 to September 2012). For comparative purposes notification numbers and rates are presented in brackets for the same period 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 October 2012. 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:* 7 notifications in the quarter (2011, 1); 11 notifications over the last 12 months (2011, 8), giving a rate of 0.2 cases per 100,000 population (2011, 0.2), not a statistically significant increase.
- *Comments:* there has been a statistically significant quarterly increase from the previous quarter (1 case) and from the same quarter last year (1 case). Cases were aged between 2 days and 62 years, with 3 cases under 5 years old. Immunisation status was recorded for 1 (14.2%) case. The case was not immunised.

Hepatitis B

- *Notifications:* 18 notifications in the quarter (2011, 14); 38 notifications over the last 12 months (2011, 60), giving a rate of 0.9 cases per 100,000 population (2011, 1.4), a statistically significant decrease.
- *Comments:* cases were aged between 23 and 76 years.

Invasive Pneumococcal Disease

- *Notifications:* 206 notifications in the quarter (2011, 221); 513 notifications over the last 12 months (2011, 526), giving a rate of 11.6 cases per 100,000 population (2011, 11.9), not a statistically significant decrease.
- *Comments:* there has been a statistically significant quarterly increase from the previous quarter (113 cases). Cases were aged between 2 months and 97 years, with 20 cases under the age of 2 years.

Measles

- *Notifications:* 2 notifications in the quarter (2011, 181); 380 notifications over the last 12 months (2011, 290), giving a rate of 8.6 cases per 100,000 population (2011, 6.6), a statistically significant increase.
- *Comments:* there has been a statistically significant quarterly decrease from previous quarter (13 cases) and from the same quarter last year (181 cases). No cases were laboratory confirmed.

Mumps

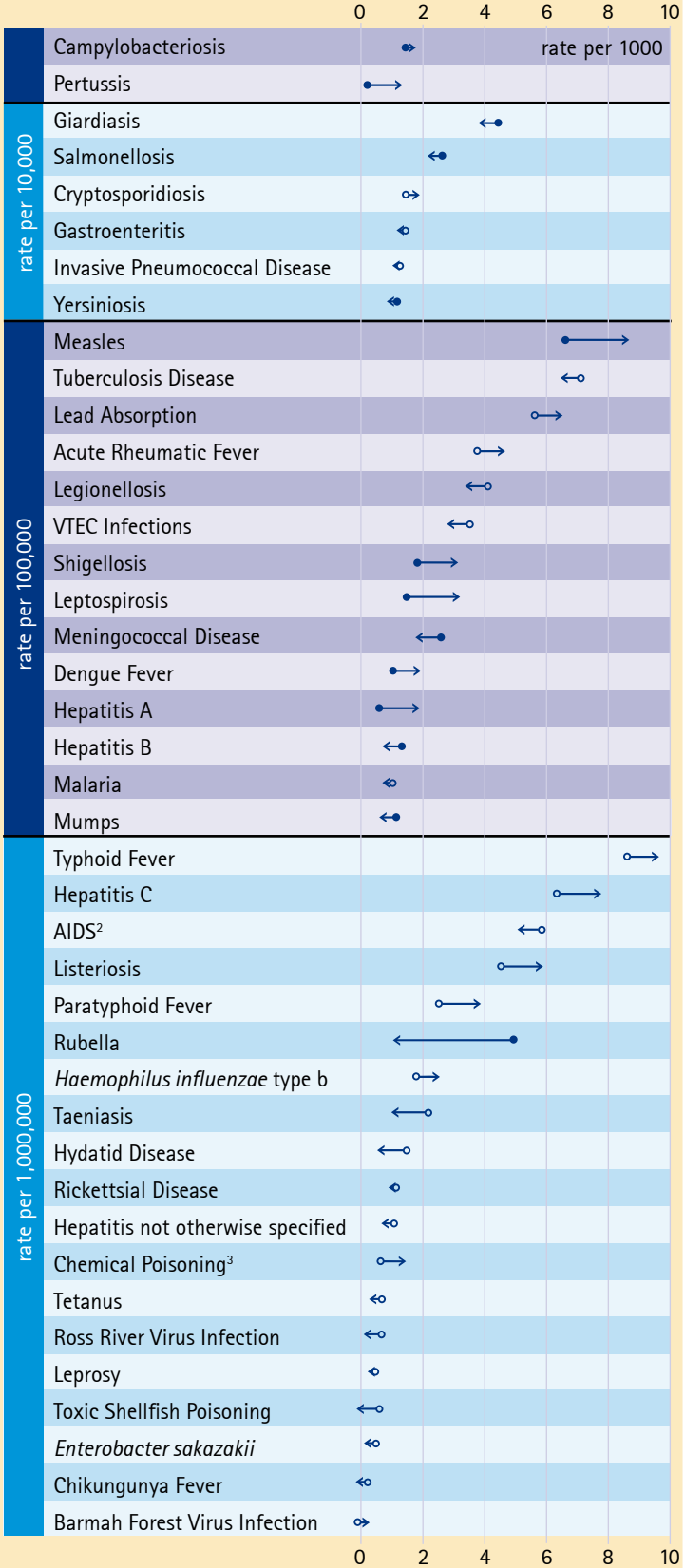
- *Notifications:* 12 notifications in the quarter (2011, 12); 33 notifications over the last 12 months (2011, 51), giving a rate of 0.7 cases per 100,000 population (2011, 1.2), a statistically significant decrease.
- *Comments:* 5 cases were laboratory confirmed.

Pertussis

- *Notifications:* 1629 notifications in the quarter (2011, 403); 5473 notifications over the last 12 months (2011, 960), giving a rate of 124.2 cases per 100,000 population (2011, 21.8), 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 2011 to September 2012 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.

[3] From the environment.

- *Comments:* there has been a statistically significant quarterly increase from the previous quarter (1373 cases) and from the same quarter last year (403 cases).

Rubella

- *Notifications:* no notifications in the quarter (2011, 11); 5 notifications over the last 12 months (2011, 22), giving a rate of 0.1 cases per 100,000 population (2011, 0.5), a statistically significant decrease.
- *Comments:* there has been a statistically significant quarterly decrease from the same quarter last year (11 cases).

ENTERIC INFECTIONS

Campylobacteriosis

- *Notifications:* 1414 notifications in the quarter (2011, 1629); 7215 notifications over the last 12 months (2011, 6502), giving a rate of 163.8 cases per 100,000 population (2011, 147.6), a statistically significant increase.
- *Comments:* there has been a statistically significant quarterly decrease from the same quarter last year (1629 cases).

Salmonellosis

- *Notifications:* 243 notifications in the quarter (2011, 207); 1024 notifications over the last 12 months (2011, 1138), giving a rate of 23.2 cases per 100,000 population (2011, 25.8), a statistically significant decrease.

Yersiniosis

- *Notifications:* 138 notifications in the quarter (2011, 179); 506 notifications over the last 12 months (2011, 513), giving a rate of 11.5 cases per 100,000 population (2011, 11.6), not a statistically significant decrease.
- *Comments:* there has been a statistically significant quarterly decrease from the same quarter last year (179 cases).

INFECTIOUS RESPIRATORY DISEASES

Acute Rheumatic Fever

- *Notifications:* 45 notifications in the quarter (2011, 51); 201 notifications over the last 12 months (2011, 166), giving a rate of 4.6 cases per 100,000 population (2011, 3.8), not a statistically significant increase.
- *Comments:* there has been a statistically significant quarterly decrease from the previous quarter (76 cases). Cases were distributed by age as follows: 1 (1–4 years), 28 (5–14 years), 13 (15–24 years), and 3 (25–44 years). 42 cases were an initial attack of acute rheumatic fever and 3 cases were recurrent attacks.

Meningococcal Disease

- *Notifications:* 30 notifications in the quarter (2011, 56); 83 notifications over the last 12 months (2011, 116), giving a rate of 1.9 cases per 100,000 population (2011, 2.6), a statistically significant decrease.
- *Comments:* there has been a statistically significant quarterly decrease from the same quarter last year (56 cases). Cases were distributed by age as follows: 1 (<1 year), 5 (1–4 years), 3 (5–14 years), and 21 (15 years and over). 29 cases were laboratory confirmed. Of these, the strain group was identified for 27 cases: epidemic (3 cases), B non-epidemic (12 cases), and C (12 cases).

ENVIRONMENTAL EXPOSURES & INFECTIONS

Cryptosporidiosis

- *Notifications:* 318 notifications in the quarter (2011, 212); 794 notifications over the last 12 months (2011, 640), giving a rate of 18.0 cases per 100,000 population (2011, 14.5), a statistically significant increase.
- *Comments:* there has been a statistically significant quarterly increase from the previous quarter (131 cases) and from the same quarter last year (212 cases).

Giardiasis

- *Notifications:* 383 notifications in the quarter (2011, 461); 1728 notifications over the last 12 months (2011, 1961), giving a rate of 39.2 cases per 100,000 population (2011, 44.5), a statistically significant decrease.
- *Comments:* there has been a statistically significant quarterly decrease from previous quarter (443 cases) and from the same quarter last year (461 cases).

Leptospirosis

- *Notifications:* 54 notifications in the quarter (2011, 15); 136 notifications over the last 12 months (2011, 66), giving a rate of 3.1 cases per 100,000 population (2011, 1.5), a statistically significant increase.
- *Comments:* there has been a statistically significant quarterly increase from the same quarter last year (15 cases). There were 46 male and 8 female cases. 31 cases were recorded as having an occupation identified as high risk for exposure. Most commonly recorded occupations were farmer/farmer worker (21 cases) and meat process worker (6 cases).

NEW, EXOTIC & IMPORTED INFECTIONS

Dengue Fever

- *Notifications:* 32 notifications in the quarter (2011, 14); 74 notifications over the last 12 months (2011, 46), giving a rate of 1.7 cases per 100,000 population (2011, 1.0), a statistically significant increase.
- *Comments:* there has been a statistically significant quarterly increase from the previous quarter (17 cases) and from the same quarter last year (14 cases). 31 cases were laboratory confirmed. 31 cases were overseas during the incubation period of the disease. Places visited or resided in were Thailand (9 cases), Indonesia (7 cases), Cook Islands, Fiji, India, Niue (2 cases each), Brazil, Cambodia, Solomon Islands, South America (not further defined), Sri Lanka, Tonga, Vietnam (1 case each). The travel history of the remaining case is unknown.

Hepatitis A

- *Notifications:* 12 notifications in the quarter (2011, 9); 82 notifications over the last 12 months (2011, 25), giving a rate of 1.9 cases per 100,000 population (2011, 0.6), a statistically significant increase.
- *Comments:* cases were aged between 6 and 73 years, with 2 cases under the age of 16 years. Overseas travel information was recorded for 9 cases (75.0%). Of these, 1 (11.1%) case had not travelled overseas during the incubation period of the disease.

Shigellosis

- *Notifications:* 28 notifications in the quarter (2011, 25); 136 notifications over the last 12 months (2011, 80), giving a rate of 3.1 cases per 100,000 population (2011, 1.8), a statistically significant increase.
- *Comments:* Overseas travel or prior travel information was recorded for 15 (53.6%) cases. Of these, 2 (13.3%) cases had not travelled overseas during the incubation period and had no prior history of travel that could account for their infection.

3. Other Surveillance Reports

The impact of laboratory practices on the isolation of pathogenic *Yersinia* species in New Zealand

Yersiniosis is the third most commonly reported foodborne illness notified in New Zealand. The diagnosis of *Yersinia enterocolitica* and *Yersinia pseudotuberculosis* infections is best achieved by the isolation and identification of the bacteria from clinical samples. However, both are affected by the incubation temperature and the selective media used.[1] *Yersinia* species grow more slowly than the background of enteric bacterial species present in faecal samples when incubated at 37°C. It is therefore recommended that faecal samples are plated onto selective media and incubated at 25 to 28°C. *Yersinia* species grow well on most enrichment media with the exception of the *Salmonella-Shigella* agar. Several selective media have been developed for the isolation of *Y. enterocolitica*.[2]

In late 2006, an apparent surge in yersiniosis cases was reported in New Zealand. Anecdotal evidence at the time suggested that differing clinical practices for referring specimens for confirmatory testing and differences among the methods used by the clinical laboratories to isolate and identify *Yersinia* species may have led to the changed notification rate.[3] A survey of clinical laboratories practices was recommended to examine the relationship between the *Yersinia* species being reported and the isolation methods used. ESR undertook a project in 2010 to determine the laboratory practices used to isolate *Yersinia* species and to establish their impact on yersiniosis notifications in New Zealand.[4]

The procedures used to isolate *Yersinia* species by clinical laboratories in New Zealand are summarised in Table 1.

Table 1. Procedures used by clinical laboratories to isolate *Yersinia* species, February 2010

Treatment number	Enrichment step (Incubation temperature, time)	Selective agar (Incubation temperature, time)	Number of laboratories using the treatment
1	N/A	CIN (28°C, 18 h)	11
2	N/A	CIN (28°C, 48 h)	16
3	N/A	CIN (37°C, 18 h)	5
4	N/A	CIN (37°C, 48 h)	1
5	Selenite (37°C, 24 h)	CIN (37°C, 18 h)	2
6	Selenite (37°C, 24 h)	MacConkey (37°C, 18 h)	1
7	Selenite (37°C, 24 h)	CIN (28°C, 24 h)	1[1]
8	YSE (28°C, 18 h)	CIN (28°C, 48 h)	2[1]

[1] These laboratories also directly plated faecal specimens onto CIN agar
YSE, *Yersinia* selective enrichment; CIN, cefsulodin-irgasan-novobiocin agar; N/A, not applicable

All laboratories reported using one or more identification methods for *Yersinia*. The results of the survey indicated that the kit most commonly used in New Zealand for the identification of *Yersinia* species was API20E (13 laboratories), followed by the BD BBL Crystal Enteric/Non-fermenter ID system (9 laboratories).

Twenty-three laboratories referred all *Yersinia* isolates to the Enteric Reference Laboratory (ERL), and one laboratory referred all *Yersinia* isolates other than *Y. enterocolitica*. The remaining 13 laboratories reported four criteria for referring *Yersinia* isolates to ERL: (i) when requested by ERL (5 laboratories), (ii) for confirmation of ambiguous results (4 laboratories), (iii) for confirmation of *Y. pestis* (2 laboratories) and (iv) for invasive blood isolates (2 laboratories).

Data from the clinical laboratory practices survey were combined with biotyping results for yersiniosis notifications from 1 September 2008 to 28 February 2009[3] to explore the relationship between the methods used by clinical laboratories for the isolation of *Yersinia* and the biotypes reported. For a table summarising *Yesrsinia* species and biotyping results for notified yersiniosis cases refer to http://www.surv.esr.cri.nz/surveillance/NZPHSR.php

Sixty-four percent of the *Yersinia* isolates confirmed during this period were isolated by laboratories using an incubation temperature of 28°C, of which 62.7% were *Y. enterocolitica* biotype 2, 3 or 4.

This study reports the apparent increased isolation of non-pathogenic *Yersinia* species with *Yersinia* selective enrichment (YSE), while the isolation rate of pathogenic *Yersinia* species by selenite enrichment was comparable with no enrichment. A simple frequency analysis of the relationship between the enrichment step used by the clinical laboratory and the *Yersinia* species and biotypes identified at ERL showed that *Y. enterocolitica* biotype 1A was much more commonly identified by the YSE enrichment than by the other two methods, that is, selenite broth or no enrichment. This could explain the link with the greater *Y. enterocolitica* biotype 1A notification rate reported in the South Island as both laboratories using YSE are located in this region.

Variation in the ability of *Y. pseudotuberculosis* to grow on cefsulodin-irgasan-novobiocin (CIN) agar was observed in this study, especially when incubated at 37°C. At 37°C, incubation for two days was required before distinct colonies appeared on CIN agar. This is of concern because nine laboratories in New Zealand use CIN agar at 37°C, but only one incubates for a 48-hour period. This means that the presence of *Y. pseudotuberculosis* in a clinical sample could be missed.

The data presented in this study confirm that the standard procedure for the isolation of *Yersinia* species should be as described in the Health Protection Agency National Standard Methods for the identification of *Yersinia* species, that is, using CIN agar at 28°C for 18 to 48 hours.[5] This procedure is already used by 75% of the clinical laboratories in New Zealand.

This study has illustrated the diversity in methods used for the isolation of *Yersinia* from clinical samples in New Zealand. In addition, it highlights the impact that clinical laboratory methods may have on yersiniosis notification data and its epidemiology, and the difficulties in establishing the true incidence of this pathogen. Adoption of the Health Protection Agency standard for the isolation of *Yersinia* species will contribute to a more complete picture of the incidence of yersiniosis in New Zealand.

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

Reported by Muriel Dufour, Hugo Strydom and Ruth Pirie, 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 (July to September 2012). Comparisons are made to the previous quarter (April to June 2012), and to the same quarter in the previous year (July to September 2011). Note that the outbreak data in this section are notified to ESR by the Public Health Services.

General

- 207 outbreaks notified in this quarter (2303 cases).
- 135 are 'final' reports (1971 cases); 72 are 'interim' reports (332 cases) that have yet to be finalised and closed.

All data that follow relate to final reports only.

- 14.6 cases on average per outbreak, compared with 11.3 cases per outbreak in the previous quarter (12.8 cases per outbreak in the same quarter of last year).
- 24 hospitalisations: norovirus (14 cases), *Listeria monocytogenes* (5 cases), 'gastroenteritis' (3 cases), and influenza A(H3N2) (2 cases).
- 12 deaths: influenza A(H3N2) (9 deaths) and *L. monocytogenes* (3 deaths).

Pathogens

- 39 norovirus outbreaks (957 cases).
- 24 'gastroenteritis' outbreaks (228 cases).
- 17 *Bordetella pertussis* outbreaks (56 cases).
- 12 *Cryptosporidium* outbreaks (38 cases).
- 13 *Giardia* outbreaks (50 cases).
- 6 influenza A(H3N2) outbreaks (441 cases).
- 6 *Campylobacter* outbreaks (23 cases).
- 5 *Salmonella* outbreaks (15 cases).
- 4 rotavirus outbreaks (19 cases).
- 2 lead poisoning outbreaks (4 cases).
- 2 *Yersinia* outbreaks (5 cases).
- 1 *Clostridium difficile* outbreak (8 cases).
- 1 influenza A outbreak (45 cases).
- 1 influenza B outbreak (47 cases).
- 1 influenza virus outbreak (35 cases).
- 1 *L. monocytogenes* outbreak (6 cases).
- 1 sapovirus outbreak (4 cases).
- 1 *Shigella* outbreak (2 cases).
- 1 *Staphylococcus aureus* outbreak (2 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.

- 120 person-to-person, from (non-sexual) contact with an infected person (including droplets): 38 norovirus (953 cases), 17 *B. pertussis* (56 cases), 16 'gastroenteritis' (179 cases), 13 *Giardia* (50 cases), 11 *Cryptosporidium* (36 cases), 6 influenza A(H3N2) (441 cases), 4 *Campylobacter* (13 cases), 4 rotavirus (19 cases), 4 *Salmonella* (13 cases), 2 *Yersinia* (5 cases), 1 *C. difficile* (8 cases), 1 influenza A (45 cases), 1 influenza B (47 cases), 1 influenza virus (35 cases), and 1 sapovirus (4 cases).
- 19 environmental, from contact with an environmental source (eg, swimming): 6 norovirus (143 cases), 5 *Giardia* (25 cases), 3 *Cryptosporidium* (13 cases), 2 lead poisoning (4 cases), 1 *Campylobacter* (6 cases), 1 *Salmonella* (7 cases), and 1 rotavirus (5 cases).
- 19 foodborne, from consumption of contaminated food or drink (excluding water): 6 norovirus (168 cases), 5 'gastroenteritis' (33 cases), 3 *Campylobacter* (12 cases), 1 *Cryptosporidium* (2 cases), 1 *Giardia* (3 cases), 1 *L. monocytogenes* (6 cases), 1 *Salmonella* (2 cases), and 1 *Staphylococcus aureus* (3 cases).
- 17 zoonotic, from contact with infected animal: 7 *Cryptosporidium* (21 cases), 5 *Campylobacter* (17 cases), 3 *Giardia* (14 cases), 1 norovirus (4 cases), 1 *Salmonella* (7 cases), and 1 *Yersinia* (3 cases).
- 13 waterborne, from consumption of contaminated drinking-water: 6 *Cryptosporidium* (20 cases), 4 *Giardia* (16 cases), 2 *Salmonella* (9 cases), and 1 *Campylobacter* (6 cases).
- 4 'other' modes: 2 norovirus (42 cases), 1 lead poisoning (2 cases), and 1 *Salmonella* (2 cases).
- 8 mode of transmission unknown: 5 'gastroenteritis' (21 cases), 1 *Cryptosporidium* (2 cases), 1 *Salmonella* (2 cases), and 1 *Shigella* (2 cases).

Circumstances of Exposure

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

- 49 home: 16 *B. pertussis* (52 cases), 10 *Cryptosporidium* (28 cases), 10 *Giardia* (39 cases), 5 *Campylobacter* (17 cases), 4 *Salmonella* (13 cases), 2 norovirus (8 cases), 1 rotavirus (3 cases), and 1 *Yersinia* (2 cases).
- 26 long term care facility: 16 norovirus (500 cases), 4 'gastroenteritis' (58 cases), 4 influenza A(H3N2) (178 cases), 1 influenza virus (35 cases), and 1 sapovirus (4 cases).
- 15 childcare centre: 7 'gastroenteritis' (95 cases), 5 norovirus (104 cases), 2 rotavirus (11 cases), and 1 *Giardia* (3 cases).
- 8 restaurant/café/bakery: 4 norovirus (13 cases), 2 'gastroenteritis' (6 cases), 1 *Campylobacter* (6 cases), and 1 *S. aureus* (3 cases).
- 17 hospital (acute care): 11 norovirus (303 cases), 3 'gastroenteritis' (33 cases), 1 *C. difficile* (8 cases), 1 *L. monocytogenes* (6 cases), and 1 rotavirus (5 cases).
- 5 school: 2 influenza A(H3N2) (263 cases), 1 *B. pertussis* (5 cases), 1 influenza B (47 cases), and 1 *Yersinia* (2 cases).
- 4 farm: 3 *Cryptosporidium* (8 cases) and 1 *Yersinia* (3 cases).
- 3 other institution: 2 norovirus (180 cases) and 1 *B. pertussis* (8 cases).
- 3 takeaways: 2 'gastroenteritis' (5 cases) and 1 norovirus (2 cases).
- 1 other food outlet: *L. monocytogenes* (6 cases).
- 1 hostel/boarding house: influenza A (45 cases).
- 1 workplace: lead poisoning (2 cases).
- 6 'other setting': 3 *Giardia* (15 cases), 1 *Cryptosporidium* (6 cases), 1 lead poisoning (2 cases), and 1 *Salmonella* (2 cases).
- 10 outbreaks had 2 exposure settings recorded.
- 9 outbreaks had no exposure settings recorded.

Common 'settings' where the preparations occurred in foodborne outbreaks are identified below.

- 7 restaurant/café/bakery: 4 norovirus (13 cases), 1 *Campylobacter* (6 cases), 1 'gastroenteritis' (2 cases), and 1 *S. aureus* (3 cases).
- 3 takeaways: 2 'gastroenteritis' (5 cases) and 1 norovirus (2 cases).
- 1 other food outlet: *L. monocytogenes* (6 cases).
- 8 outbreaks had no preparation settings recorded.
- 1 outbreak had 2 preparation settings recorded.

5. Outbreak Case Reports

An outbreak of waterborne gastroenteritis in Darfield, Canterbury, July to August 2012

Background

Darfield is a rural town 35 kilometres west of Christchurch in the Selwyn District. It has a reticulated drinking-water supply servicing a population of approximately 3280 people. Historically, the town sourced its drinking-water from the Waimakariri River via shallow infiltration galleries, 100 metres from the river. Since November 2011, the main source of drinking-water has been a deep well near State Highway 73, supplemented by the river source, when necessary. Following a pump failure on 18 June 2012, the Waimakariri River was used as the drinking-water source. However, the chlorine analyser was uncalibrated and it is questionable how much chlorine was entering the water supply. In mid-August 2012, heavy rainfall caused surface flooding and turbidity in the water supply. Weekly microbial testing revealed the presence of faecal coliforms and *Escherichia coli* in the drinking-water on 16 August. Despite a boil water notice

being issued on 17 August and manual chlorination of the reservoir, Darfield Medical Centre notified Community and Public Health (CPH) of 13 cases of gastroenteritis on 22 August. As a result, an outbreak investigation was initiated.

Investigation

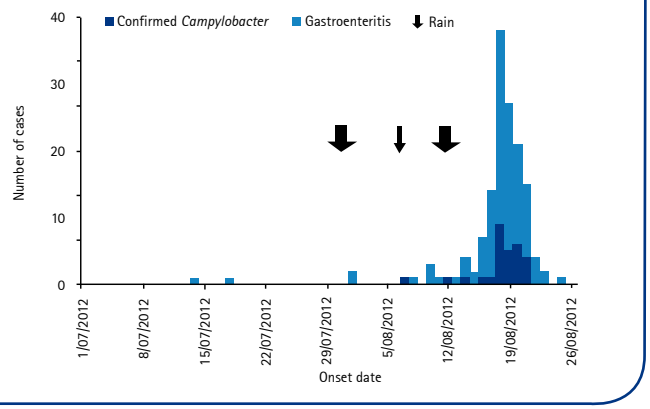
Sample questionnaires were completed via telephone interviews and others were self-completed following their distribution at a public meeting, through the council offices, the medical centre and a local community website. Cases were requested to provide stool samples for testing for notifiable enteric diseases, as well as norovirus. A site visit was carried out and rainfall levels were requested from Environment Canterbury.

Findings

One hundred and eighteen cases met the case definition for probable gastroenteritis and 29 cases were positive for *Campylobacter* spp., mostly *Campylobacter coli* (Figure 1). All *C. coli* cases had the same genotype that had been previously isolated in New Zealand from sheep, cattle and humans. One case was positive for *C. coli* and *Giardia*. No other pathogens were isolated.

The age range of cases was from 11 months to 89 years (mean 30 years). The majority of cases developed symptoms from 15 to 25 August following heavy rain (164 mm) that fell between late July and mid-August.

Figure 1. Onset dates of gastroenteritis and laboratory confirmed campylobacteriosis cases from the Darfield waterborne outbreak, July to August 2012



Most of the cases (93%) lived in Darfield, and all consumed unboiled water from the Darfield water supply. No other risk exposures, including food consumption, recreational water contact, human contact or animal contact, showed any commonality.

The infiltration gallery in use at the time of the *E. coli* transgression was located in a small recess in an unsecure privately owned paddock, where no animals are thought to have grazed for a couple of months. There is uncertainty about whether the paddock was flooded during the heavy rains. The gallery intake was unlikely to have provided significant levels of filtration given the typically high permeability gravels that occur in the alluvial deposits in the area.

Discussion

Given that *E. coli* and faecal coliforms were found in the water samples tested on 16 August and the incubation time for *Campylobacter* is between 1 and 10 days, the major drinking-water contamination event probably occurred between 13 and 14 August. Heavy rainfall is likely to have contaminated the drinking-water supply either due to the runoff of animal effluent from paddocks flowing into the Waimakariri River and from there into the gallery, or effluent that may have contaminated the gallery directly by seepage through the adjacent ground. In either case, the failure to implement a strategy to manage turbidity, a malfunctioning treatment plant and the lack of treatment for protozoa led to water containing pathogens being distributed through the town's water supply.

Remediation

By 22 August, the deep bore pump had been reinstalled and the water from the bore had been repeatedly tested and found to be free of microorganisms. Since the outbreak, the council has engaged an external consultant to review its water supply management and CPH staff are working with the council to ensure that further waterborne outbreaks do not occur. CPH is keen that the council fully adopts a multi-barrier approach to their drinking-water supply consistent with the Health (Drinking Water) Amendment Act 2007.

Reported by Nadia Bartholomew, Public Health Registrar, Peter Mitchell, Medical Officer of Health, Reynold Ball, Trainee Health Protection Officer, Judy Williamson, Health Protection Officer/Drinking Water Assessor, Community and Public Health and Brent Gilpin, Water Programme, ESR.

Norovirus outbreak associated with imported oysters

Background

Toi Te Ora Public Health Service was notified on 26 June 2012 that a number of people had become unwell with symptoms of gastroenteritis after attending a banquet in Tauranga. The notification was received from the event's organiser.

Between 600 and 700 people attended the banquet on 21 June 2012. A catering company provided a hot buffet and the banquet organisers provided a selection of raw and cooked seafood.

Methods

The objectives of this outbreak investigation were to:

- identify the source of the outbreak
- prevent any further cases
- ensure the communications and information surrounding this outbreak were accurate and appropriate.

The environmental investigation included inspections of the premises used to cater for the banquet and of the kitchen where the banquet was held. Laboratory investigations included obtaining faecal specimens from those people who met the case definition and obtaining a surrogate food sample for an implicated product of the same batch number. No food samples were available from the banquet.

An epidemiological investigation was undertaken. The case definition was any person who attended the banquet and subsequently developed diarrhoea and/or vomiting before 24 June 2012. It was not possible to conduct a cohort study because there was no attendance list for the banquet. Cases were identified through the event organiser's networks and by direct enquiries to Toi Te Ora Public Health Service.

A control group was identified in the same way. In addition, a newspaper article published on 28 June 2012 referring to an increase in gastroenteritis cases in the community, resulted in a number of enquiries some of which were related to the event and classified as either cases or controls. Statistical analysis included the calculation of the median incubation time, the median duration of illness and risk ratios associated with each food type consumed at the banquet.

Results

The epidemiological investigation included 28 identified cases and 37 controls. The median incubation period was 48 hours. The median duration of illness was approximately 60 hours. Analysis of questionnaire responses identified an elevated risk associated with the consumption of oysters.

Faecal specimens were obtained from a food handler who had experienced a recent illness, and from five cases. The food handler's results were negative for the common bacterial pathogens and negative for norovirus. The faecal specimens from all five cases were negative for the common bacterial pathogens but positive for norovirus. Three specimens were positive for norovirus genogroups I and II, one specimen was positive for norovirus genogroup I and one specimen was positive for norovirus genogroup II. The surrogate sample of oysters was positive for norovirus genogroup II.

The environmental investigation did not identify any food safety concerns associated with the kitchen at the location where the banquet was held or with the caterer's premises. However, the oysters had been served raw when the oyster packaging includes a statement that the product requires cooking. No other food handling practice issues were identified.

Discussion

The epidemiological study implicated rock oysters in this norovirus outbreak. The laboratory investigations identified norovirus genotype II in four out of five case specimens and in the surrogate oyster sample. Therefore, the likely source of this outbreak was consumption of contaminated frozen imported oysters served raw. Common cooking and consumption practices indicate that oysters are typically consumed raw or not cooked sufficiently to reach the required 90°C for 90 seconds to destroy norovirus. Therefore, in addition to the routine advice given to cases on preventing the spread of illness and the advice given to food handlers regarding safe seafood preparation, control measures included a consumer product recall of all frozen imported oysters in New Zealand of the implicated brand by the Ministry for Primary Industries. A number of norovirus outbreaks in New Zealand have been linked to the consumption of contaminated oysters, including the largest common source outbreak of norovirus recorded in New Zealand that affected several hundred people.[1]

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

Reported by Grant King, Health Protection Officer, Neil de Wet and Jim Miller, Medical Officers of Health, Toi Te Ora Public Health Service, Tauranga.

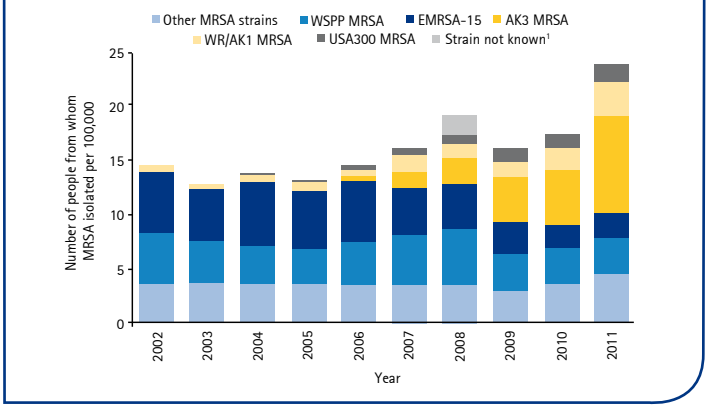
6. Laboratory Surveillance

Annual survey of MRSA, 2011

Each year ESR conducts a one-month survey of methicillin-resistant *Staphylococcus aureus* (MRSA) to provide information on the epidemiology of MRSA in New Zealand. For the 2011 survey, hospital and community microbiology laboratories referred all MRSA isolated during August, or an alternative 31-day period, to ESR.

MRSA isolates were referred from 1042 people (1020 patients and 22 staff), which equates to a national point-prevalence rate of 23.7 people with MRSA per 100,000 population. The prevalence of MRSA in New Zealand has increased significantly (p=0.0047) over the last 10 years, cumulating in a massive 37.0% increase between 2010 and 2011 – the largest single-year rise (Figure 2).

Figure 2. MRSA point-prevalence rates, 2002 to 2011



[1] The category 'Strain not known' in 2008 represents people identified with MRSA during the survey period but from whom no isolate was referred for strain identification.

There were significant geographical differences in the point-prevalence rates of MRSA in 2011, with rates above the national rate of 23.7 MRSA per 100,000 population in the Tairawhiti (64.4), Counties Manukau (57.4), Hawke's Bay (50.1), Northland (32.2), Bay of Plenty (25.0), Auckland (24.7) and Waikato (23.9) District Health Boards (DHBs). Differences in screening policies and protocols for the collection of diagnostic specimens may contribute to the variation in MRSA prevalence among DHBs.

MRSA was reported as causing infection in 78.2% of the 895 patients for whom this information was provided. Among the 1020 patients with MRSA, 43.7% were categorised as hospital patients and 56.3% as community patients. Patients were classified as hospital patients if they were in a healthcare facility (including a residential-care facility) when MRSA was isolated, or if they had been in a healthcare facility in the previous three months.

MRSA strains were identified using *spa* typing and, where necessary, pulsed-field gel electrophoresis. Six MRSA strains predominated in 2011 and represented 86.2% of all MRSA isolations – AK3 MRSA (38.0% of isolates), WSPP MRSA (14.0%), WR/AK1 MRSA (12.1%), EMRSA-15 (9.6%), USA300 MRSA (7.3%) and Queensland clone MRSA (5.4%). For a description of these MRSA strains, including their typical antibiotic susceptibility patterns (see http://www.esr.cri.nz/competencies/Health/Pages/MRSAstrains.aspx. The most notable change in MRSA strains in recent years has been the emergence in 2005 and subsequent spread of the AK3 MRSA. This strain appears to belong to the globally widespread 'Paediatric' MRSA clone. In 2011, AK3 MRSA was the most prevalent strain in most DHBs in the upper and central North Island, and was particularly dominant in Tairawhiti DHB.

Five of the six most common strains – AK3 MRSA, WSPP MRSA, WR/AK1 MRSA, USA300 MRSA and Queensland clone MRSA – are usually considered community-associated MRSA (CA-MRSA) strains. The EMRSA-15 strain was the only healthcare-associated MRSA (HA-MRSA) strain represented among the six most common strains in 2011. The current predominance of CA-MRSA strains indicates that once again, as in the 1990s when New Zealand was one of the first countries to experience CA-MRSA, MRSA may be more commonly transmitted and acquired in the community in New Zealand than in our healthcare facilities.

A more detailed report is available at http://www.surv.esr.cri.nz/antimicrobial/mrsa_annual.php

Reported by Helen Heffernan, Health Programme, ESR.

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

New Zealand Public Health Surveillance Report is produced quarterly by ESR for the Ministry of Health and may be downloaded in PDF format from www.surv.esr.cri.nz

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

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