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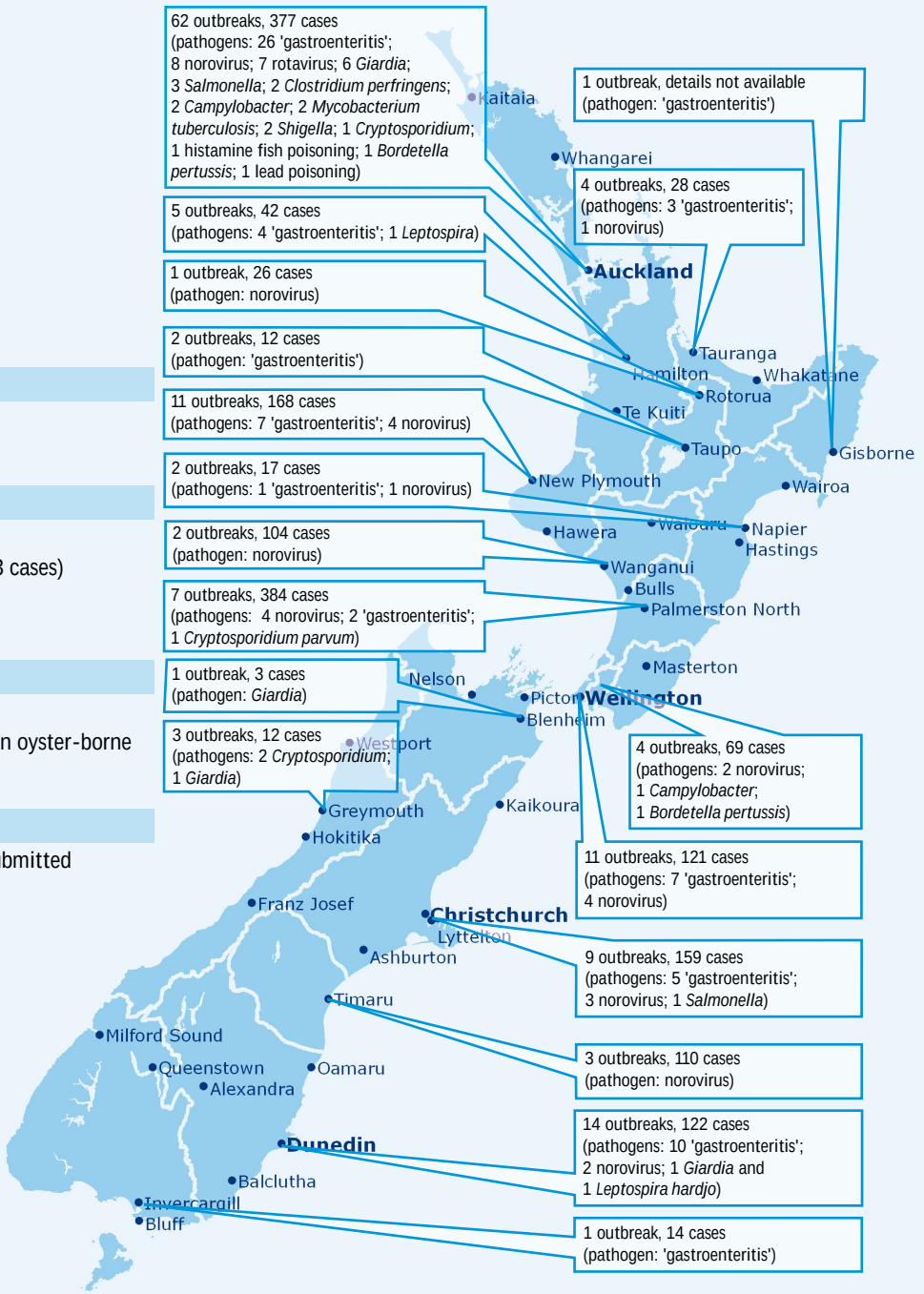
New Zealand Public Health Surveillance Report

March 2009: Covering October – December 2008

Contents & Highlights

This Quarter's Outbreaks

Notification and outbreak data in this issue are drawn from the October – December quarter of 2008. The outbreak map on this page consists of all outbreak information, final and interim. The total number of outbreaks and cases by region and outbreaks by pathogen are reported, as notified up to 15 January 2009.



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

1. Editorial

Yersiniosis notifications – laboratory tests a key component to interpreting surveillance data

In 2007, the New Zealand Food Safety Authority (NZFSA) approached ESR to review yersiniosis notifications as New Zealand has one of the highest reported rates of yersiniosis in the developed world.

In response to this request ESR reviewed the relevant literature and combined the EpiSurv notification data with the Enteric Reference Laboratory's data and hospitalisation data from the National Minimum Dataset (NMDS) collection to investigate the situation. In addition, a survey of Public Health Service staff was carried out to assess current practices for investigating and recording yersiniosis cases. The review revealed a complex picture of an organism with pathogenicity that varies with the species of *Yersinia*.

Most human illness is caused by one species, *Yersinia enterocolitica*. Infection with *Y. enterocolitica* can cause a variety of symptoms depending on the age of the person infected. Infection with *Y. enterocolitica* occurs most often in young children. The mechanism of pathogenicity varies within biotypes of *Y. enterocolitica*.

Only two species of *Yersinia* are notifable as yersiniosis in New Zealand, *Y. enterocolitica* and *Y. pseudotuberculosis*.

The key issues identified in the review were:

(1) ESR received *Yersinia* isolates for biotyping from only selected laboratories. For many parts of the country there was little or no biotyping data available making it difficult to compare what was happening across New Zealand.

(2) A number of *Yersinia* species that are not notifable were being reported by laboratories. A variety of diagnostic tests are used by clinical laboratories to identify *Yersinia*. Some laboratories are using tests that can distinguish a *Y. enterocolitica* from a *Y. frederiksenii* isolate. Other laboratories are using methods that identify the organism as belonging to the *Yersinia* genus and isolates are sent to ERL to identify both the species and the biotype. Given the significant differences in pathogenicity between species of *Yersinia* these differences affect the response that can be taken by Public Health staff and can delay the start of an investigation.

(3) Public Health staff were unclear on the significance of the species or biotyping data that were available and had insufficient guidance on which cases warranted public health investigation.

The review identified some areas for improvement including the need to:

(1) Make better use of the information held by ESR on biotyping.

(2) Improve methods of identifying different biotypes of *Y. enterocolitica* and/or consider serotyping or other laboratory methods as an alternative. This would allow public health services to make more timely and targeted investigations.

(3) Obtain more complete biotyping data for all *Y. enterocolitica* isolates in New Zealand.

As a result of the review ESR is now updating biotyping data regularly into the national notification database, EpiSurv, so it is readily available for public health staff investigating yersiniosis cases.

From October 2008, laboratories have been requested to send all *Yersinia* isolates to ESR for biotyping. This has resulted in a more complete picture of the incidence of different biotypes and species being identified by laboratories throughout New Zealand. There are some clear differences in types being reported in the North and South Islands and further work will be undertaken by ESR in coming months to assess factors influencing these differences.

Yersiniosis is a complex disease and clear information from clinical and reference laboratories regarding species and biotypes alongside details of clinical symptoms is essential for public health staff to decide on a timely and appropriate response to notifications.

A copy of the full review can be found on NZFSA's website www.nzfsa.govt.nz/science/research-projects/yersiniosis/FW07111Yersiniosis_report_2008_update.pdf

Ruth Pirie, Population & Environmental Health Programme, ESR

2. Notifable Disease Surveillance

The following is a summary of disease notifications for the October – December quarter of 2008 and cumulative notifications and rates calculated for a 12-month period (January 2008 – December 2008). 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 15 January 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 DISEASE

Hepatitis B

- *Notifications:* 9 notifications in the quarter (2007, 18); 42 notifications over the last 12 months (2007, 73) giving a rate of 1.0 cases per 100,000 population (2007, 1.7); a statistically significant decrease
- *Comments:* Cases were aged between 25 and 80 years (age of one case unknown), with no cases reported under the age of 16 years

Invasive Pneumococcal Disease

- *Notifications:* 125 notifications in the quarter
- *Comments:* Cases were aged between 2 months and 99 years, with 15 cases under the age of 2 years
- *Note:* Invasive pneumococcal disease became notifable on 17 October 2008, therefore comparisons between quarters and 12-month rates are not valid

Pertussis

- *Notifications:* 186 notifications in the quarter (2007, 73); 435 notifications over the last 12 months (2007, 332) giving a rate of 10.2 cases per 100,000 population (2007, 7.9); a statistically significant increase
- *Comments:* there has been a statistically significant quarterly increase from the previous quarter (112 cases) and from the same quarter last year (73 cases)

INFECTIOUS RESPIRATORY DISEASES

Acute Rheumatic Fever

- *Notifications:* 26 notifications in the quarter (2007, 12); 245 notifications over the last 12 months (2007, 140) giving a rate of 5.7 cases per 100,000 population (2007, 3.3); a statistically significant increase
- *Comments:* there has been a statistically significant quarterly decrease from the previous quarter (58 cases) and a statistically significant quarterly increase from the same quarter last year (12 cases). Cases were distributed by age as follows: 1 (less than 1 year), 6 (5-9 years), 10 (10-14 years), 4 (15-19 years), 4 (greater than 20 years), and the age of one case was unknown; 23 cases were initial attacks of acute rheumatic fever and 3 cases were recurrent attacks

ENTERIC INFECTIONS

Campylobacteriosis

- *Notifications:* 2,349 notifications in the quarter (2007, 3,056); 6,693 notifications over the last 12 months (2007, 12,778) giving a rate of 156.8 cases per 100,000 population (2007, 302.2); a statistically significant decrease

- *Comments:* there has been a statistically significant quarterly increase from the previous quarter (1,532 cases) and a statistically significant quarterly decrease from the same quarter last year (3,056 cases)

Gastroenteritis

- *Notifications:* 253 notifications in the quarter (2007, 179); 688 notifications over the last 12 months (2007, 622) giving a rate of 16.1 cases per 100,000 population (2007, 14.7); not a statistically significant increase
- *Comments:* there has been a statistically significant quarterly increase from the previous quarter (140 cases) and from the same quarter last year (179 cases). Note that this is not a notifable 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 notifable 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:* 339 notifications in the quarter (2007, 349); 1,349 notifications over the last 12 months (2007, 1,274) giving a rate of 31.6 cases per 100,000 population (2007, 30.1); not a statistically significant increase
- *Comments:* there has been a statistically significant quarterly increase from the previous quarter (231 cases)

ENVIRONMENTAL EXPOSURES & INFECTIONS

Chemical Poisoning

- *Notifications:* 0 notifications in the quarter (2007, 0); 1 notification over the last 12 months (2007, 13) giving a rate of 0.0 cases per 100,000 population (2007, 0.3); a statistically significant decrease

Cryptosporidiosis

- Notifications: 314 notifications in the quarter (2007, 272); 764 notifications over the last 12 months (2007, 924) giving a rate of 17.9 cases per 100,000 population (2007, 21.9); a statistically significant decrease

Giardiasis

- *Notifications:* 390 notifications in the quarter (2007, 316); 1,664 notifications over the last 12 months (2007, 1,402) giving a rate of 39.0 cases per 100,000 population (2007, 33.2); a statistically significant increase
- *Comments:* there has been a statistically significant quarterly increase from the same quarter last year (316 cases)

Hepatitis A

- *Notifications:* 20 notifications in the quarter (2007, 11); 91 notifications over the last 12 months (2007, 42) giving a rate of 2.1 cases per 100,000 population (2007, 1.0); a statistically significant increase
- *Comments:* there has been a statistically significant quarterly decrease from the previous quarter (38 cases). Cases were aged between 3 and 76 years, with 7 cases under the age of 16 years

Lead Absorption

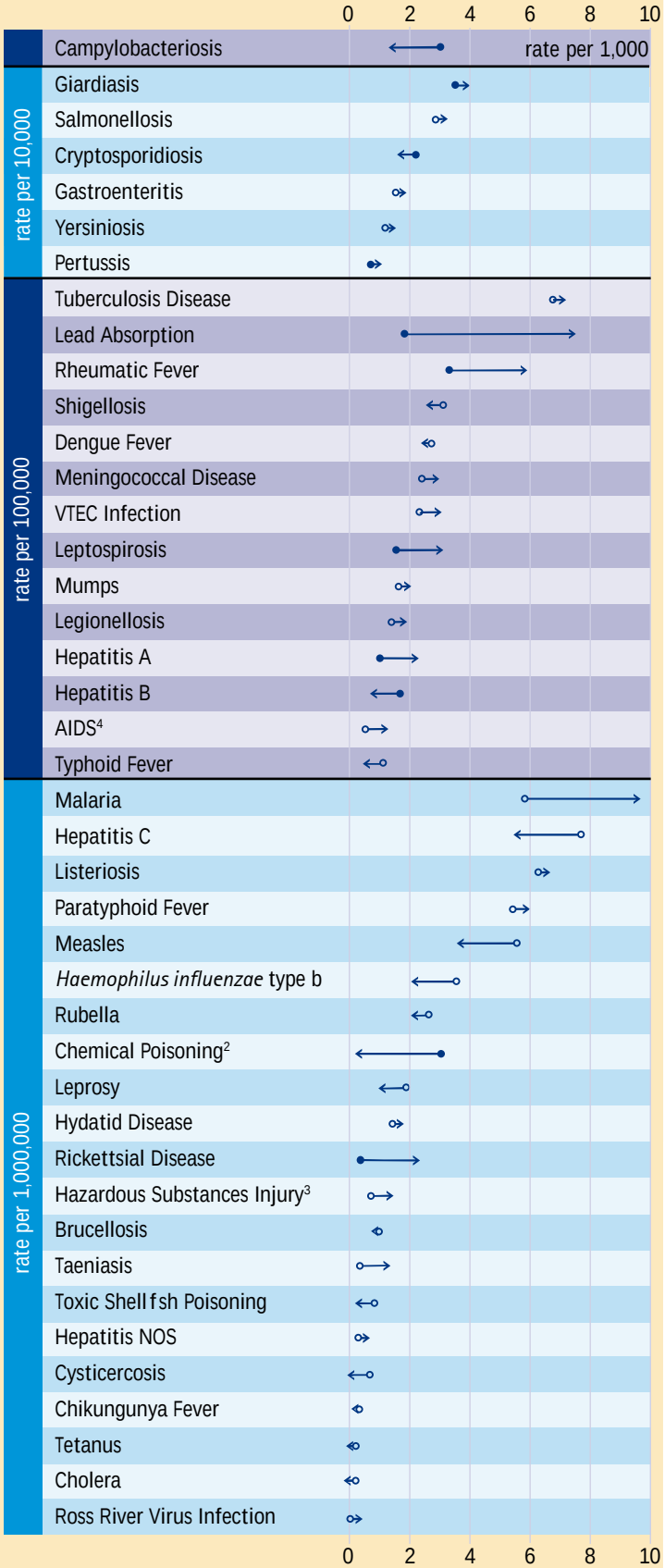
- *Notifications:* 89 notifications in the quarter (2007, 31); 315 notifications over the last 12 months (2007, 78) giving a rate of 7.4 cases per 100,000 population (2007, 1.8); a statistically significant increase
- *Comments:* there has been a statistically significant quarterly increase from the same quarter last year (31 cases). Cases were distributed by age as follows: 2 (1-4 years), 2 (5-14 years), 13 (15-24 years), 36 (25-44 years), 30 (45-64 years), and 6 (65 years and over). There were 76 male cases, 10 female cases, and 3 of unknown sex; 57 cases recorded an occupation that involved exposure to lead: painter (4), lead lighter (2), radiator repairer (2), welder (2), boilermaker (1), general electrician (1), laboratory worker (1), plastics worker (1), sand stripper (1), and 42 cases were not specified
- *Note:* since June 2007 the blood lead level for reporting has lowered from 0.72 to 0.48 µmol/l

Legionellosis

- *Notifications:* 36 notifications in the quarter (2007, 20); 80 notifications over the last 12 months (2007, 64) giving a rate of 1.9 cases per 100,000 population (2007, 1.5); not a statistically significant increase

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 January - December 2008 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

- *Comments:* there has been a statistically significant quarterly increase from the previous quarter (11 cases) and from the same quarter last year (20 cases)

Leptospirosis

- *Notifications:* 39 notifications in the quarter (2007, 14); 123 notifications over the last 12 months (2007, 66) giving a rate of 2.9 cases per 100,000 population (2007, 1.6); a statistically significant increase
- *Comments:* there has been a statistically significant quarterly increase from the same quarter last year (14 cases). There were 36 male cases, and 3 female cases; 15 farmers/farm workers, and 12 meat process/freezing workers. The remaining cases either did not have an occupation stated or did not participate in a high risk occupation for leptospirosis exposure

NEW, EXOTIC & IMPORTED INFECTIONS

Dengue Fever

- *Notifications:* 34 notifications in the quarter (2007, 14); 114 notifications over the last 12 months (2007, 114) giving a rate of 2.7 cases per 100,000 population (2007, 2.7); no change
- *Comments:* there has been a statistically significant quarterly increase from the same quarter last year (14 cases); 28 cases were laboratory confirmed; 29 cases were overseas during the incubation period and the travel history of 5 cases was unknown. Places visited were Fiji (12), Samoa (8), Vietnam (4), Thailand (3), India (2), Tuvalu (2), Australia (1), Cambodia (1), Italy (1), Papua New Guinea (1), and Vanuatu (1)

Rickettsial Disease

- *Notifications:* 0 notifications in the quarter (2007, 0); 10 notifications over the last 12 months (2007, 2) giving a rate of 0.2 cases per 100,000 population (2007, 0.0); a statistically significant increase
- *Comments:* there has been a statistically significant quarterly decrease from the previous quarter (9 cases)

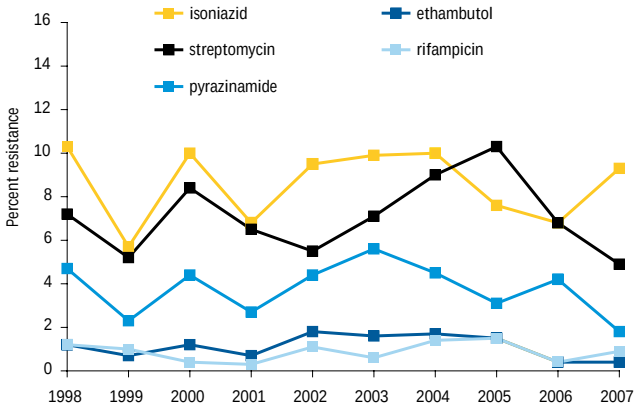
3. Other Surveillance Reports

Antituberculosis-drug resistance

The national surveillance of antituberculosis-drug resistance is based on the results of susceptibility testing of isolates in the Mycobacteriology Reference Laboratories at Auckland City, Wellington and Waikato Hospitals. Susceptibility to five antituberculosis drugs (isoniazid, rifampicin, ethambutol, pyrazinamide and streptomycin) is routinely tested.

In 2007, 288 cases of tuberculosis were notified, 225 (78.1%) of which were reported by the Mycobacteriology Reference Laboratories as culture positive. The 225 isolates from the culture-positive cases included 222 *Mycobacterium tuberculosis* and three *M. bovis* isolates. Resistance to isoniazid (9.3%) and streptomycin (4.9%) was most common, followed by resistance to pyrazinamide (1.8%), rifampicin (0.9%) and ethambutol (0.4%).

Figure 1. Antituberculosis-drug resistance, 1998–2007



Trends in resistance to the five antimicrobials are shown in Figure 1. Overall, during the last 10 years, 1998-2007, there has been no significant change in resistance to any of the five antimicrobials.

The majority (88.0%) of the isolates in 2007 were susceptible to all five antimicrobials tested. Two isolates (0.9%) were multidrug resistant (MDR-TB, resistant to at least isoniazid and rifampicin). Both cases were TB relapses or reactivations. One MDR-TB case was a visitor from Indonesia. The other case appears to have developed multidrug resistance during treatment in New Zealand. MDR-TB remains rare in New Zealand, with an average annual incidence of 0.8% and a total of 21 cases recorded in the last 10 years. No extensively drug-resistant TB (XDR-TB) isolates have been identified in New Zealand. XDR-TB is defined as resistance to isoniazid and rifampicin (i.e. MDR-TB) with additional resistance to any fluoroquinolone and either aminoglycosides (amikacin, kanamycin) or capreomycin.

Compared with New Zealand-born cases, cases born overseas were more resistant to each of the antimicrobials except pyrazinamide, although the differences were not significant ($p \geq 0.05$). Resistance by ethnicity is shown in Table 1. Resistance, in particular, isoniazid and streptomycin resistance, was highest among cases of Asian or 'Other' ethnicity.

Table 1. Resistance by case's ethnicity, 2007[1]

	Percent				
	Maori n=37	Pacific Peoples n=21	Asian n=111	Other n=17	European n=30
Fully susceptible	91.9	95.2	84.7	76.5	93.3
Resistant to:[2]					
Isoniazid	5.4	0	14.4	11.8	3.3
Rifampicin	2.7	0	0.9	0	0
Ethambutol	0	0	0.9	0	0
Pyrazinamide	2.7	4.8	0.9	0	3.3
Streptomycin	0	0	7.2	17.7	0
MDR-TB[3]	2.7	0	0.9	0	0

1 Ethnicity was unknown or not reported for nine cases, which were all fully susceptible
2 Includes resistance alone or in combination with other antimicrobials
3 Multidrug-resistant tuberculosis, that is, resistant to at least isoniazid and rifampicin

A full report on antituberculosis-drug resistance in 2007 is available at www.surv.esr.cri.nz/PDF_surveillance/Antimicrobial/TB/TB_2007.pdf

Reported by Helen Heffernan, Communicable Disease Programme, ESR, on behalf of the Mycobacteriology Reference Laboratories

An elusive tapeworm *Taenia saginata*

Public Health South was notified early January 2009 by a veterinary pathologist under section 87A of the Health Act 1956 that *Taenia saginata* had been detected in a steer sent to the meat works a few days earlier. This was one of two steers from the same property, and one was found with cysticercosis estimated to have been present for a minimum of four months. This finding prompted Public Health South to investigate further although no human case had been notified. The New Zealand Food Safety Authority (NZFSA) was also notified, as this parasite is a food-borne zoonosis and has potential implications for food safety. However, as the steer was for consumption by the owners only, the NZFSA took no further action.

The owner of the steer was contacted and reported that all members of the family were well. They live in a four year old home on a 50 acre lifestyle block. Domestic water is supplied from a bore which uses rapid sand filtration as treatment, and wastewater is managed through an on-site septic tank system. The family do not eat undercooked meat and use beef from their freezer. They had not travelled overseas recently and do not employ seasonal workers. Faecal samples from three of four family members were tested for proglottids (segments of worm) and eggs and all were negative. However, perianal swabs are more likely to aid diagnosis.[1]

Cows, sheep and deer are raised in separate paddocks on the lifestyle block and are able to access water from two irrigation raceways that go through the property. These come through many other 'upstream' properties and a popular tourist trail. The property is food irrigated every three weeks. The septic tank was emptied for the first time in June 2008 and the sludge was disposed of on the property close to an irrigation race. At the time of this disposal the irrigation race was shut off. Five beef cows, brought onto the property in June 2007, had grazed the land on the banks of the irrigation race near where the tank sludge had been disposed of and two of these had been sent to the meat works. The contractor who emptied the septic tank does not clean the de-sludge truck between jobs but does clean it after transporting gravel by hosing it down at the depot. Records of septic tanks emptied prior to this property have not been inspected as yet.

Tapeworms are endemic in many parts of the world and, as humans are the definitive hosts, are one of few parasites that can be passed from humans to animals. Taeniasis is the term used for gut infestation in humans from either the beef tapeworm, *T. saginata*, or the pork tapeworm, *T. solium*. Cysticercosis is the term used for somatic infection in various muscles and organs of intermediate hosts which include cattle, pigs, sheep, reindeer and dogs. *Taenia saginata* causes only intestinal infection in humans, while *T. solium* can cause both intestinal infection and cysticercosis.

Human infection in New Zealand is rare with only six notifications since 1997, all of whom had travelled overseas during the incubation period.[2] The cheek muscle and heart of all beef carcasses at meat works are inspected and suspicious lesions sent to a veterinary pathologist. On average there would be one confirmed case per year (pers. com. A. Julian, Gribbles Veterinary Pathology Ltd).

The risk of infection to humans occurs where beef or pork is eaten raw or undercooked and where sanitary conditions allow host animals, especially cattle and pigs, access to human faeces. Freezing meat is an effective way of killing cysticerci. Eggs appear in human stools about 10 – 14 weeks after infection, while symptoms of cysticercosis may appear between weeks and years after infection.[3]

Taenia saginata causes economic losses due to condemnation, refrigeration and downgrading of infected carcasses and in many countries persists in the environment because of low sensitivity of meat inspection protocols. The eggs can remain viable on pastures, in streams and surface water for months. Animal husbandry which allows grazing and drinking from environments potentially contaminated with human sewage through food irrigation of pastures and proximity of wastewater effluent enables the cycle to be completed.[4,5]

No definitive source of infection for the steer in this case has been identified. However, there are several ways that the grazing land may have become contaminated. These include via the disposed-of septic tank waste (either through an infected family member, although one was not identified, or from eggs present in the de-sludge truck from a previous job), from eggs carried in irrigation water from another property, or from defecation of an infected person on the grazed land.

The increasing number of seasonal workers and visitors from countries where *T. saginata* is endemic may pose a risk in New Zealand of further such cases.

References

1. Cabaret J, Geerts S, Madeline M, Ballandonne C, Barbier D 2002. The use of urban sludge on pastures: the cysticercosis threat. *Veterinary Research* 33: 575–597.
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4. Boone I, Thys E, Marcotty T, de Borchgrave J, Ducheyne E, Dorny P 2007. Distribution and risk factors of bovine cysticercosis in Belgian dairy and mixed herds. *Preventive Veterinary Medicine* 82(1–2): 1–11.
5. Dorny P, Praet N 2007. *Taenia saginata* in Europe. *Veterinary Parasitology* 149(1–2): 22–24.

Reported by Marion Poore, Medical Officer of Health, and Michael Wong, Health Protection Officer, Public Health South

4. Outbreak Surveillance

The following information is a summary of the outbreak trends for New Zealand, from data collected in the last quarter (October – December 2008). Comparisons are made to the previous quarter (July – September 2008), and to the same quarter in the previous year (October – December 2007). Note that the outbreak data in this section are notified to ESR by the Public Health Services.

General

- 143 outbreaks notified in this quarter (1,768 cases)
- 77 are 'final' reports (1,335 cases); 66 are 'interim' reports (433 cases) that have yet to be finalised and closed

All following data pertain to final reports only.

- 17.3 cases on average per outbreak, compared with 10.1 cases per outbreak in the previous quarter (15.6 cases per outbreak in the same quarter of last year)
- 35 hospitalisations: norovius (17), 'gastroenteritis' (17), and *Mycobacterium tuberculosis* (1)
- 4 deaths: norovirus

Pathogens

- 30 norovirus outbreaks (940 cases) during this quarter
- 22 'gastroenteritis' outbreaks (188 cases)
- 6 *Giardia* outbreaks (17 cases)
- 4 rotavirus outbreaks (21 cases)
- 3 *Cryptosporidium* outbreaks (15 cases)
- 3 *Salmonella* outbreaks (9 cases)
- 2 *Clostridium perfringens* outbreaks (125 cases)
- 2 *Campylobacter* outbreaks (10 cases)
- 2 *Bordetella pertussis* outbreaks (4 cases)
- 1 *Shigella sonnei* outbreak (2 cases)
- 1 *Shigella spp.* outbreak (2 cases)
- 1 *Mycobacterium tuberculosis* 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.

- 64 person-to-person, from (non-sexual) contact with an infected person (including droplets): 28 norovirus (934 cases), 16 gastroenteritis (163 cases), 4 rotavirus (21 cases), 4 *Giardia* (10 cases), 3 *Cryptosporidium* (15 cases), 3 *Salmonella* (9 cases), 2 *Campylobacter* (10 cases), 2 *B. pertussis* (4 cases), 1 *M. tuberculosis* (2 cases), and 1 *S. sonnei* (2 cases)
- 16 environmental, from contact with an environmental source (e.g. swimming): 8 norovirus (425 cases), 2 gastroenteritis (14 cases), 2 rotavirus (14 cases), 2 *Cryptosporidium* (9 cases), 1 *Giardia* (3 cases), and 1 *S. sonnei* (2 cases)
- 9 foodborne, from consumption of contaminated food or drink (excluding water): 4 gastroenteritis (27 cases), 2 *C. perfringens* (125 cases), 2 *Campylobacter* (10 cases), and 1 norovirus (288 cases)
- 6 waterborne, from consumption of contaminated drinking water: 2 *Cryptosporidium* (9 cases), 2 *Giardia* (5 cases), 1 *Campylobacter* (4 cases), and 1 *S. sonnei* (2 cases)
- 3 zoonotic: 1 *Campylobacter* (4 cases), 1 *Salmonella* (3 cases), and 1 *Giardia* (2 cases)
- 1 'other' mode of transmission: 1 norovirus (via fomites) (23 cases)
- 8 'unknown' mode of transmission: 4 gastroenteritis (16 cases), 2 norovirus (6 cases), 1 *Giardia* (4 cases), and 1 *Shigella spp.* (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.

- 22 home: 5 gastroenteritis (59 cases), 4 *Giardia* (10 cases), 3 norovirus (9 cases), 3 *Salmonella* (9 cases), 2 *Cryptosporidium* (10 cases), 2 rotavirus (7 cases), 2 *B. pertussis* (4 cases), and 1 *Campylobacter* (4 cases)
- 18 rest home: 13 norovirus (314 cases), 4 gastroenteritis (30 cases), and 1 *Campylobacter* (6 cases)
- 10 hospital (continuing care): 6 norovirus (160 cases), 3 gastroenteritis (13 cases), and 1 *Campylobacter* (6 cases)
- 8 café: 5 gastroenteritis (22 cases), 2 norovirus (8 cases), and 1 *C. perfringens* (4 cases)
- 6 childcare: 3 rotavirus (19 cases), 2 gastroenteritis (32 cases), and 1 *Salmonella* (2 cases)
- 5 hostel: 3 norovirus (437 cases), 1 *C. perfringens* (121), and 1 gastroenteritis (16 cases)
- 4 hospital (acute care): 2 norovirus (32 cases), and 2 gastroenteritis (21 cases)
- 3 school: 1 norovirus (91 cases), 1 gastroenteritis (16 cases), and 1 *M. tuberculosis* (2 cases)
- 3 farm: 1 *Cryptosporidium* (5 cases), 1 *Campylobacter* (4 cases), and 1 *Giardia* (2 cases)
- 2 workplace: 1 norovirus (6 cases), and 1 *Cryptosporidium* (5 cases)
- 1 community: *Giardia* (3 cases)
- 1 hotel/motel: norovirus (15 cases)
- 8 'other setting': 3 norovirus (374 cases), 3 gastroenteritis (28 cases), 1 *Salmonella* (4 cases), and 1 *Giardia* (2 cases)
- 6 outbreaks with no setting selected: 2 norovirus (5 cases), 1 *Giardia* (4 cases), 1 gastroenteritis (2 cases), 1 *S. sonnei* (2 cases), and 1 *Shigella spp.* (2 cases)

5. Outbreak Case Reports

Two outbreaks, one restaurant, 12 days

Community and Public Health (C&PH) were involved in two food borne outbreak investigations involving the same Mexican Restaurant during August 2008. The first outbreak was reported to C&PH on Thursday 14 August by a member of a group who dined at the restaurant as part of a birthday function. A questionnaire was drafted including the restaurant's menu and administered to the attendees of the birthday dinner in addition to two other groups that had dined there the same evening. An early indication of the source of the outbreak was those affected by gastroenteritis had eaten the side dishes; rice, beans and salad.

A premises visit was made by two Health Protection Officers from C&PH the following day. A number of food safety issues were identified that directly related to the preparation of the implicated side dishes. These included; the addition of spices and fresh herbs to the cooked bean mixture, slow cooling of the mashed bean mixture in deep containers, reheating the bean mixture in the microwave with no temperature checking, the use of raw egg in the salad dressing and the lack of temperature checking of the hot held rice. Food safety advice was given, including safe cooling methods to avoid future outbreaks. Unfortunately, no food samples were obtained as they had all been disposed of in the garbage that had been collected.

Five faecal specimens were submitted and tested for a range of food poisoning pathogens and norovirus. All five specimens were positive for *Clostridium perfringens* (levels > 1×10^5) with four of these positive for *C. perfringens* enterotoxin and three positive for norovirus. The positive laboratory results of *C. perfringens* and norovirus accounts for the variation in symptoms experienced by those affected. Initially there was some confusion due to the order in which these symptoms presented (diarrhoea *followed* by vomiting), which can be explained by the presence of the two pathogens.

Questionnaires were administered to a total of 28 people during the first outbreak and the information was analysed using EpiInfo version 3.5.1. Sixteen (57%) were affected by gastroenteritis, with a mean incubation period of 17 hours (range 10 to 45 hours). The symptoms experienced included diarrhoea, vomiting, stomach cramps, nausea, headache and fatigue. Analysis of foods eaten at the restaurant indicated an increased risk of gastroenteritis with consumption of three side dishes (rice, p 0.002; beans, p 0.0007; and salad, p 0.02; odds ratios (ORs) undefined). No other risk factors were found to be significant.

The second outbreak was reported on 25 August under similar circumstances; a birthday function which was held at the previously implicated Mexican restaurant. The same questionnaire was administered to this second group. Another premises visit was conducted on 26 August by which time it appeared that previous food safety advice had been implemented. However, it was noticed that an old masher was being used to mash the bean mixture which may have been the source of contamination. The masher was disposed of by restaurant staff. A range of food samples were taken including; cooked beef mixture, cumin and coriander spices, which were all negative for *C. perfringens*, however, *Bacillus cereus* was isolated in the spice mixtures. An additional cook step was added to the herb preparation to reduce the potential for foodborne illness from *B. cereus*. As in the first outbreak, there was no cooked bean mixture available to sample. However, samples taken the following week to verify that food safety practices were achieved were negative for *C. perfringens*.

A total of 19 questionnaires were administered in relation to the second outbreak with eight (42%) people experiencing symptoms of diarrhoea, vomiting, stomach cramps, nausea, headache and fatigue. The mean incubation period was 15 hours. The risk factor analysis was repeated using the combined data from both outbreaks. As for the first outbreak, rice (p 0.0012, OR 22.86), beans (p 0.0018, OR 13.75) and salad (p 0.0762, OR 6.67) were found to be the only significant risk factors.

A total of 24 people were affected by gastroenteritis during the two outbreaks. Both groups experienced similar symptoms and incubation periods, and *C. perfringens* was isolated from faecal specimens in both groups. Norovirus was isolated in the first outbreak, but this appears to be an incidental finding as no source could be ascertained. Both outbreaks could have been prevented by correct food safety procedures and since implementing the food safety advice provided and disposing of the old bean masher there have been no further reports of illness from this Mexican restaurant to C&PH. Where food samples may assist in determining the cause of an outbreak, a site visit by food safety officers should take place immediately after notification. This enables food samples to be obtained before they are disposed of, and food safety procedures to be scrutinised before they are modified.

Reported by Chivala Hope, Health Protection Officer, Community and Public Health

Novel recombinant strain of norovirus identified from an oyster-borne outbreak in Auckland

Between 11 and 30 July 2008, the Auckland Regional Public Health Service (ARPHS) was notified of 30 separate foodborne illness incidents, affecting 121 people who had consumed raw Pacific oysters (*Crassostrea gigas*), grown and marketed locally. Symptoms of those affected included nausea, vomiting, stomach cramps and diarrhoea, and a norovirus outbreak was suspected.

An outbreak investigation, which consisted of an epidemiological investigation, oyster traceback, virological analysis and several environmental surveys, was commenced on 16 July at which time 11 incidents had been reported.

The epidemiological investigation concentrated on the two largest outbreaks. Both involved private functions at which raw oysters had been served as part of a wider buffet menu. Retrospective cohort studies of both functions were conducted, with standardised food questionnaires being administered by telephone to determine which foods or beverages were associated with illness. A case was defined as any person who consumed food or drink at their respective function and subsequently experienced diarrhoea or vomiting within 72 hours. Cases who were still symptomatic at the time of interview were asked to submit faecal samples for microbiological and virological analysis.

Oyster traceback was carried out by contacting the implicated oyster farm and food premises to obtain batch numbers and oyster samples for virological testing. Environmental surveys of the implicated oyster growing areas and surrounding regions were undertaken to identify possible sources of contamination.

Results of the epidemiological investigations into the two private functions were similar, and consistent with oyster-borne norovirus outbreaks. Mean incubation periods were 30 and 36 hours, respectively; and mean duration of illness was 53 hours for both outbreaks. For both functions, raw oysters were the only foods significantly associated with illness, with relative risks of 21.9 (95% confidence interval (CI) 1.4-343.7) and 44.3 (95% CI 6.2-315.2), respectively.

Traceback of oysters implicated three growing areas (leases) belonging to one oyster growing farm. All implicated oysters had either been grown on one lease ("lease X") or relayed through it from other leases.

Sixteen faecal samples from symptomatic cases and 23 oyster samples (including leftover food obtained from food premises, library samples from the three implicated growing areas, and feral samples from the Wairoa River) were tested for norovirus by real-time reverse transcriptase polymerase chain reaction.[1] Fifteen of the faecal samples (94%) were positive for a recombinant strain of norovirus genogroup II (GII.c-GII.12) that, to our knowledge, has not previously been reported. Fourteen of the oyster samples (61%), 11 of which were from lease X, were also positive for norovirus genogroup II. One of these oyster samples (a fresh lease X sample) was further typed as the recombinant GII.c-GII.12 strain, indistinguishable from that identified in the faecal samples. Further sequence analysis of norovirus strains from other oyster samples is pending.

Environmental investigations of the implicated growing areas revealed a number of potential sewage contamination points along the Wairoa River, upstream from the main lease implicated in the outbreaks. These sites included five properties lining the Wairoa River with suspect onsite sewage disposal systems, and therefore with the potential to discharge untreated raw effluent into the river from where it could make its way to the oyster farm. Boating activity was not felt to have been a potential contamination source of the oyster farm because of its lack of proximity to any of the leases.

Another potential source of contamination was identified at a processing stage of the oyster farm's factory. Due to excessive rainfall, the disposal field for the factory's sewerage treatment plant had become saturated, resulting in wastewater (which may have contained norovirus particles) seeping from the field into a nearby creek. This creek water was subsequently used, untreated, to 'wash down' freshly harvested oysters as soon as they were received from the three implicated growing areas, prior to shucking by factory hands.

The implicated oyster growing areas were closed on 17 July. On 22 July, the New Zealand Food Safety Authority initiated a product recall of all oysters harvested from these leases between 30 June and 11 July. Following publication of recall notices, ARPHS received 15 further notifications of foodborne illness related to consumption of these oysters, including two notifications involving oysters that had been consumed at food premises one or two days after the recall had been made public.

This outbreak is noteworthy for the following two reasons:

(1) Firstly, the norovirus strain detected in the faeces of symptomatic cases and in the oyster samples is a recombinant strain that has not been described previously.

(2) Secondly, this outbreak highlights the importance of a timely and comprehensive investigation into an oyster-associated outbreak of foodborne illness to enable rapid public health action to control the spread of infection. Such action may include closure of oyster growing areas and initiation of a product recall.

References

1. Greening GE and Hewitt J 2008. Norovirus detection in shellfish using a rapid, sensitive virus recovery method and real-time RT-PCR detection protocol. *Food Analytical Methods* 1: 109-118.

Reported by Corina Grey, Public Health Medicine Registrar, Greg Simmons, Medical Officer of Health, Cameron Ormsby, Health Protection Officer, Auckland Regional Public Health Service; Joanne Hewitt, Scientist, Gail Greening, Science Leader, Communicable Disease Programme, ESR

6. Pathogen Surveillance

Unless otherwise reported, pathogen surveillance in this section is for the October – December 2008 quarter.

ENTERIC PATHOGENS

The Enteric Reference Laboratory (ERL) is responsible for the confirmation of the following notifable diseases *Salmonellae, Shigellae, Vibrio cholerae* O1 and VTEC.

Salmonella (ERL)

Human and non-human Salmonella isolate data are available at www.surv.esr.cri.nz/enteric_reference/enteric_reference.php

- 328 human and 224 non-human isolates were submitted to ERL (2007, 336 and 248 respectively)
- 62 isolates *S.* Typhimurium phage type 42 were confirmed
- epidemiological findings implicated uncooked four as a major risk factor
- molecular testing confirmed 42 human isolates and 5 four isolates which had indistinguishable DNA profles
- a voluntary withdrawal of product was made and the general public were informed via media coverage immediately prior to Christmas

VTEC/STEC (ERL)

- 17 isolates of *E. coli* O157:H7 were laboratory confirmed (2007, 20)

Yersinia (ERL and Population and Environmental Health)

- 119 isolates have been received as part of the *Yersinia* typing project being undertaken by ESR for the Ministry of Health to assess the national profle of biotypes circulating in New Zealand
- isolates were identified as *Y. enterocolitica* type 1A (33), type 2 (2), type 3 (28), type 4 (45); *Y. frederiksenii* (7); *Y. intermedia* (1); *Y. kristensenii* (1); and *Y. rohdei* (2)

Norovirus (Norovirus Reference Laboratory)

- 46 confirmed norovirus outbreaks were reported, of which 21 (45.6%) occurred in rest home (17) and hospital settings (4), and 11 occurred in catered settings
- 5 outbreaks occurred in home, hostel or institutional settings, and 1 occurred in a tour bus group
- the majority of norovirus outbreak strains identified belonged to Genogroup II (45, 97.8%) and only 1 outbreak was associated with a Genogroup I strain
- genotyping showed that the predominant genotype was again GII.4, accounting for 20 outbreaks, including outbreaks in healthcare institutions
- 12 of the GII.4 strains identified were 2006b variants; another 2 variants, GII.4 2008 (6 outbreaks) and a provisional GII.4 2007 variant (2 outbreaks) were also identified in this quarter
- these variants have also been identified in Europe and Japan

- other genotypes identified included GI.8, GII.6, GII.7 and recombinant GII strains GII.b/GII.3 and GII.c/GII.12
- 1 hospital outbreak was associated with a mixed infection of 2 GII norovirus strains, GII.4 2006b and GII.7
- the novel recombinant GII.c/GII.12 strain, first identified in shellfish - related outbreaks in July, was associated with a further 4 outbreaks, 2 from rest home outbreaks in the South Island and 2 from unknown settings in Auckland

LEGIONELLOSIS & ENVIRONMENTAL LEGIONELLA

- 45 cases were notified this quarter of which 30 were lab-confirmed as cases
- all lab-confirmed cases involved sporadic community acquired cases, with no outbreaks identified
- 3 deaths were attributed to legionellosis
- of the 30 cases identified, 22 fitted the confirmed case definition and 8 fitted the probable case definition
- the 22 confirmed cases demonstrated either antibody titres >512 on two or more occasions (8 cases), or at least a four-fold rise in antibody titre by the legionella IFAT (4 cases), or a rising antibody titre to >1024 (4 cases), or were culture-positive (6 cases)
- the 8 probable cases exhibited either a single high antibody titre >512 (1 case), or a stable titre of 512 (2 cases), or were urinary antigen-positive (3 cases), or were PCR test-positive (2 cases)
- the increase in legionellosis cases this quarter can be attributed to infection with *L. longbeachae* strains following exposure to compost material
- *L. longbeachae* was identified as the causative agent in 18 cases
- *L. pneumophila* serogroup 1 was identified as the causative agent in 6 cases
- *L. pneumophila* serogroup 12 was identified as the causative agent in 1 case
- *L. dumoffii* was identified as the causative agent in 3 cases
- *L. feeleii* was identified as the causative agent in 1 case
- *L. micdadei* was identified as the causative agent in 1 case
- Legionellae isolated from domestic drinking and recreational water systems, including spa pools, included *L. feeleii* serogroup 1, *L. longbeachae* serogroup 1, and *L. pneumophila* serogroup 1
- Legionellae isolated from industrial water systems including cooling towers included *L. anisa, L. rubrilucens,* and *L. pneumophila* serogroups 1, 5, 6, 13 and 14
- Legionellae isolated from composts and soils included *L .bozemanii*, *L. dumoffii, L. feeleii, L. longbeachae* serogroups 1 and 2, and *L. pneumophila* serogroups 3, 4, and 13

RESPIRATORY VIRUSES

Influenza Virus

- 15 influenza viruses were identified (2007, 24)
- 5 were identified as influenza A, 1 as A/Brisbane/10/2007 (H3N2)–like strains, 1 as A (H3N2) not-antigenically-subtyped, and 3 as A not subtyped
- 10 were identified as influenza B, 6 as B/Malaysia/2506/2004-like strains, and 4 as B not subtyped

(For more details on the influenza vaccine recommendation, please refer to the report: www.surv.esr.cri.nz/virology/influenza_vaccine.php)

Respiratory Syncytial Virus, Rhinovirus & Parainfluenza Virus

- 104 cases of respiratory syncytial virus were reported (2007, 75)
- 17 rhinoviruses were reported (2007, 10)
- 77 parainfluenza viruses were reported (2007, 45), 76 were typed as parainfluenza type 3, and 1 as parainfluenza type 1

ADENOVIRUSES & ENTEROVIRUSES

Adenoviruses

- 132 adenoviruses were reported (2007, 176)
- adenovirus type 8 was the predominant serotype
- 120 adenoviruses were serotyped as adenovirus type 1 (12), type 2 (14), type 3 (22), type 4 (1), type 5 (6), type 6 (1), type 8 (62), type 11 (1), and type 37 (1)

Enteroviruses

- 83 enteroviruses were reported (2007, 50)
- 21 enteroviruses were serotyped as Coxsackie B1 (1), Coxsackie B5 (2), Echovirus 4 (1), Echovirus 6 (13), Echovirus 9 (1), Echovirus 18 (1), and Echovirus 25 (2)

SPECIAL BACTERIOLOGY

Listeria monocytogenes

- 5 isolates of *L. monocytogenes* from human cases were referred (for table of human *L. monocytogenes* cases giving more details see www.surv.esr.cri.nz/surveillance/NZPHSR.php)
- 3 cases were perinatal, all the infants survived
- 2 cases were in adults, both were elderly and/or had underlying illness

Corynebacterium diphtheriae

- 4 isolates of *C. diphtheriae* were received for toxigenicity testing, typing and surveillance purposes
- all isolates were from cutaneous sources, and were var. *gravis* strains
- the patients were from Auckland
- all the isolates were determined to be non-toxigenic by PCR examination for the toxin gene
- 1 isolate of *Corynebacterium ulcerans* was received from cutaneous source in a 46 year old male (Auckland), it was determined by PCR testing to be harbouring the diphtheria toxin gene
- literature reports of disease associated with *C. ulcerans* are rare, but if the organism is recovered from pseudomembranous material the disease must be treated like a case of diphtheria

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

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