

New Zealand Public Health Surveillance Report

March 2011: Covering October to December 2010

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- 17 hospitalisations, no deaths

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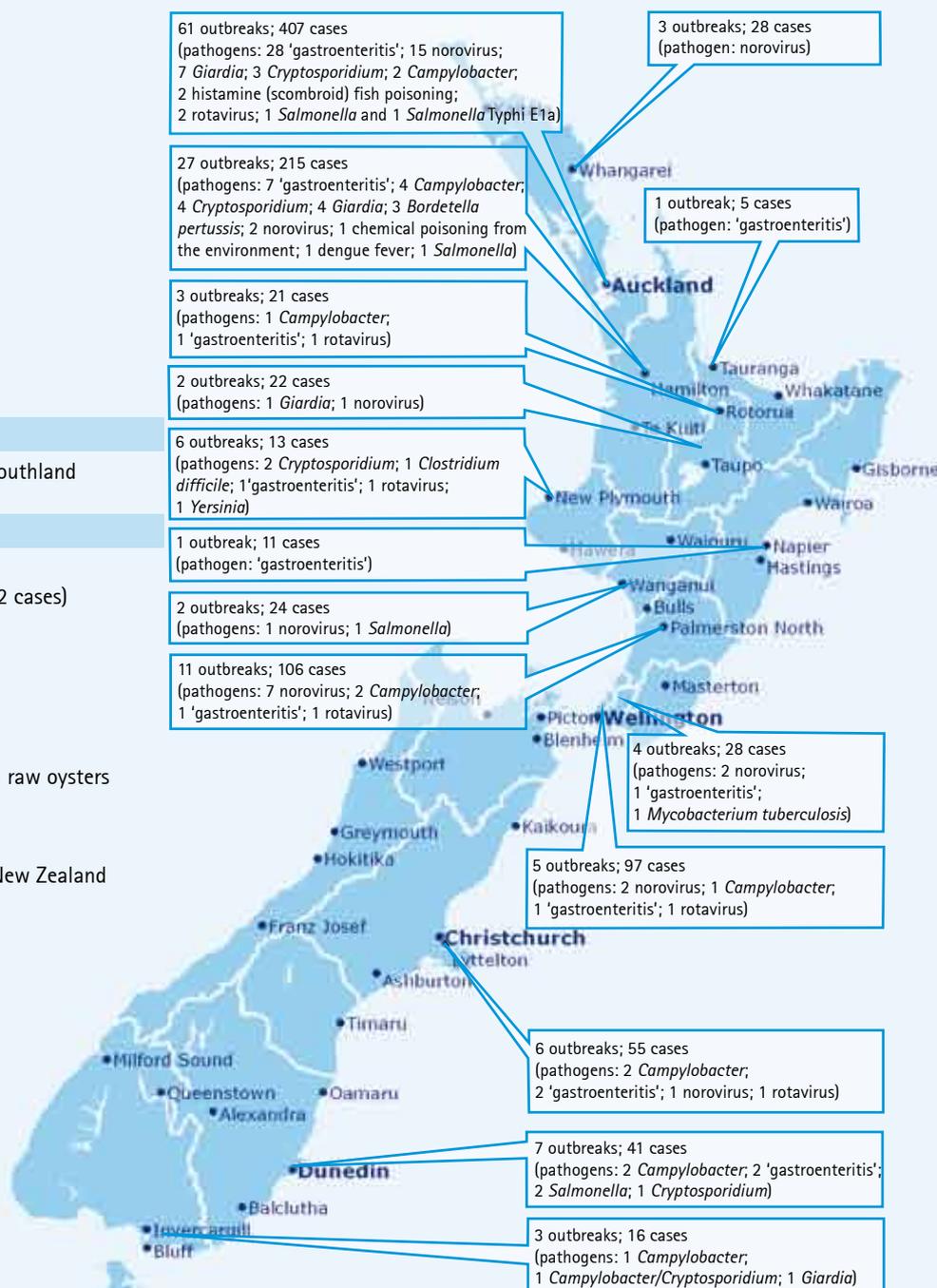
6. Laboratory Surveillance

- NDM and KPC carbapenemases recently identified in New Zealand

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

This Quarter's Outbreaks

Notification and outbreak data in this issue are drawn from the October to December quarter of 2010. 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 17 January 2011.



Rheumatic fever – an indicator of child health

Acute rheumatic fever (ARF) has been proposed as a potent indicator of the lack of progress in child health in New Zealand. This is based on the following rationale:

- the primordial reason with the biggest effect for high rheumatic fever (RF) rates is most likely to be household crowding. Limited health literacy about the preventability of ARF is also likely to be a factor
- access to primary healthcare. ARF is preventable by treating the precursor Group A streptococcal pharyngitis, but access to healthcare continues to be inadequate for Maori and Pacific families (www.heartfoundation.org.nz). This, coupled with reduced health literacy, is likely to delay a child's presentation with potential ARF, guaranteeing more serious heart disease on later presentation
- long-term sequelae. Adults who have sustained ARF as children, even with a highly efficient secondary prophylaxis programme, carry the burden of chronic disease related to rheumatic heart disease (RHD), including heart failure, atrial fibrillation, strokes and endocarditis
- premature mortality from RHD sequelae.

An International Workshop on Rheumatic Fever and Rheumatic Heart Disease Control in New Zealand held on 20 June 2009 (www.paediatrics.org.nz), that provided best practice advice for RF control, concluded that ARF in high risk populations in New Zealand could be reduced to that of low risk populations by 2020.

Historical data¹ indicate that the ARF rate in young city dwellers in the 1920s (assumed predominantly non-Maori) was at the rate now seen in the early 21st century in Maori and Pacific children of similar age.² The virtual disappearance of ARF in Pakeha has been mirrored in similar populations in other developed countries. This is well documented,³ and likely to be due to a composite of factors, including improved housing and better access to healthcare.⁴ Moreover, ARF has been controlled in more deprived countries where there has been a focus on its management, for example, the French Caribbean⁵, Costa Rica and Cuba.^{6,7}

How can New Zealand reduce ARF levels among Maori and Pacific children? School- and community- based approaches are key. Guided by a highly successful programme in Whangaroa,⁸ rural areas, in particular, are establishing school- and/or community- based clinics in New Zealand. However, the major health gain for RF control in New Zealand will derive from addressing the largest burden of disease (60%) in the Auckland region. Although an approach is under discussion, there remains lack of cohesive planning especially in the Auckland Region.

RF as an indicator of child health points to communities in need. Other diseases of poverty and disadvantage in association with poor housing and lack of access are equally preventable e.g. bronchiolitis and pneumonia leading on to bronchiectasis, invasive staphylococcal bone and joint disease, post streptococcal glomerulonephritis leading to renal failure and serious skin sepsis as the commonest cause of hospitalisation in the school age group. Enhanced primary care and health knowledge at the level of schools and communities is likely to reduce hospitalisation rates and sequelae for Maori and Pacific children to those of Pakeha children. To this end, a pilot project is to start in South Auckland linking sore throat clinics for ARF prevention to nurse-led skin disease control in a school setting. Community interventions to reduce child pedestrian injury will be part of this intervention.

Housing New Zealand's (HNZ) Healthy Housing initiative in Auckland (a joint initiative between HNZ and the health sector) has reduced hospitalisations likely to be related to housing conditions by 26% in 5–45 year old people in South Auckland.⁹ This includes hospitalisations for RF, post streptococcal glomerulonephritis, osteomyelitis and cellulitis, all expensive to the health service. Clearly, this important initiative should not be allowed to languish, though its planned finish date is June 2011.

National steering group establishment

A national steering group led by the National Heart Foundation has ratified the way forward for RF and RHD control as forged by the Workshop above. Planning meetings, supported by PHARMAC are underway to progress RF/RHD control. The inclusion of all levels of New Zealand society is recommended as the success of the Whangaroa initiative was due to it being community based. Education of healthcare professionals to take into account the startlingly different risks in different communities of developing RF following Group A streptococcal pharyngitis when managing this very common condition (www.heartfoundation.org.nz/sorethroatguidelines) is an important and urgent educational initiative for the future.

Development of a national RF register

To monitor the control of ARF and the progress of this child health indicator in New Zealand, accurate data are essential. RF became notifiable in 1986. From 1996 to 2005, there were 22% fewer notifications than there were first hospital admissions for ARF.² This is likely to underestimate the degree of under-reporting as some notifications are likely to have been for RHD, not ARF. Under-reporting appears to have occurred in most regions. Household contact tracing of further cases of Group A streptococcal pharyngitis surrounding an index ARF case has been promoted by the American Heart Association for many years, and was subsequently incorporated into the New Zealand guidelines for diagnosis and prevention of RF (www.heartfoundation.org.nz). This occurs in some District Health Boards (DHBs).

Should ARF remain a notifiable disease? A review of the literature suggests that contact tracing is not likely to be cost effective.¹⁰ However, notification data if timely and accurate, are a more rapid data source than hospital discharge data. Notification to regional registers is done for secondary prophylaxis delivery to prevent recurrent attacks,¹¹ and was underway before 1986. Enhanced surveillance would ensure a more robust knowledge of the ARF burden and could be expanded to include the RHD burden, which currently is only measured by Auckland's regional RF register, and only when prophylaxis is required. A national RF register has been proposed to link regional registers to improve ongoing delivery of prophylaxis across DHBs. Those that slip through the net often present from another DHB.¹¹ This issue could be solved by a simple electronic register. Quality standards in all areas of endeavour for the control of RF/RHD should be in place.¹²

Other activities endorsed by workshop attendees that would help to reduce RF in New Zealand's high risk populations included:

- primary prevention in very high risk schools
- primary prevention in medium risk schools, where school sore throat clinics are not supportable
- secondary prevention to abolish recurrent attacks of RF that further damage the heart
- development of necessary tools to ensure full participation by populations most at risk of ARF/RHD and for health professionals to adhere to published guidelines
- continuing research into detection of sub-clinical RHD by echocardiography.

In 21st century New Zealand RF rates are increasing rather than diminishing as a result of rising rates in disadvantaged communities. We have the tools available to control this disease with its attendant premature morbidity and mortality and are acting irresponsibly as a nation until RF is controlled.

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

Reported by Diana Lennon, Population and Child Health, Starship Children's Hospital/ University of Auckland.

2. Notifiable Disease Surveillance

The following is a summary of disease notifications for the October to December quarter of 2010 and cumulative notifications and rates calculated for a 12-month period (January to December 2010). For comparative purposes notification numbers and rates are presented in brackets for the same periods in the previous year. A robust method of constructing 95% confidence intervals is used to determine 'statistically significant differences' throughout this report unless otherwise stated [see Newcombe RG and Altman DG 2000. Proportions and their differences. In: Statistics with Confidence. BMJ Books, Bristol.]. Data contained within this report are based on information recorded in EpiSurv by public health service staff up to 17 January 2011. As this information may be updated over time, these data should be regarded as provisional.

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

VACCINE PREVENTABLE DISEASE

Invasive Pneumococcal Disease

- **Notifications:** 97 notifications in the quarter (2009, 161); 535 notifications over the last 12 months (2009, 697), giving a rate of 12.4 cases per 100,000 population (2009 16.1), a statistically significant decrease.
- **Comments:** there has been a statistically significant quarterly decrease from the previous quarter (218 cases) and from the same quarter last year (161 cases); cases were aged between 3 days and 96 years, with 8 cases under the age of 2 years.

Measles

- **Notifications:** 3 notifications in the quarter (2009, 14); 48 notifications over the last 12 months (2009, 248), giving a rate of 1.1 cases per 100,000 population (2009, 5.7), a statistically significant decrease.
- **Comments:** there has been a statistically significant quarterly decrease from the same quarter last year (14 cases); one case was laboratory confirmed.

Meningococcal Disease

- **Notifications:** 19 notifications in the quarter (2009, 26); 97 notifications over the last 12 months (2009, 133), giving a rate of 2.2 cases per 100,000 population (2009, 3.1), a statistically significant decrease.
- **Comments:** cases were distributed by age as follows: 8 (<1 year), 2 (1–4 years), 1 (10–14 years), and 8 (15 years and over); 3 cases were the epidemic strain.

Mumps

- **Notifications:** 9 notifications in the quarter (2009, 18); 41 notifications over the last 12 months (2009, 63), giving a rate of 0.9 cases per 100,000 population (2009, 1.5), a statistically significant decrease.
- **Comments:** 5 notifications were laboratory confirmed.

Pertussis

- **Notifications:** 194 notifications in the quarter (2009, 405); 875 notifications over the last 12 months (2009, 1398), giving a rate of 20.3 cases per 100,000 population (2009, 32.4), a statistically significant decrease.
- **Comments:** there has been a statistically significant quarterly decrease from the same quarter last year (405 cases).

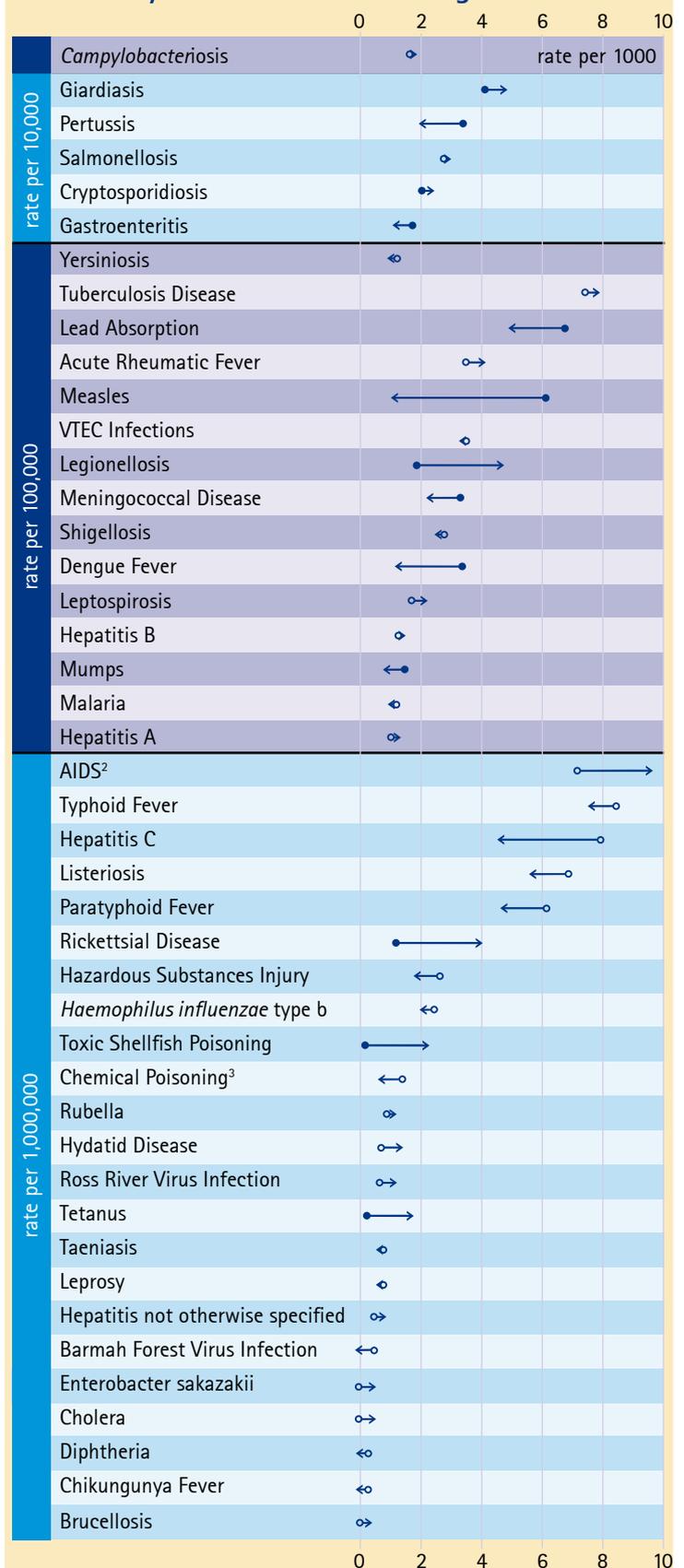
INFECTIOUS RESPIRATORY DISEASES

Acute Rheumatic Fever

- **Notifications:** 38 notifications in the quarter (2009, 18); 167 notifications over the last 12 months (2009, 140), giving a rate of 3.9 cases per 100,000 population (2009, 3.2), not a statistically significant increase.
- **Comments:** there has been a statistically significant quarterly increase from the same quarter last year (18 cases); cases were distributed by age as follows: 26 (5–14 years), 11 (15–24 years), and 1 (25–44 years); 36 cases were initial attack of acute rheumatic fever and 2 cases were recurrent attacks.

National Surveillance Data

12-Monthly Notification Rate Changes¹



Notifications per 1000 or 10,000 or 100,000 or 1,000,000 population

Rate Change Symbol Key:

➤ Rate increase from the previous 12-month period

➤ Rate decrease from the previous 12-month period

● Statistically significant rate change

○ Statistically non-significant rate change

¹ Rates are calculated for the 12-month period January to December 2010 and compared to previous 12-month rates.

² Data provided by the AIDS Epidemiology Group, University of Otago. Note: changes in the 12-month notification rate should be interpreted with caution as this often reflects late notifications.

³ From the environment.

Non-seasonal Influenza (pandemic influenza (H1N1) 09)

- **Notifications:** 29 notifications in the quarter (2009, 44); 1826 notifications over the last 12 months, giving a rate of 42.3 cases per 100,000 population.
- **Comments:** there has been a statistically significant quarterly decrease from the previous quarter (1754 cases); cases were distributed by age as follows: 1 (<1 year), 2 (1–4 years), 7 (5–14 years), 4 (15–24 years), 7 (25–44 years), 6 (45–64 years), 2 (65 years and over); 28 cases were laboratory confirmed.
- **Note:** non-seasonal influenza became notifiable on 29 April 2009, therefore comparisons between 12-month rates are not valid.

ENTERIC INFECTIONS

Campylobacteriosis

- **Notifications:** 2077 notifications in the quarter (2009, 2489); 7346 notifications over the last 12 months (2009, 7177), giving a rate of 170.2 cases per 100,000 population (2009, 166.3), not a statistically significant increase.
- **Comments:** there has been a statistically significant quarterly increase from the previous quarter (1738 cases) and a statistically significant quarterly decrease from the same quarter last year (2489 cases).

Gastroenteritis

- **Notifications:** 154 notifications in the quarter (2009, 167); 498 notifications over the last 12 months (2009, 712), giving a rate of 11.5 cases per 100,000 population (2009, 16.5), a statistically significant decrease.
- **Note:** this is not a notifiable disease per se except in persons with a suspected common source or with a high risk occupation. The term 'gastroenteritis' provides a catch-all category for enteric diseases that are not notifiable and for syndromic reports that come through public health units, including direct reports from the public where the causative pathogen may never be known.

Paratyphoid Fever

- **Notifications:** one notification in the quarter (2009, 5); 19 notifications over the last 12 months (2009, 25), giving a rate of 0.4 cases per 100,000 population (2009, 0.6), not a statistically significant decrease.
- **Comments:** there has been a statistically significant quarterly decrease from the previous quarter (8 cases).

Salmonellosis

- **Notifications:** 296 notifications in the quarter (2009, 246); 1146 notifications over the last 12 months (2009, 1128), giving a rate of 26.6 cases per 100,000 population (2009, 26.1), not a statistically significant increase.
- **Comments:** there has been a statistically significant quarterly increase from the same quarter last year (246 cases).

VTEC Infections

- **Notifications:** 25 notifications in the quarter (2009, 30); 142 notifications over the last 12 months (2009, 143), giving a rate of 3.3 cases per 100,000 population (2009, 3.3), not a statistically significant decrease.
- **Comments:** there has been a statistically significant quarterly decrease from the previous quarter (41 cases).

ENVIRONMENTAL EXPOSURES & INFECTIONS

Cryptosporidiosis

- **Notifications:** 265 notifications in the quarter (2009, 324); 954 notifications over the last 12 months (2009, 854), giving a rate of 22.1 cases per 100,000 population (2009, 19.8), a statistically significant increase.
- **Comments:** there has been a statistically significant quarterly decrease from the same quarter last year (324 cases).

Giardiasis

- **Notifications:** 419 notifications in the quarter (2009, 376); 1985 notifications over the last 12 months (2009, 1639), giving a rate of 46.0 cases per 100,000 population (2009, 38.0), a statistically significant increase.

Hepatitis A

- **Notifications:** 5 notifications in the quarter (2009, 14); 47 notifications over the last 12 months (2009, 44), giving a rate of 1.1 cases per 100,000 population (2009, 1.0); not a statistically significant increase.
- **Comments:** there has been a statistically significant quarterly decrease from the same quarter last year (14 cases); cases were aged between 7 and 35 years, with 3 cases under the age of 16 years.

Lead Absorption

- **Notifications:** 61 notifications in the quarter (2009, 56); 201 notifications over the last 12 months (2009, 273), giving a rate of 4.7 cases per 100,000 population (2009, 6.3), a statistically significant decrease.
- **Comments:** cases were distributed by age as follows: 1 (<1 year), 1 (5–14 years), 6 (15–24 years), 18 (25–44 years), 28 (45–64 years) and 7 (65 years and over); there were 54 male and 7 female cases; 15 cases were recorded as having an occupation that involved exposure to lead: painter/decorator (8 cases), boilermaker, engineer, lead tackle worker, radiator repair worker, roofer (1 case each), and not specified (2 cases).

Legionellosis

- **Notifications:** 89 notifications in the quarter (2009, 22); 190 notifications over the last 12 months (2009, 74), giving a rate of 4.4 cases per 100,000 population (2009, 1.7), a statistically significant increase.
- **Comments:** there has been a statistically significant quarterly increase from the previous quarter (38 cases) and from the same quarter last year (22 cases).

Shigellosis

- **Notifications:** 8 notifications in the quarter (2009, 22); 105 notifications over the last 12 months (2009, 119), giving a rate of 2.4 cases per 100,000 population (2009, 2.8), not a statistically significant decrease.
- **Comments:** there has been a statistically significant quarterly decrease from the previous quarter (34 cases) and from the same quarter last year (22 cases).

Tetanus

- **Notifications:** 3 notifications in the quarter (2009, no cases); 7 notifications over the last 12 months (2009, 1).
- **Comments:** cases were aged between 4 and 86 years, with 2 cases over the age of 50 years.

NEW, EXOTIC & IMPORTED INFECTIONS

Dengue Fever

- **Notifications:** 13 notifications in the quarter (2009, 13); 51 notifications over the last 12 months (2009, 139), giving a rate of 1.2 cases per 100,000 population (2009, 3.2), a statistically significant decrease.
- **Comments:** all cases were laboratory confirmed; all cases were overseas during the incubation period. Places visited or resided in were Viet Nam (3 cases), India, Indonesia, Thailand (2 cases each), Australia, Haiti, Jamaica, and Panama (1 case each).

Malaria

- **Notifications:** 5 notifications in the quarter (2009, 10); 44 notifications over the last 12 months (2009, 50), giving a rate of 1.0 cases per 100,000 population (2009, 1.2), not a statistically significant decrease.
- **Comments:** there has been a statistically significant quarterly decrease from the previous quarter (14 cases); all cases were overseas during the incubation period. Places visited or resided in were India (3 cases) and Vanuatu (2 cases).

Rickettsial Disease

- **Notifications:** 2 notifications in the quarter (2009, 1); 16 notifications over the last 12 months (2009, 5), giving a rate of 0.4 cases per 100,000 population (2009, 0.1), a statistically significant increase.

- **Comments:** there has been a statistically significant quarterly decrease from the previous quarter (10 cases); both cases were rickettsial disease that was not further specified.

Toxic Shellfish Poisoning

- **Notifications:** No notifications in the quarter (2009, 1); 9 notifications over the last 12 months (2009, 1).

3. Other Surveillance Reports

Salmonella Typhimurium phage type 9 in Otago and Southland

Introduction

Salmonella species are zoonotic bacteria that can be transmitted by direct or indirect contact with infected animals or humans. *Salmonella* can cause gastroenteritis and septicaemia in humans and animals. Over 2500 serovars of *Salmonella* have been identified worldwide, one of which is phage type 9 (DT 9).

ESR has tested for DT 9 in New Zealand since 1988 and it was first detected in 1990. Before 2005, national notifications of this serovar had been sporadic, but since 2005, notifications have steadily increased from six in 2005 to 26 in 2010. Over the same period for all of New Zealand, total salmonellosis notifications decreased from 1383 cases in 2005 to 1143 in 2010.

DT 9 notifications are more common in Otago and Southland than other areas of New Zealand. From 2005 to 2010, these regions had 40% of the DT 9 notifications, but only 7% of New Zealand's population. The next most common regions for DT 9 notifications are Auckland, Waikato and Canterbury. DT 9 is one of the most common *Salmonella* serovars found in some areas of Australia.^{1,2} It is uncommon in countries outside New Zealand and Australia.

DT 9 was investigated by Public Health South after it was implicated in the death of an infant in 2009. In addition, a relatively large number (8) of DT 9 cases were notified in spring 2010 against a background of total notifications that were rising each year. This report describes the characteristics of DT 9 notifications in Otago and Southland and compares them with other *Salmonella* serovars.

Methods

All information about confirmed cases of salmonellosis notified to Public Health South (Otago and Southland) from 2005 to 2010 was extracted from EpiSurv. *Salmonella* cases were categorised according to whether they were the DT 9 serovar or not. Poisson regression was used to assess whether there was a significant change in the numbers of DT 9 cases from 2005 to 2010.

All cases of salmonellosis were characterised by age, sex, ethnicity, rurality (Urban/Rural profile classification), the four most commonly identified self-reported risk factors, whether the case was overseas during the incubation period, and the month of the illness onset. Non-binary variables were recategorised into binary form prior to analysis.

The proportion of *Salmonella* cases with positive responses to the variables were calculated (Table 1). Differences in proportions between DT 9 and other *Salmonella* serovars were assessed using chi-square tests. All tests were two-sided and had a significance level of 0.05. Data were analysed using Microsoft Excel and STATA.

Results

Between 2005 and 2010, 36 confirmed cases of DT 9 and 890 confirmed cases of other *Salmonella* serovars were notified to Public Health South. The majority of the DT 9 cases (28/36) were notified during 2009 and 2010. The increase in DT 9 cases from 2005 to 2010 was not statistically significant ($p = 0.051$).

The age and ethnicity distributions were similar for DT 9 and all other *Salmonella* serovars. Table 1 shows the numbers and percentages of DT 9 and other *Salmonella* serovars, by selected variables. Figure 1 shows the percentage of DT 9 and other *Salmonella* serovars, by month.

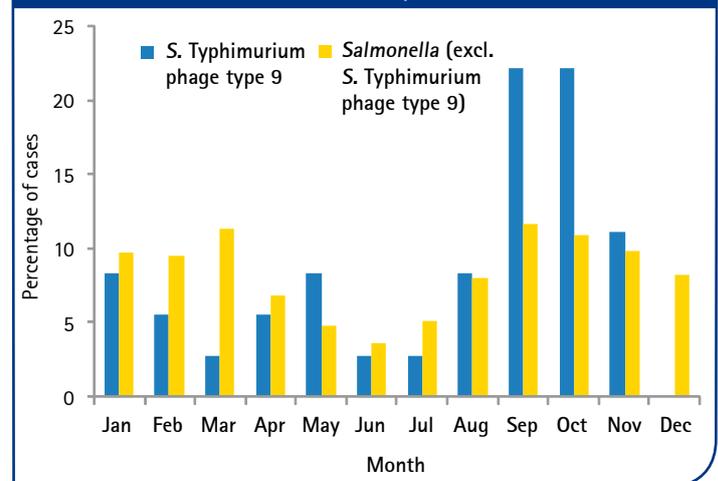
Table 1. Numbers (and percentages) of *Salmonella* Typhimurium phage type 9 (DT 9) and all other *Salmonella* serovars notified in Otago and Southland by rurality, outcome and selected risk factors, 2005–2010

Category	S. Typhimurium DT 9 serovar (n=36)		Other <i>Salmonella</i> serovars (n=890)		p-value of chi-square test
	Number of cases	% ¹	Number of cases	% ¹	
Female	18	50	408	46	0.7
Rural location	18	51	304	36	0.06
Died from disease	1	3	1	0	0.001
Hospitalised	4	13	113	16	0.6
Risk factors²					
Farm animal	15	45	286	43	0.8
Untreated water source	14	44	161	29	0.08
Food premises	14	42	285	45	0.8
Nappies, sewage, faeces or vomit	13	42	164	27	0
Overseas travel	0	0	86	13	0.03

¹ Percentage based on known data

² Risk factor recorded as positive if contact with risk factor within the incubation period (defined as 6–72 hours)

Figure 1. Percentage of cases positive for *Salmonella* Typhimurium DT 9 and other *Salmonella* serovars by month of onset date, 2005–2010



Discussion

The characteristics of cases with DT 9 were in general, similar to cases positive for other *Salmonella* serovars. However, DT 9 cases were more likely to have disease onset in spring relative to other *Salmonella* serovars ($p < 0.001$). As salmonellosis is a zoonotic disease, an analysis of non-human DT 9 isolates may assist in identifying possible DT 9 reservoirs and reasons for this spring peak. In Otago and Southland, most of the non-human DT 9 isolates came from a single veterinary laboratory and of these, most were from calves with diarrhoea.³ While this suggests calves may be the most important reservoir of DT 9 and responsible for the spring peak in Otago and Southland, other reservoirs may also be significant. For example, the same laboratory frequently isolated DT 9 from aborted sheep fetuses and in 2010, a dog faecal specimen was positive for DT 9. Nationally, DT 9 has also been isolated from horses and birds and at least two food samples have been positive for DT 9. Nationally, there have been three small outbreaks of DT 9, each involving nine cases or less. In those outbreaks where a source was identified, one was linked with chicken rolls and another with sick calves.

Another difference between DT 9 and other *Salmonella* serovars in Otago and Southland is that a lower proportion of DT 9 cases had a history of overseas travel during the incubation period, suggesting that DT 9 was more likely to be acquired within New Zealand.

Most non-human DT 9 isolated in New Zealand from 2005 to 2010 came from Otago and Southland.⁴ Thus, compared with other regions, the high numbers of DT 9 in Otago and Southland may be contributed to by farm animals in the region carrying the pathogen. Movement of infected stock between regions may contribute to increases in human DT 9 notifications in other areas.⁵

While this report was limited by several factors including the relatively small numbers of DT 9 cases and missing data for risk factor information, it is the first description of the epidemiology of DT 9 in New Zealand. Ongoing surveillance and research into DT 9 will assist in determining whether the characteristics of cases and reservoirs of this serovar are different among regions or are changing over time.

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

Reported by Dougal Thorburn, Public Health Medicine Registrar and Marion Poole, Medical Officer of Health, 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 to December 2010). Comparisons are made to the previous quarter (July to September 2010), and to the same quarter in the previous year (October to December 2009). Note that the outbreak data in this section are notified to ESR by the Public Health Services.

General

- 142 outbreaks notified in this quarter (1089 cases).
- 104 are 'final' reports (847 cases); 38 are 'interim' reports (242 cases) that have yet to be finalised and closed.

All data that follow relate to final reports only.

- 8.1 cases on average per outbreak, compared with 9.7 cases per outbreak in the previous quarter (14.6 cases per outbreak in the same quarter of last year).
- 17 hospitalisations: norovirus (7 cases), 'gastroenteritis' (6 cases), *Campylobacter* (2 cases), *Bordetella pertussis*, and *Salmonella* (1 case each).
- No deaths.

Pathogens

- 29 norovirus outbreaks (450 cases).
- 27 'gastroenteritis' outbreaks (201 cases).
- 12 *Campylobacter* outbreaks (37 cases).
- 9 *Cryptosporidium* outbreaks (25 cases).
- 9 *Giardia* outbreaks (30 cases).
- 5 rotavirus outbreak (59 cases).
- 4 *Salmonella* outbreaks (13 cases).
- 3 *B. pertussis* outbreaks (14 cases).
- 1 *Campylobacter*/*Cryptosporidium* outbreak (6 cases).
- 1 outbreak of chemical poisoning from the environment (2 cases).
- 1 *Clostridium difficile* outbreak (2 cases).
- 1 dengue fever outbreak (2 cases).
- 1 histamine (scombroid) fish poisoning outbreak (2 cases).
- 1 *Salmonella* Typhi E1a outbreak (4 cases).

Modes of Transmission

Note that reporting allows for multiple modes of transmission to be selected. In some instances no modes of transmission are selected for outbreaks notified to ESR.

- 67 person-to-person, from (non-sexual) contact with an infected person (including droplets): 25 norovirus (434 cases), 11 'gastroenteritis' (118 cases), 7 *Campylobacter* (21 cases), 6 *Cryptosporidium* (16 cases), 6 *Giardia* (21 cases), 5 rotavirus (59 cases), 3 *B. pertussis* (14 cases), 2 *Salmonella* (7 cases), 1 *Campylobacter*/*Cryptosporidium* (6 cases), and 1 *S. Typhi* E1a (4 cases).
- 16 environmental, from contact with an environmental source (e.g., swimming): 8 norovirus (120 cases), 4 *Giardia* (11 cases), 1 chemical poisoning from the environment (2 cases), 1 'gastroenteritis' (3 cases), 1 rotavirus (7 cases), and 1 *Salmonella* (2 cases).
- 26 foodborne, from consumption of contaminated food or drink (excluding water): 13 'gastroenteritis' (78 cases), 5 *Campylobacter* (15 cases), 4 norovirus (16 cases), 2 *Salmonella* (5 cases), 1 *Giardia* (3 cases), and 1 histamine (scombroid) fish poisoning (2 cases).
- 7 waterborne, from consumption of contaminated drinking water: 3 *Campylobacter* (10 cases), 3 *Cryptosporidium* (9 cases), and 1 *Giardia* (2 cases).
- 13 zoonotic, from contact with infected animals: 6 *Cryptosporidium* (18 cases), 4 *Campylobacter* (15 cases), 2 *Giardia* (9 cases), and 1 *Salmonella* (2 cases).
- 1 vectorborne: dengue fever (2 cases).
- 5 'other' mode: 1 *C. difficile* (2 cases), 1 'gastroenteritis' (6 cases), 1 norovirus (6 cases), 1 *Salmonella* (3 cases), and 1 *S. Typhi* E1a (4 cases).
- 8 mode of transmission unknown: 4 'gastroenteritis' (16 cases), 2 *Campylobacter* (7 cases), 1 *Giardia* (4 cases), and 1 *Salmonella* (4 cases).

Circumstances of Exposure

The first setting where exposure occurred is identified below.

- 24 home: 5 *Campylobacter* (11 cases), 5 *Giardia* (15 cases), 4 *Cryptosporidium* (11 cases), 4 norovirus (26 cases), 2 *B. pertussis* (12 cases), 2 *Salmonella* (8 cases), 1 *Campylobacter*/*Cryptosporidium* (6 cases), and 1 'gastroenteritis' (2 cases).
- 20 long term care facility: 12 norovirus (233 cases), 6 'gastroenteritis' (78 cases), and 2 rotavirus (30 cases).
- 16 restaurant/café/bakery: 8 'gastroenteritis' (34 cases), 4 norovirus (16 cases), 2 *Campylobacter* (4 cases), 1 histamine (scombroid) fish poisoning (2 cases), and 1 *Salmonella* (3 cases).
- 8 hospital (acute care): 5 norovirus (74 cases), 2 'gastroenteritis' (14 cases), and 1 *C. difficile* (2 cases).
- 7 childcare centre: 3 rotavirus (29 cases), 2 'gastroenteritis' (23 cases), and 2 norovirus (31 cases).
- 7 farm: 4 *Cryptosporidium* (11 cases), 2 *Campylobacter* (10 cases), and 1 *Salmonella* (2 cases).
- 3 takeaways: 2 'gastroenteritis' (4 cases) and 1 *Campylobacter* (5 cases).
- 2 fast food restaurant: 1 *Campylobacter* (2 cases) and 1 'gastroenteritis' (3 cases).
- 2 other institution: 1 *Campylobacter* (5 cases) and 1 norovirus (66 cases).
- 2 petting zoo: 1 *Cryptosporidium* (3 cases) and 1 *Giardia* (6 cases).
- 2 workplace: 2 'gastroenteritis' (37 cases).
- 1 hotel/motel: 'gastroenteritis' (3 cases).
- 3 'other setting': 2 *Giardia* (5 cases) and 1 norovirus (4 cases).
- 7 outbreaks with no setting selected: 2 'gastroenteritis' (3 cases), 1 *B. pertussis* (2 cases), 1 chemical poisoning from the environment (2 cases), 1 dengue fever (2 cases), 1 *Giardia* (4 cases), and 1 *S. Typhi* E1a (4 cases).
- 13 outbreaks also identified a second setting where exposure occurred.

5. Outbreak Case Reports

Giardia outbreak in a childcare centre

On 16 May 2010, Hawke's Bay Public Health Unit became aware of several confirmed cases of giardiasis at a large early childhood education centre (ECEC). The ECEC, comprising 35 staff and 121 children, is divided into six main areas (based largely on age) across three locations.

Thirty-four ECEC people experienced symptoms of giardiasis between 1 February and 16 May 2010 (compared with an average of 21 notified *Giardia* cases in the whole of Hawke's Bay for the same period in 2008–2009). ESR's Early Aberration Reporting System (EARS) had detected an excess number of notifications at the beginning of February.

Active case-finding was initiated. This included asking previously untested people who had symptoms to submit faecal specimens for testing. Negative faecal specimens were also tested for *Giardia*-specific antigen. A daily sickness log was created and faecal testing was arranged for those with new or relapsed symptoms. All cases with laboratory and clinical notifications of giardiasis since 1 February were asked about any connections to the ECEC.

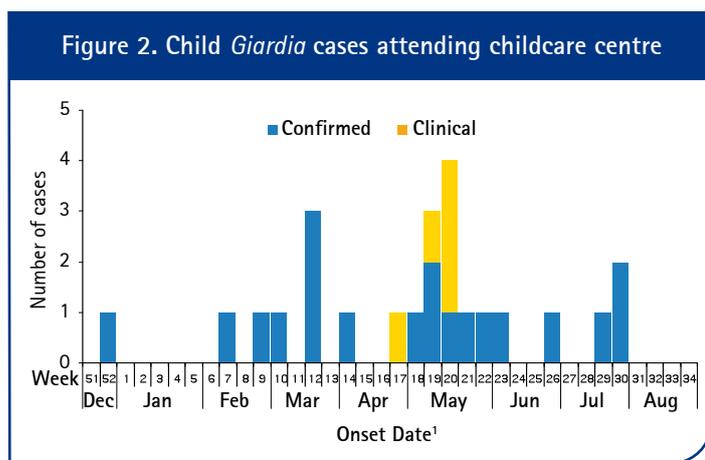
Possible aetiological factors were examined by conducting a cross-sectional survey of all children and staff at the centre. Questionnaires were completed for 115/121 (95.0%) children and 34/35 (97.1%) staff. Fifty-four of the 115 (47.0%) children had experienced at least one gastrointestinal symptom since 1 February, of these, 27 had family members with symptoms of giardiasis, 13 of whom tested positive.

For analysis, a case was defined as a person attending the ECEC between 1 February and 16 May who:

- had submitted a faecal specimen positive for *Giardia* by microscopy or antigen testing (confirmed case), or
- had reported having diarrhoea (clinical case) unless they had:
 - a negative *Giardia* faecal test, or
 - a faecal test positive for any other enteric pathogen and a *Giardia* test was not done.

Figure 2 illustrates the epidemic curve. The total number of people meeting the case definition was 26 (19 confirmed, 7 clinical), with an attack rate of 17.4% (children 24/115 (20.9%), staff 2/34 (5.9%)). Of 43 people providing faecal specimens, 19 were positive for *Giardia*.

The remainder of the analysis is confined to the 24 child cases attending the centre, 90% of whom were under 4 years of age.



¹ For asymptomatic cases, laboratory testing date was used

Cases occurred in all six ECEC areas. The area catering for toddlers (average age 1.92 years) had the highest attack rate (39%) and none of these children were toilet trained.

Males had a higher infection risk (OR = 2.5; $p \sim 0.06$) after adjustment for age and area. Toilet-trained children had a lower infection risk (OR = 0.05 (95% CI: 0.01–0.26; $p = 0.000$)), after adjustment for age, sex and area. Older children had a lower infection risk which became insignificant after adjustment for toilet training. It was difficult to separate the independent effects of age and being toilet trained because they

were highly correlated (correlation coefficient = 0.77). Having another household member with a giardiasis symptom was a significant risk factor (OR = 4.5 (95% CI: 1.8–11.7; $p = 0.0003$)). Analysis of onset dates suggests transmission of infection from child to other household members and vice versa.

Factors with no increased risk of infection included the sandpit, play dough, the water trough, cooking activities, bottlefeeding, bore or roof drinking-water at home, and swimming at another location.

We concluded that the outbreak was propagated by person-to-person transmission. The on-site pool was a possible additional transmission source, but swimming in the pool was found to be not associated with illness in the epidemiological study and pool testing did not provide strong microbiological support.

Reported by Nick Jones, Lester Calder, Medical Officers of Health, Theresa Te Whaiti, Health Protection Officer, Susan Stewart, Public Health Nurse, Ray Wibrow, Information Analyst, Christel Longhurst, Support Officer, Hawke's Bay District Health Board, Tim Wood, Health Programme, ESR, and Anthony Pita, Massey University.

Norovirus outbreak linked to consumption of imported raw oysters

On 1 July 2010, 30 guests gathered for a meal at a rural hotel in the Rangitikei District to celebrate a 65th birthday. The following morning some guests experienced diarrhoea and vomiting, and further cases developed over the next 24 to 36 hours. The MidCentral Public Health Unit was informed about this event on 12 July 2010, by which time all but three of the cases had resolved.

A questionnaire was distributed to all people who attended the function. The questionnaire was completed by all 30 attendees, and included 14 females and 16 males. Ages ranged from 44 to 85 years, with a median age of 63 years. A retrospective cohort analysis was done using the Statcalc and Analysis functions of EpiInfo 3.5.1.

The case definition was a person who attended the social event on the evening of 1 July 2010 and ate food there, and developed diarrhoea and/or vomiting in the 72 hours after the event finished. Based on this definition, there were 15 cases among the 30 diners that night. Initial symptoms developed between 6 and 40 hours after the meal. The duration of the symptoms ranged from 2–12 days, with a median of 4 days. Of the 15 cases, 14 (93.3%) had diarrhoea, and seven (46.6%) experienced vomiting.

Table 2: Attack rates and relative risks of food item consumption

Food	Food item consumed			Food item not consumed			RR	95% CI for RR	p-value for RR
	Case	Not a case	Attack rate (%)	Case	Not a case	Attack rate (%)			
Oysters	13	0	100	2	15	13	8.50	(2.3, 31.3)	<0.001
Vegetable soup	5	7	42	10	8	56	0.75	(0.3, 1.7)	0.71
Shrimp cocktail	8	7	53	7	8	47	1.14	(0.6, 2.4)	1.0
Roast turkey	9	10	47	6	5	55	0.87	(0.4, 1.8)	1.0
Glazed ham	12	9	57	3	6	33	1.71	(0.6, 4.6)	0.43
Strawberry cheesecake	12	11	52	3	4	43	1.22	(0.5, 3.1)	1.0
Cream	6	8	43	9	7	56	0.76	(0.4, 1.6)	0.71

RR = relative risk; CI = confidence interval

Those who ate the oysters were 8.5-times more likely to be ill than those who did not eat the oysters. This result was statistically significant (Table 2). Everyone who reported eating the oysters became unwell. No other foods showed a statistically significant elevation of relative risk.

One faecal sample and one oyster sample were forwarded to ESR for analysis of a range of pathogens, including norovirus. The oyster sample was not from the bag used for the meal, but from a similar bag purchased at the same time. The faecal specimen was positive for norovirus genogroup II, and negative for *Salmonella*, *Shigella*, *Campylobacter*, sapovirus and astrovirus. The oyster sample was positive for norovirus genogroups I and II, and negative for the other organisms.

The hotel manager confirmed that the oysters at the function were served raw. The oysters were from South Korea and were not the brand usually purchased. The manager did not notice the statement on the package, "This product is raw and must be fully cooked prior to consumption", as the wording was at the bottom of the package and out of sight.

Other foods on the event menu were prepared, stored and presented using good food handling practices. The local authority had not had any previous concerns regarding food safety practices at the hotel.

Strong evidence indicated that the oysters were the source of this outbreak. This included the 100% infection rate among those who ate the oysters, the high relative risk for oysters, no raised rate of infection or relative risk for other foods, confirmation of norovirus in one case, and the presence of norovirus in a bag of oysters bought at the same time as those served at the event.

Oysters have frequently been implicated as the source of norovirus outbreaks both in New Zealand and overseas.^{1,2} In 2009, norovirus was identified as the causative agent in 34.5% of foodborne outbreaks in New Zealand. Shellfish were implicated in 11/64 foodborne outbreaks where a suspect source was identified.³

In 2004, the New Zealand Food Safety Authority required packaging on imported Korean oysters to display a label advising that the product must be fully cooked before it is consumed. A subsequent outbreak at Eden Park in 2006, implicated raw or lightly cooked oysters, and the package labelling appeared to have been ignored.¹

Two main implications arise from this study. First, people handling food need to be instructed that their default position is that oysters should be served well-cooked, unless they are from an officially monitored collection area. Second, labels that advise that oysters must be fully cooked before consumption should be designed to catch the attention of a busy chef. This means labels must be printed in bold lettering in colour and positioned at the top of the bag where it is opened.

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

Reported by Patrick O'Connor, Medical Officer of Health, Margaret Tunbridge and Bruce Butters, Health Protection Officers, Whanganui Office, MidCentral Public Health Unit.

6. Laboratory Surveillance

NDM and KPC carbapenemases recently identified in New Zealand

Carbapenems (ertapenem, imipenem and meropenem) are antibiotics reserved for the treatment of serious infections due to multiresistant Gram-negative bacteria, for example, organisms that produce extended-spectrum β -lactamases making them resistant to cephalosporins.

Over the last decade, resistance to carbapenems has been increasing and it is often mediated by carbapenemases – β -lactamase enzymes that inactivate carbapenems as well as most other β -lactam antibiotics. There are two main classes of acquired, transmissible carbapenemases.

- Metallo- β -lactamases (MBLs)
- *Klebsiella pneumoniae* carbapenemases (KPCs)

Globally, the most common MBLs are the VIM- and IMP- types. These types are most common in *Pseudomonas*, but also occur in Enterobacteriaceae. In late 2009, a new type of MBL was described – New Delhi metallo- β -lactamase (NDM). NDMs appear to have arisen in India and are now rapidly spreading throughout the world, particularly via the travel of people who have received healthcare in India. Currently, NDMs are most commonly isolated from Enterobacteriaceae, particularly

K. pneumoniae. The gene encoding NDMs is located on a very mobile genetic element, which facilitates the rapid spread of this mechanism of carbapenem resistance among different bacterial species and strains.

Since the first isolation in late 2008, VIM- and IMP- type MBLs have been identified in three *Pseudomonas aeruginosa* isolates in New Zealand – two VIM types (VIM-2 and VIM-5) and one IMP type (IMP-7). All three isolates were very multiresistant. Two of the three patients had a history of hospitalisation overseas, but the third did not.

In February 2010, the NDM-type MBL (specifically NDM-1) was identified for the first time in New Zealand in both an *Escherichia coli* isolate and a *Proteus mirabilis* isolate from the same patient. Since then, NDM-1 has been identified in two *E. coli* isolates and one *K. pneumoniae* isolate from three more patients. All five NDM-producing isolates were very multiresistant, however, all but the *P. mirabilis* isolate remained susceptible to colistin and tigecycline. All four patients had been hospitalised or received other healthcare in India.

The KPC carbapenemases were first identified, and are most common, in *K. pneumoniae* as their name implies. KPCs emerged about 7 years ago on the eastern seaboard of the United States, but have now spread to many other countries. KPC carbapenemase, specifically KPC-2, was first identified in New Zealand in late 2010, in a *K. pneumoniae* isolate from a patient repatriated from a Chinese to a New Zealand hospital.

Given the features of the MBL- and KPC- producing bacteria isolated to date in New Zealand, laboratories should be particularly suspicious of any very multiresistant *P. aeruginosa* or Enterobacteriaceae isolated from patients who have been hospitalised or received other healthcare overseas.

Reported by Helen Heffernan, Health Programme, ESR.

Mycology

Tables detailing the biannual summary of opportunistic mycoses and aerobic actinomycetes in New Zealand are available at www.surv.esr.cri.nz/surveillance/NZPHSR.php

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