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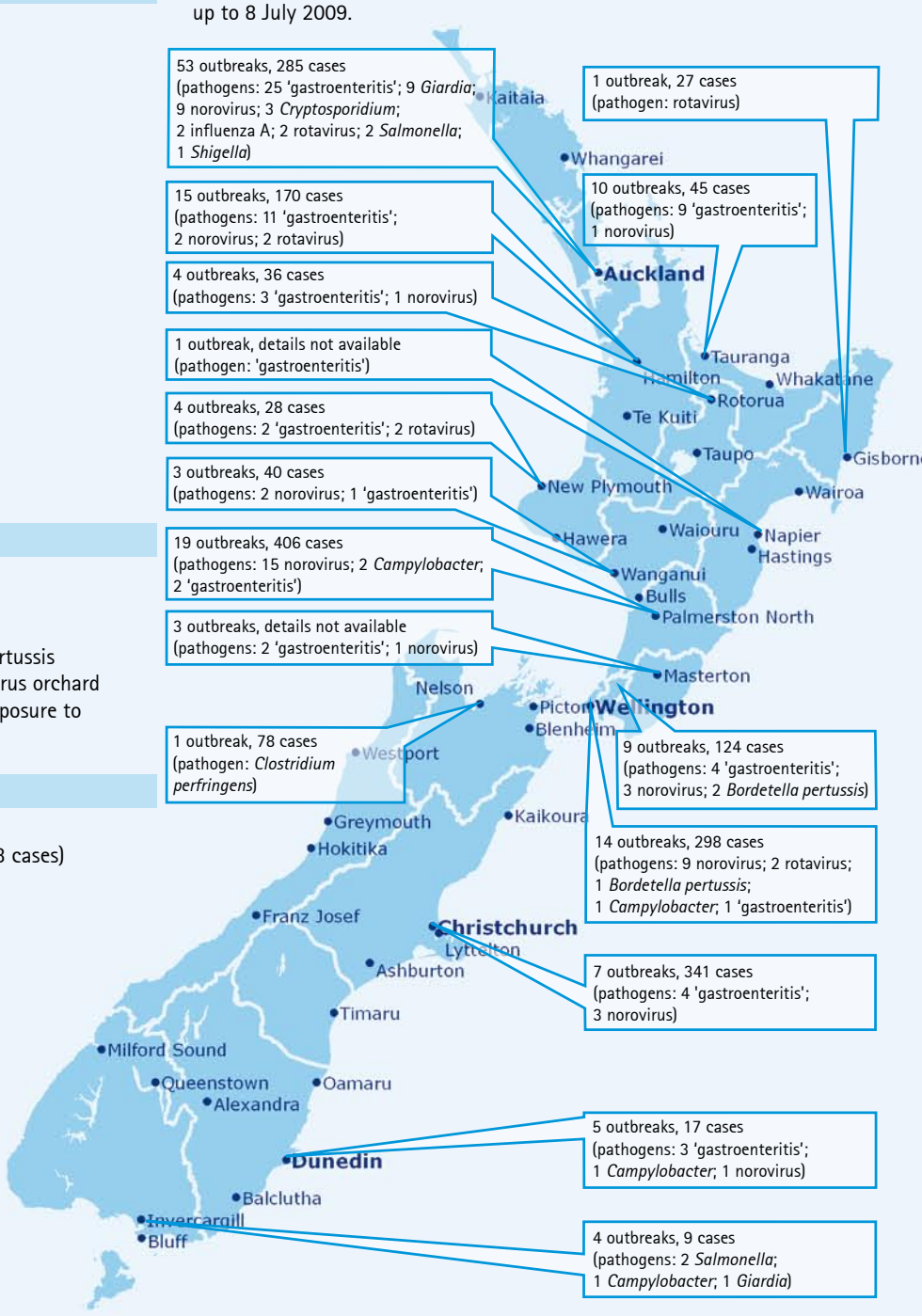
New Zealand Public Health Surveillance Report

September 2009: Covering April – June 2009

Contents & Highlights

This Quarter's Outbreaks

Notification and outbreak data in this issue are drawn from the April – June quarter of 2009. 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 8 July 2009.



The latest reports from STI Surveillance, Antimicrobial Resistance, Virology and Enteric Reference Laboratory are available at www.surv.esr.cri.nz

1. Editorial

Vigilance for measles and pertussis during the novel influenza A (H1N1) pandemic

The syndrome of influenza-like illness (ILI) is most prominent during the influenza season and is defined as a history of fever, chills and sweating or a clinically documented fever ≥38°C plus cough and/or sore throat. At present, there is an intense focus on ILI in the community due to the current novel influenza A (H1N1) pandemic. However, other notifiable diseases can clinically resemble ILI, including pertussis and measles, which are of current public health concern. Therefore, front-line medical practitioners should be on the alert.

Measles is so highly infectious that one case can be considered an outbreak. Given that the prodromal phase of measles can be non-specific (fever, coryza, cough and conjunctivitis) and the infectious period can begin 1 to 2 days prior to the prodrome (3 to 5 days prior to the onset of rash), a case of measles initially missed can result in major contact tracing efforts by public health to control the outbreak. Recent large outbreaks of measles have been seen both nationally and overseas including Australia, the United Kingdom, as well as parts of central Europe, Africa and Asia. The current outbreak in Christchurch has included over 100 cases over June and July this year (in comparison, there was a total of 12 measles cases for the entire country in 2008). The less than optimal Measles Mumps Rubella (MMR) immunisation coverage nationally (86% for first dose of MMR by 24 months)[1] and the infectivity of measles is likely to result in increasing cases arising from national or overseas outbreaks.

Like measles, pertussis is highly infectious, and cases require a public health response in an effort to contain the transmission of infection, particularly in high risk occupational and patient groups. While the paroxysmal stage of pertussis can clinically lead to an appropriate diagnosis, patients with pertussis are actually most infectious during the non-specific initial catarrhal stage, which consists of rhinorrhoea and cough. This year, pertussis figures have been closely monitored as numbers of cases have markedly increased throughout New Zealand. For example, in the Auckland region there were 26 cases of pertussis during June 2009, compared to 5 cases for the same month last year. This is of particular concern as epidemics of pertussis tend to occur every 3 to 4 years, and the last epidemic of pertussis in New Zealand occurred during 2004 and 2005.

Immunisation is the most effective method of prevention against pertussis and measles infection. Timely vaccination will prevent severe infection and infant death associated with pertussis, while ensuring that children receive both MMR doses enables better immunity, as only 90% to 95% of vaccine recipients seroconvert after one dose of MMR[2].

Certain clinical features associated with measles and pertussis, as well as other notifiable diseases such as meningococcal disease and group A Streptococcus tonsillopharyngitis (leading to rheumatic fever) may resemble ILI. Therefore, it is important that these diseases be considered as part of the differential diagnosis, alongside novel influenza A (H1N1), for patients presenting with an ILI syndrome to ensure appropriate investigation, and subsequent diagnosis, treatment and public health management.

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

Dr Shanika Perera, Public Health Medicine Specialist, Auckland Regional Public Health Service

2. Notifiable Disease Surveillance

The following is a summary of disease notifications for the April – June quarter of 2009 and cumulative notifications and rates calculated for a 12-month period (July 2008 – June 2009). 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, R. G. and D. G. Altman. Proportions and their differences. In: *Statistics with Confidence*. 2000. BMJ Books. Bristol]. Data contained within this report are based on information recorded in EpiSurv by public health service staff up to 8 July 2009. As this information may be updated over time, these data should be regarded as provisional.

National surveillance data tables are available online (www.surv.esr.cri.nz).

VACCINE PREVENTABLE DISEASES

Invasive Pneumococcal Disease

- *Notifications:* 165 notifications in the quarter
- *Comments:* cases were aged between 6 days and 98 years, with 25 cases under the age of 2 years
- *Note:* Invasive pneumococcal disease became notifiable on 17 October 2008 therefore comparisons between quarters and 12-month rates are not valid

Measles

- *Notifications:* 17 notifications in the quarter (2008, 8); 48 notifications over the last 12 months (2008, 21) giving a rate of 1.1 cases per 100,000 population (2008, 0.5); a statistically significant increase
- *Comments:* 5 cases were laboratory confirmed

Mumps

- *Notifications:* 27 notifications in the quarter (2008, 21); 58 notifications over the last 12 months (2008, 95) giving a rate of 1.4 cases per 100,000 population (2008, 2.2); a statistically significant decrease
- *Comments:* there has been a statistically significant quarterly increase from the previous quarter (5 cases); 6 cases were laboratory confirmed

Pertussis

- *Notifications*: 323 notifications in the quarter (2008, 70); 939 notifications over the last 12 months (2008, 292) giving a rate of 22.0 cases per 100,000 population (2008, 6.9); a statistically significant increase
- *Comments:* there has been a statistically significant quarterly increase from the same quarter last year (70 cases)

Rubella

- *Notifications:* 6 notifications in the quarter (2008, 5); 10 notifications over the last 12 months (2008, 13) giving a rate of 0.2 cases per 100,000 population (2008, 0.3); not a statistically significant decrease
- *Comments:* there has been a statistically significant quarterly increase from the previous quarter (0 cases); 1 case was laboratory confirmed

INFECTIOUS RESPIRATORY DISEASES

Acute Rheumatic Fever

- *Notifications:* 50 notifications in the quarter (2008, 43); 163 notifications over the last 12 months (2008, 177) giving a rate of 3.8 cases per 100,000 population (2008, 4.2), not a statistically significant decrease
- *Comments:* there has been a statistically significant quarterly increase from the previous quarter (29 cases). Cases were distributed by age as follows: 1 (1-4 years), 20 (5-9 years), 21 (10-14 years), 2 (15-19 years), and 6 (20 years and over); 45 cases were initial attacks of acute rheumatic fever and 5 cases were recurrent attacks

Non Seasonal Influenza A (H1N1)

- *Notifications:* 1,227 notifications in the quarter
- *Comments:* cases were distributed by age as follows: 34 (< 1 years), 95 (1-4 years), 224 (5-14 years), 324 (15-24 years), 327 (25-44 years), 160 (45-64 years), 17 (65 years and over), and for 46 cases age was unknown; 775 cases were laboratory confirmed
- *Note:* non seasonal influenza became notifiable on 29 April 2009 therefore comparisons between quarters and 12-month rates are not valid

ENTERIC INFECTIONS

Campylobacteriosis

- *Notifications:* 1,246 notifications in the quarter (2008, 1,052); 7,023 notifications over the last 12 months (2008, 8,526) giving a rate of 164.5 cases per 100,000 population (2008, 201.6); a statistically significant decrease
- *Comments:* there has been a statistically significant quarterly decrease from the previous quarter (1,896 cases) and a statistically significant quarterly increase from the same quarter last year (1,052 cases)

Gastroenteritis

- *Notifications:* 150 notifications in the quarter (2008, 116); 686 notifications over the last 12 months (2008, 613) giving a rate of 16.1 cases per 100,000 population (2008, 14.5); a statistically significant increase
- *Comments:* there has been a statistically significant quarterly increase from the same quarter last year (116 cases). Note that this is not a notifiable disease per se except in persons with a suspected common source or with a high risk occupation, and the term 'gastroenteritis' provides a catch-all category for enteric diseases that are not notifiable and for syndromic reports that come through public health units, including direct reports from the public where the causative pathogen may never be known

Salmonellosis

- *Notifications:* 231 notifications in the quarter (2008, 286); 1,239 notifications over the last 12 months (2008, 1,362) giving a rate of 29.0 cases per 100,000 population (2008, 32.2); a statistically significant decrease
- *Comments:* there has been a statistically significant quarterly decrease from the previous quarter (440 cases) and from the same quarter last year (286 cases)

Typhoid Fever

- Notifications: 8 notifications in the quarter (2008, 5); 43 notifications over the last 12 months (2008, 29) giving a rate of 1.0 cases per 100,000 population (2008, 0.7); not a statistically significant increase
- *Comments:* there has been a statistically significant quarterly decrease from the previous quarter (20 cases)

VTEC Infections

- *Notifications:* 23 notifications in the quarter (2008, 33); 140 notifications over the last 12 months (2008, 129) giving a rate of 3.3 cases per 100,000 population (2008, 3.1); not a statistically significant increase
- *Comments:* there has been a statistically significant quarterly decrease from the previous quarter (73 cases)

ENVIRONMENTAL EXPOSURES & INFECTIONS

Cryptosporidiosis

- *Notifications:* 164 notifications in the quarter (2008, 93); 886 notifications over the last 12 months (2008, 672) giving a rate of 20.8 cases per 100,000 population (2008, 15.9); a statistically significant increase
- *Comments:* there has been a statistically significant quarterly increase from the same quarter last year (93 cases)

Giardiasis

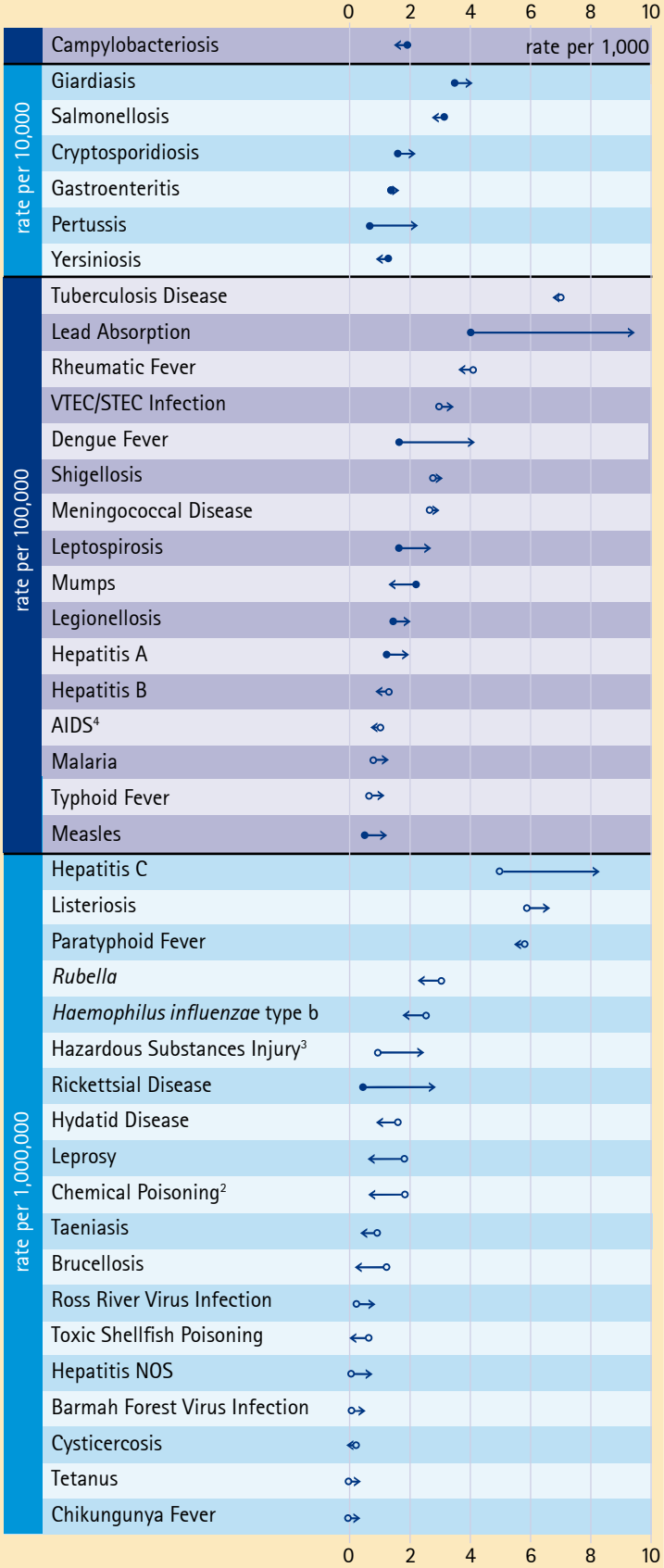
- *Notifications:* 413 notifications in the quarter (2008, 430); 1,698 notifications over the last 12 months (2008, 1,482) giving a rate of 39.8 cases per 100,000 population (2008, 35.0); a statistically significant increase
- *Comments:* there has been a statistically significant quarterly decrease from the previous quarter (472 cases)

Hepatitis A

- *Notifications:* 12 notifications in the quarter (2008, 15); 78 notifications over the last 12 months (2008, 50) giving a rate of 1.8 cases per 100,000 population (2008, 1.2); a statistically significant increase
- *Comments:* cases were aged between 7 and 68 years, with 1 case under the age of 16 years

National Surveillance Data

12-Monthly Notification Rate Changes[1]



Notifications per 1,000 or 10,000 or 100,000 or 1,000,000 persons

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 July 2008 – June 2009 and compared to previous 12-month rates

[2] From the environment

[3] Hazardous Substance Injury became notifiable in EpiSurv as of 19 September 2007

[4] 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

Lead Absorption

- *Notifications:* 122 notifications in the quarter (2008, 69); 402 notifications over the last 12 months (2008, 170) giving a rate of 9.4 cases per 100,000 population (2008, 4.0); a statistically significant increase
- *Comments:* there has been a statistically significant quarterly increase from the previous quarter (91 cases) and from the same quarter last year (69 cases). Cases were distributed by age as follows: 3 (1-4 years), 1 (5-14 years), 8 (15-24 years), 56 (25-44 years), 47 (45-64 years), and 7 (65 years and over); there were 103 male cases, 12 female cases, and 7 of unknown sex; 68 cases recorded an occupation that involved exposure to lead: painter and/or decorator (7), metal tradesperson (6), plumber (2), radiator fitter (1), and 52 cases were not specified

Legionellosis

- *Notifications:* 16 notifications in the quarter (2008, 17); 86 notifications over the last 12 months (2008, 60) giving a rate of 2.0 cases per 100,000 population (2008, 1.4); a statistically significant increase
- *Comments:* there has been a statistically significant quarterly decrease from the previous quarter (30 cases)

Leptospirosis

- *Notifications:* 22 notifications in the quarter (2008, 27); 112 notifications over the last 12 months (2008, 69) giving a rate of 2.6 cases per 100,000 population (2008, 1.6); a statistically significant increase
- *Comments:* there were 19 male cases, and 3 female cases; 11 farmers, 3 meat process workers, an earth rig digger, a cleaner, a fitter, a market gardener, a retiree, and an unemployed person (each 1 case), and for 2 cases occupation was not stated

Yersiniosis

- *Notifications:* 80 notifications in the quarter (2008, 110); 458 notifications over the last 12 months (2008, 553) giving a rate of 10.7 cases per 100,000 population (2008, 13.1), a statistically significant decrease
- *Comments:* there has been a statistically significant quarterly decrease from the previous quarter (160 cases) and from the same quarter last year (110 cases)

NEW, EXOTIC & IMPORTED INFECTIONS

Dengue Fever

- *Notifications:* 46 notifications in the quarter (2008, 19); 178 notifications over the last 12 months (2008, 70) giving a rate of 4.2 cases per 100,000 population (2008, 1.7); a statistically significant increase
- *Comments:* there has been a statistically significant quarterly decrease from the previous quarter (69 cases) and a statistically significant quarterly increase from the same quarter last year (19 cases); 41 cases were laboratory confirmed; 40 cases were overseas during the incubation period and the travel history of 6 cases was unknown. Places visited were Cook Islands (32), Fiji (3), Vietnam (2), Papua New Guinea (1), Philippines (1), and Samoa (1)

Malaria

- *Notifications:* 7 notifications in the quarter (2008, 11); 46 notifications over the last 12 months (2008, 35) giving a rate of 1.1 cases per 100,000 population (2008, 0.8); not a statistically significant increase
- *Comments:* there has been a statistically significant quarterly decrease from the previous quarter (18); all cases had malaria parasites in a blood film; 4 cases were overseas during the incubation period and 3 cases had prior overseas travel to malaria endemic areas. Places visited were India (4), Papua New Guinea (2), and Malaysia (1)

Rickettsial Disease

- *Notifications:* 2 notifications in the quarter (2008, 1); 12 notifications over the last 12 months (2008, 2) giving a rate of 0.3 cases per 100,000 population (2008, 0.0); a statistically significant increase
- *Comments:* 1 case had positive serology for the typhus fever group and 1 case was under investigation

3. Other Surveillance Reports

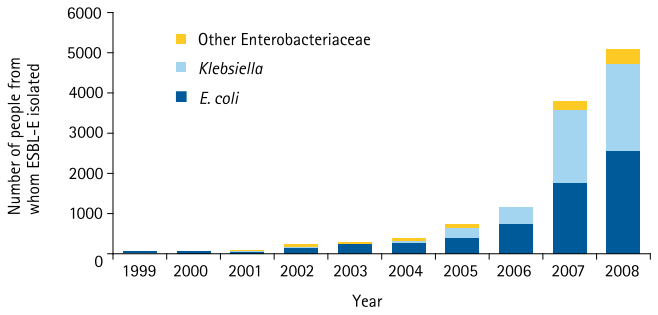
Extended-spectrum β-lactamase (ESBL)-producing Enterobacteriaceae, 2008

Extended-spectrum β-lactamases (ESBLs) confer resistance to third- and fourth-generation cephalosporins and monobactams, in addition to the earlier generation cephalosporins. ESBLs are most common in *Klebsiella pneumoniae* and *Escherichia coli*, but do occur in other Enterobacteriaceae.

ESR conducts annual one-month surveys of ESBL-producing Enterobacteriaceae (ESBL-E) to provide information on the incidence and epidemiology of ESBL-E in New Zealand. Hospital and community microbiology laboratories were asked to refer all ESBL-E they isolated during August 2008 to ESR. During the month, ESBL-E were referred from 301 people. In addition, one hospital laboratory, which was unable to refer isolates for the survey, reported that they isolated ESBL-E from 124 people during the month. These 124 ESBL-E isolations have been included in the data presented in Figure 1, in the calculations of the national and district health board (DHB) ESBL-E incidence rates, and in the analysis of the species distribution among ESBL-E. However, they could not be included in the analyses of the proportions of ESBL-E that were from infected or colonised sites, or from hospital or community patients, as this information was not available.

The annualised incidence of ESBL-E in 2008 was estimated at 119.5 people with ESBL-E per 100,000 population – a 32.8% increase on the 2007 rate of 90.0. Information on whether the ESBL-E was causing infection or colonising was received for 267 of the isolates, of which 131 (49%) were categorised as from infections.

Figure 1. ESBL-producing Enterobacteriaceae, 1999-2008



Data for 1998 to 2005 are based on continuous surveillance of all ESBL-E isolations. Data for 2006 to 2008 are annualised and based on 4-week or 1-month surveys in these years. The 2006 survey only included urinary *E. coli* and *Klebsiella*, therefore the data for 2006 is not directly comparable with that for other years.

The total 425 ESBL-E isolates referred or reported in 2008 comprised 214 (50%) *E. coli*, 180 (42%) *Klebsiella* species, 19 (5%) *Enterobacter* species, 7 (2%) *Citrobacter* species, 3 (0.7%) *Morganella morganii*, 1 (0.2%) *Raoultella terrigena* and 1 (0.2%) *Serratia fonticola*.

The patients from whom ESBL-E were isolated were categorised as hospital patients if they were in a healthcare facility (including emergency department, outpatient clinic or residential-care facility) when ESBL-E was isolated or had been in a healthcare facility in the previous 3 months. All other patients were categorised as community patients. The majority of the ESBL-E (67%), and notably 86% of ESBL-producing *Klebsiella*, were isolated from patients categorised as hospital patients. These proportions of hospital patients are likely to be underestimates due to the ESBL-E reported by the hospital laboratory not being included in this analysis.

The highest annualised incidence rates, and rates above the national rate of 119.5 per 100,000, occurred in the Counties Manukau (380.2 per 100 000), Hawke's Bay (289.6), Waitemata (221.2) and Auckland (169.8) DHBs.

A more detailed report is available at www.surv.esr.cri.nz/PDF_surveillance/Antimicrobial/ESBL/ESBL_2008.pdf

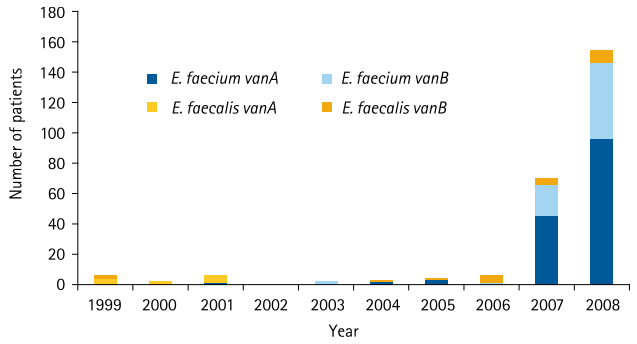
Reported by Helen Heffernan, Communicable Disease Programme, ESR

Vancomycin-resistant Enterococci (VRE), 2008

The national surveillance of vancomycin-resistant *Enterococcus faecium* and *E. faecalis* is based on the referral of isolates to ESR. Microbiology laboratories are requested to refer all VRE isolates to ESR for confirmation, identification of the *van* gene, and molecular typing to identify the strain.

In 2008, VRE were referred from 153 patients, over twice the number referred in 2007 (Figure 2). Prior to 2007, VRE were referred from no more than six patients in any one year. The increases in VRE isolates since 2007 were due to an outbreak of vancomycin-resistant *E. faecium* in Auckland City Hospital in 2007, which continued into 2008, along with additional outbreaks in 2008 in other Auckland hospitals and Waikato Hospital. In 2008, 87% percent of patients with VRE were in Auckland hospitals (57% Auckland City Hospital, 17% Middlemore Hospital and 12% North Shore Hospital) and 10% were in Waikato Hospital. Most (90%) of the VRE were isolated from screening swabs taken as part of extensive outbreak control measures. The outbreaks in Auckland hospitals were contained by the end of 2008 and the outbreak in Waikato Hospital was confined to the February-July 2008 period.

Figure 2. Species and van genotype of VRE isolated in New Zealand, 1999-2008



Among both the vanA and vanB *E. faecium* isolated in 2007 and 2008, several outbreak strains were identified by pulsed-field gel electrophoresis typing. Several of the strains were common to patients in Auckland City, North Shore and Middlemore Hospitals, and these strains were distinct from the VRE isolated from Waikato Hospital patients.

A more detailed report is available at www.surv.esr.cri.nz/PDF_surveillance/Antimicrobial/VRE/VRE_2008.pdf

Reported by Helen Heffernan, Communicable Disease Programme, ESR

Public health response to a health care worker with pertussis

Auckland Regional Public Health Service (ARPHS) was notified of a probable pertussis case on 5 January 2009. The case was a 49 year old female who had been symptomatic while working as a midwife managing antenatal and postnatal patients. The diagnosis was based on a positive pertussis serology result and the fact that she had been in contact with a confirmed case of pertussis.

The symptoms of the index case started on 1 December 2008 and she remained symptomatic right up to the day of notification. Although she had been coughing for more than three weeks by the time of notification, it was recommended that she take an appropriate course of antibiotics given her work with neonatal patients, and stay off work until she had taken at least five days of antibiotics. One non-vulnerable household contact who had been symptomatic was identified and advised to see his general practitioner (GP).

The consensus view from the disease investigation team (which included input from a paediatrician) was that while the overall risk of the patients exposed to the index case was low, there was still risk. Information and advice was offered to the 55 identified patients who had contact with the index case during the infectious period. Where possible, this was provided by phone using a pre-written script to ensure messages were consistent from all staff and the details of the index case were kept confidential. Written information was also sent to all contacts and their GPs.

At least three attempts were made to phone each contact over a two day period after which 67% (37/55) of all contacts had been reached. Nine were found to be coughing, and advice was given to see their GPs. All GPs of the symptomatic contacts were also phoned to ensure they were aware that pertussis was one of the differential diagnoses. Of the nine contacts who had been coughing, eight subsequently saw their GP. The remaining contact reported she had already recently seen her GP at the time of the phone call. Two contacts had pertussis related investigations undertaken, the results of which were negative. The other six contacts did not report any respiratory symptoms during the visit to their GP.

All pertussis notifications from 5 January 2009 to 2 February 2009 were reviewed. No confirmed or probable cases of pertussis were linked to the contacts of the index case. This finding supports the view that the risk of exposure was low during antenatal clinics and postnatal home visits.

The public health response instigated by ARPHS was well supported by the current scientific evidence and consistent with Centers for Disease Control and Prevention guidelines.[1] The subsequent audit indicated that the risk of acquiring pertussis infection was low during the short exposure time of the antenatal clinic and postnatal visits, even though there was probably face to face exposure of less than three feet. Virtually all the contacts who were coughing had sought at least one formal medical appointment following advice given during contact tracing. This finding supported the view that phoning patients and their respective GPs are effective means of ensuring patients follow public health advice. However, this observation was based on small numbers and it is likely that women who are receiving antenatal or postnatal care have more contacts with the health system than the general population.

The contact tracing process as described, which involved an index case who was a healthcare worker, was labour and resource intensive. This scenario illustrates the potential value of providing a pertussis vaccine booster dose to all healthcare workers. The booster dose would protect the healthcare workers as well as the subsequent vulnerable patients with whom they have contact. The Immunisation Advisory Centre recommends that occupational groups working with infants and young children be vaccinated with diphtheria/tetanus/acellular pertussis vaccine (dTap) every 10 years. In fact, immunising health care workers with such a vaccine has been shown to be a cost saving practice.[2] The costs saved by reducing the number of health care workers infected with pertussis and the subsequent cost in contact tracing and infection control were shown to be greater than the costs required to provide the health care workers with the vaccine. The analyses demonstrated the cost benefit ratio was 2.38, meaning that for every dollar spent on the vaccination program, the health centre would save $2.38 on infection control measures.[2]

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

Reported by Wing Cheuk Chan, Public Health Medicine Registrar; Cathy Pikholz, Medical Officer of Health; Brigid O'Brien, Medical Officer; Lech Beltowski, Medical Officer and Shanika Perera, Medical Officer of Health; Auckland Regional Public Health Service

Health risk assessment: Spraying of endosulfan at a citrus orchard

In November 2008, a complaint was made to the Northland Medical Officer of Health about the use of the agrichemical endosulfan at a commercial citrus orchard adjacent to 'sensitive' areas in Taipa, Far North District. Sensitive areas within 10-25 metres of the orchard included a school and homes with young children. Also within a 300 metre radius were three early childhood education centres, a freshwater aquifer, and a harbour with important cultural significance to Māori.

An investigation into the complaint was initiated that aimed to estimate any health risk associated with the event, to address community concerns, and to improve the safety of agrichemical use near to 'sensitive' areas in Northland. Firstly, a standard health risk assessment was undertaken involving the steps of hazard identification, dose-response assessment and exposure assessment, including environmental sampling. Secondly, an assessment of human illness was undertaken by interviewing and obtaining records of symptoms reported by staff, students and residents during the time period that spraying occurred. The school nurse and the local General Practitioner were also contacted. Blood and urine samples from a symptomatic nearby resident were analysed for the presence of endosulfan residue.

During the spraying event subject to the complaint, endosulfan was applied via an airblast sprayer carried by tractor over a seven hour period during school hours. The spray release height was 1.3 metres. Sprayer nozzles

were of the ceramic low-drift type, the top four nozzles were turned off and the upper nozzles in use were pointed downwards to effectively spray the target. Application pressure was 200psi and the GROWSAFE© code was followed. A live shelterbelt of approximately 7 metres height was present around the sprayed area and a 30 metre no-spray buffer zone was employed from the edge of the crop. There was a south-easterly to easterly wind of approximately 5.6-6.5 km/hr blowing away from the school field, and approximately 45-90° to the school buildings. Properties along the main road may have been close to downwind in a true south-easterly wind but were 50-100 metres distant from spray site. Relative humidity was approximately 65% and temperatures 20-25°C. There was no endosulfan residue detected in the environmental samples from soil, water and foliage on the orchard boundary (taken five days after the spraying event). A range of symptoms were reported by people during the time period of spraying, some of which could be consistent with endosulfan exposure, but that could also be reasonably explained by other factors. Analysis of the blood and urine samples from the symptomatic nearby resident (taken seven days after the spraying event) did not reveal any endosulfan residue.

Endosulfan is a controversial agrichemical with known human and environmental toxicity.[1-3] Weather conditions and operator technique during this episode are likely to have prevented any significant spray-drift, and there was no evidence of off-target spray-drift in the environmental or biological samples. Reported human illness was not conclusive of agrichemical exposure. When all the accumulated evidence was considered together the risk of any acute or long-term adverse health effects was judged to be low. Limitations to the investigation are noted including the lag-time before environmental and biological sampling, and the lack of data on spray droplet size.

The health risk associated with this event was judged to be low, and the Environmental Risk Management Authority's decision to revoke approval for endosulfan in New Zealand (effective from January 2009) will prevent the use of endosulfan in the future. However, we are concerned about the use of agrichemicals with known adverse human health effects close to 'sensitive' areas. As such, a number of recommendations have been made to the Northland Regional Council, District Councils and agrichemical operators in order that high risk agrichemical applications are avoided or tightly controlled at sites adjacent to 'sensitive' areas.

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

Reported by Hayley Bennett, Public Health Medicine Registrar; and Jonathan Jarman, Medical Officer of Health; Northland Public Health Unit

Case Report: Probable illness related to recreational exposure to cyanobacteria toxins

On 17 January 2009, a seven year old girl presented to her local Emergency Department at 6pm. She had been swimming in the Waipoua River, Wairarapa, for 30 minutes with her family between 4 and 4:30pm. There were algae mats at the swimming site, the amount being similar to previous occasions, though the river flow was reported as subjectively lower.

She had developed constant abdominal pain that had started at 5pm, and lasted a total of two hours. There were no other symptoms, including specifically diarrhoea and vomiting. When her pain subsided there were no further symptoms and she remained well. When she was assessed in the Emergency Department she was apyrexial, with normal physical examination and urinalysis was negative.

Her siblings aged seven and nine, and her parents had swum in the water at the same time. They remained symptom free. During the previous seven days all of the family had been on holiday together and had been well.

The river was subsequently sampled at three sites on 29 January 2009: the first at the swimming hole used by the family, the second 100 metres upstream, and the third 200 metres upstream. At all three areas algae mats were present at the time of testing. The three samples had elevated levels of Homoanatoxin-a: 100, 110 and 230 mcg/Kg of wet weight for the three sites respectively. These levels are considered significantly elevated. However, a cut-off point is not feasible for the method used, because sampling of the algae mats as well as water is required and this affects its reproducibility and standardisation.

Cyanobacteria produce a wide range of cyanotoxins, including Anatoxin-a and its homologue Homoanatoxin-a, which are both neurotoxins that mimic the effect of acetylcholine.[1] In animals their pathological effects are evident within minutes of oral or parenteral exposure.[2] Only acute effects have been demonstrated in mammals.[3] Once released into water, cyanobacteria toxins persist in the environment, ranging from days to months.[1]

There have been previous reports of ill health associated with exposure to cyanotoxins in drinking water, and death of haemodialysis patients via contaminated water supply.[1] Case reports of recreational exposure to cyanobacteria more commonly describe allergic type reactions or gastrointestinal effects.[2] Epidemiological studies, performed have had methodological limitations, but have detected ill health associated with recreational exposure, though the symptoms have been generally mild.[2]

This report of probable illness related to cyanobacteria toxin is noteworthy because of the combination of environmental exposure, confirmatory laboratory testing, and compatible clinical presentation. The clinical features are compatible with exposure to cyanobacteria toxin demonstrated in the environmental samples: abdominal pain could be mediated through the cholinergic effects of the toxin on gastrointestinal smooth muscle. There was a close temporal relationship between the girl's symptoms and her recreational exposure to blooms, and there is not a strong alternative diagnosis.

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

Reported by Terence Quirke, Public Health Medicine Registrar, Regional Public Health, Hutt Valley DHB

4. Outbreak Surveillance

The following information is a summary of the outbreak trends for New Zealand, from data collected in the last quarter (April – June 2009). Comparisons are made to the previous quarter (January – March 2009), and to the same quarter in the previous year (April – June 2008). Note that the outbreak data in this section are notified to ESR by the Public Health Services.

General

- 153 outbreaks notified in this quarter (1,904 cases)
- 82 are 'final' reports (1441 cases); 71 are 'interim' reports (463 cases) that have yet to be finalised and closed

All following data pertain to final reports only.

- 17.6 cases on average per outbreak, compared with 13.9 cases per outbreak in the previous quarter (13.8 cases per outbreak in the same quarter of last year)
- 17 hospitalisations: norovirus (5), rotavirus (4), *Campylobacter* (4), *Salmonella* (2), *Bordetella pertussis* (1), and 'gastroenteritis' (1)
- 1 death: norovirus

Pathogens

- 34 norovirus outbreaks (961 cases) during this quarter
- 20 'gastroenteritis' outbreaks (320 cases)
- 8 *Giardia* outbreaks (22 cases)
- 5 rotavirus outbreaks (95 cases)
- 4 *Campylobacter* outbreaks (13 cases)
- 4 *Salmonella* outbreaks (9 cases)
- 3 *B. pertussis* outbreaks (12 cases)
- 3 *Cryptosporidium* outbreaks (7 cases)
- 1 *Shigella* outbreak (2 cases)

Modes of Transmission

Note that reporting allows for multiple modes of transmission to be selected. In many instances no mode of transmission is selected for outbreaks notified to ESR, consequently, numbers may not add up to the total number of outbreaks reported.

- 70 person-to-person, from (non-sexual) contact with an infected person (including droplets): 33 norovirus (954 cases), 16 gastroenteritis (237 cases), 7 *Giardia* (20 cases), 4 rotavirus (81 cases), 4 *Salmonella* (9 cases), 3 *B. pertussis* (12 cases), 2 *Cryptosporidium* (5 cases), and 1 *Shigella* (2 cases)

- 19 environmental, from contact with an environmental source (e.g. swimming): 14 norovirus (440 cases), 2 gastroenteritis (29 cases), 2 *Giardia* (8 cases), and 1 *Salmonella* (2 cases)
- 6 foodborne, from consumption of contaminated food or drink (excluding water): 2 *Campylobacter* (5 cases), 2 *Salmonella* (5 cases), and 2 gastroenteritis (4 cases)
- 6 waterborne, from consumption of contaminated drinking water: 3 *Giardia* (10 cases), 2 *Cryptosporidium* (4 cases), and 1 *Salmonella* (2 cases)
- 7 'other' mode of transmission: 5 norovirus (via fomites) (135 cases) and 2 gastroenteritis (via fomites) (34 cases)
- 9 'unknown' mode of transmission: 4 gastroenteritis (83 cases), 2 *Campylobacter* (8 cases), 1 rotavirus (14 cases), 1 norovirus (7 cases), and 1 *Giardia* (2 cases)

Circumstances of Exposure/Transmission

Common 'settings' where exposure/transmission occurred or contaminated food/beverage was prepared for consumption are identified below. Note that multiple settings can be selected and in many instances no settings are selected in outbreaks notified to ESR.

- 37 rest home: 26 norovirus (897 cases), 10 gastroenteritis (247 cases), and 1 rotavirus (14 cases)
- 19 home: 5 *Giardia* (12 cases), 3 *Cryptosporidium* (7 cases), 3 gastroenteritis (7 cases), 3 *Salmonella* (7 cases), 2 *Campylobacter* (6 cases), 1 *B. pertussis* (2 cases), 1 norovirus (2 cases), and 1 *Shigella* (2 cases)
- 16 hospital (continuing care): 11 norovirus (438 cases), 4 gastroenteritis (82 cases), and 1 rotavirus (14 cases)
- 7 childcare: 4 rotavirus (81 cases), 2 gastroenteritis (6 cases), and 1 *Giardia* (3 cases)
- 5 hospital (acute): 4 norovirus (56 cases) and 1 gastroenteritis (51 cases)
- 4 café: 3 gastroenteritis (6 cases) and 1 *Campylobacter* (4 cases)
- 2 hotel or motel: 1 norovirus (10 cases) and 1 *Cryptosporidium* (2 cases)
- 2 school: 2 *B. pertussis* (10 cases)
- 2 takeaway: 1 gastroenteritis (3 cases) and 1 norovirus (2 cases)
- 1 hostel: 1 *Campylobacter* (3 cases)
- 4 'other setting': 1 norovirus (10 cases), 1 *Giardia* (5 cases), 1 *Campylobacter* (3 cases), and 1 *Salmonella* (2 cases)
- 4 outbreaks with no setting selected: 2 gastroenteritis (5 cases), 1 norovirus (12 cases), and 1 *Giardia* (2 cases)

5. Outbreak Case Reports

No contributions received this quarter for outbreak case reports.

6. Laboratory Surveillance

The zoonotic bacterial pathogens, *Salmonella* and VTEC

In April 2008, the Enteric Reference Laboratory (ERL) moved to the National Centre for Biosecurity and Infectious Disease (NCBID) in Wallaceville, Upper Hutt. ERL provides a national reference centre and surveillance service for human, animal, food and environmental enteric bacterial pathogens. During 2008, ERL confirmed the identity of over 2,000 human enteric bacteria, belonging mainly to the following genera: *Salmonella* (67%), *Escherichia* (9%), *Shigella* (5%) and *Yersinia* (19%).

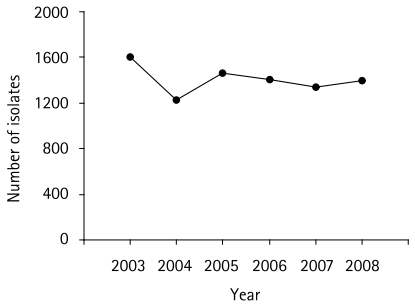
Salmonella

Serotyping of *Salmonella* is based on three surface structures: O antigen (somatic), H antigen (flagellar), and Vi antigen (capsular polysaccharide present only in specific serotypes). ERL routinely performs the serotyping of all isolates submitted as presumptive *Salmonella* allowing surveillance of this pathogen and the detection of outbreaks, unusual clusters, or serotypes new to New Zealand. There were 1,399 human *Salmonella* isolates confirmed in 2008 (Figure 3) (2007, 1341). *S.* Typhimurium phage type 160 remained the predominant strain, representing 9.7% of total isolates (11.3% 2007). *S.* Typhimurium phage type 101 and *S.* Saintpaul increased to 5% (3.2% 2007) and 2.5% (1.9% 2007) respectively.

There were four significant outbreaks in 2008:

- *S.* Chester (54 cases). The outbreak started in October 2007 with a total of 84 cases. No food source was linked to the outbreak.
- *S.* Mbandaka (36 cases). No food source was connected to the outbreak. The results of the case control study however suggested the consumption of chicken breast meat as a possible risk factor.
- *S.* Typhimurium phage type 42 (62 cases). The majority of these cases were connected to the consumption of raw flour. The same phage type was also isolated from bags of unopened flour and resulted in a voluntary withdrawal of the product by the manufacturer.
- *S.* Typhi phage types E1a and E7 (5 cases). The outbreak occurred in a household where crowded living conditions and poor hygiene facilitated person-to-person spread amongst the five cases.

Figure 3. Total number of human *Salmonella* isolates confirmed by ERL, 2003–2008



VTEC

Verocytotoxigenic *Escherichia coli* (VTEC) has emerged as one of New Zealand's most important enteric disease over the past 15 years. The incidence has increased from 1.3 cases per 100,000 (1998) to 3 cases per 100,000 (2008), placing New Zealand in the upper end of the range reported by other developed countries. The rate of infection is highest in the under 5 age group, rural population and Europeans. The epidemiology of VTEC infections is characterised by farm animal reservoirs, transmission by a wide variety of foods or water, and person-to-person transmission due to its small infection dose (<200 CFU). VTEC infection may be asymptomatic or cause a spectrum of illness from mild non bloody diarrhoea, through haemorrhagic colitis, to haemolytic uraemic syndrome (HUS) and thrombotic thrombocytopaenic purpura.

A total of 120 VTEC isolates were confirmed by ERL in 2008, a slight increase compared to previous years (Table 1). Biochemical identification of any presumptive O157 VTEC isolates is required as some species such as *Escherichia hermannii* may cross-react with O157 latex reagents. Although 181 O antigens and 56 H antigens have been described, there are only a few combinations that have been associated with diarrhoeal disease. While most of the infections (94.5% in 2008) in New Zealand are caused by *E. coli* O157:H7, ERL have confirmed 25 non-O157 VTEC in the last six years belonging to the following serotypes: O176:HNM, O130:H11, O77:HNM, O113:H21, O91:H21, O128:H2, O103:H25, O26:H21, ONT:H8, O117:H7, O84:HNM, O177:HNM, ONT:H11, O107:H51, O117:HNM, O84:H2, and O75:HNM. In America, O157 VTEC are the most frequently isolated VTEC but increasingly non-O157 VTEC are confirmed as the cause of outbreaks and sporadic illness. In some countries, non-O157 VTEC serotypes, particularly *E. coli* O111:NM and O26:H11, are more common than O157 VTEC. Currently in New Zealand serotyping, phage tying, and PFGE analysis are undertaken routinely on *E. coli* O157:H7 isolates. The presence and the production of the Shiga toxins are established using multiplex PCR and vero cell assay respectively. All the tests performed on presumptive *E. coli* O157 or non-O157 VTEC allow ERL to detect any outbreaks or household clusters.

Table 1. Number of VTEC isolates confirmed by ERL in the last 6 years

Year	Number of VTEC confirmed	
	O157 serotype	Non-O157 serotypes
2003	92	3
2004	75	7
2005	85	6
2006	80	6
2007	96	1
2008	118	2

Clusters of VTEC were detected between the months of January and March 2008 in the region of Canterbury (5 cases), Auckland (12 cases) and Wellington (6 cases). Investigations by ERL (phage typing and PFGE analysis) and by Health Protection staff did not establish a common source.

Reported by Muriel Dufour, Enteric Reference Laboratory, ESR NCBID

Norovirus outbreaks in New Zealand during 2007 and 2008

Noroviruses are a major cause of epidemic gastroenteritis worldwide. They infect all age groups and are especially prevalent in rest home and hospital settings. The Norovirus Reference Laboratory (NRL) at ESR carries out laboratory surveillance of norovirus outbreaks for the New Zealand Ministry of Health. This includes analysis of faecal specimens from cases of gastroenteritis by real - time RT-PCR, DNA sequencing of representative outbreak strains, and collation of data on the predominant genotypes occurring in New Zealand. The NRL is a member of the international Noronet network, which circulates information on disease trends and emerging norovirus variants to norovirus reference centres around the world.

In 2007 and 2008, there were 316 norovirus outbreaks entered in EpiSurv and confirmed by NRL laboratory testing and a further 60 laboratory-confirmed norovirus outbreaks not entered in EpiSurv. The majority of outbreaks occurred in healthcare settings such as rest homes (180) and acute-care hospitals (46). Outbreaks in catered settings and the home were also common (Table 2).

Table 2. Settings of Norovirus outbreaks in 2007 and 2008

Outbreak Setting	2007	2008	Total
Catered setting	18	27	45
Child-related	9	18	27
Community event	1	5	6
Healthcare-elderly	123	57	180
Healthcare-medical	24	22	46
Home	23	16	39
Hostel/institution/hotel/camp	5	8	13
Shellfish	0	8	8
Travel-bus	0	1	1
Travel-plane	1	0	1
Travel-ship	0	1	1
Unknown/common event	3	2	5
Total	**207**	**165**	**372**

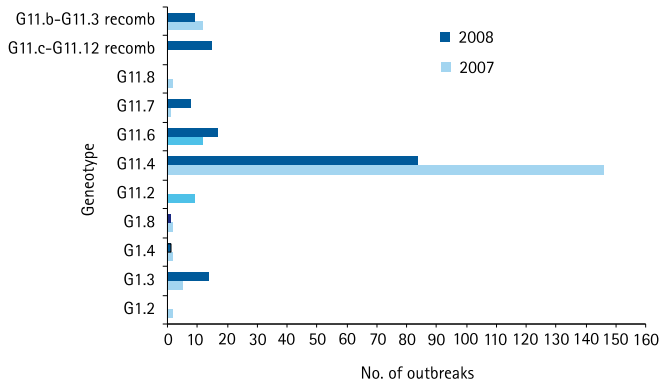
Noroviruses are classified into five genogroups, GI-V, but GI and GII are the main causes of human disease. Twenty five different human genotypes are now recognised, eight in GI, 16 in GII and one in GIV. In recent years, GII.4 strains have been internationally reported as the most common causes of outbreaks in institutional settings which also occurred in New Zealand. Since 2002, variants of GII.4 strains have emerged, become predominant and have then been replaced by other variants. In early 2006 a new variant, GII.4 2006a, became predominant in Europe, North America, Australia and New Zealand. This was followed later in 2006 by GII.4 2006b. These strains were both prevalent in New Zealand throughout 2007. In 2008, these strains were replaced by another new variant, GII.4 2008, which has since become predominant during 2008 and 2009. Other noroviruses identified in outbreaks during 2007 and 2008 included genogroup I types GI.2, GI.3, GI.4, GI.5, GI.8, GI.15, GI.17, and genogroup II types GII.2, GII.6, GII.7 and GII.8. Recombinant types GII.c-GII.12 and GII.b- GII.3 have also been identified in several outbreaks (Figure 4).

Significant outbreaks

Over the 2007-8 New Year holiday period, a large norovirus outbreak occurred during an international scout jamboree. Effective public health procedures were successful in containing this outbreak to ~150 cases among 3,000 scouts. The outbreak was caused by a GII.6 norovirus strain. In 2007 and 2008, this strain was responsible for a total of 29 outbreaks across all settings, including rest homes, catered settings, childcare centres, hostels and a national flower show.

In 2008, a number of outbreaks were linked to consumption of contaminated New Zealand oysters. A novel recombinant norovirus genotype, GII.c-GII.12, was identified by ESR in both faecal samples from cases and in the oysters. This genotype had not been recognised before and provided evidence for the link between the cases and the oysters consumed (NZPHSR Volume 7 Issue 1). This recombinant strain was subsequently associated with a further four outbreaks, two from rest home outbreaks in the South Island and two from unknown settings in Auckland.

Figure 4. Major norovirus genotypes identified in New Zealand, Jan 2007 - Dec 2008 (n=360[1])



[1] Genotypes identified in < 2 outbreaks not shown

Reported by Gail Greening, Norovirus Reference Laboratory, Communicable Disease Group, ESR

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