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New Zealand Public Health Surveillance Report

September 2010: Covering April to June 2010

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- 11 hospitalisations, no deaths

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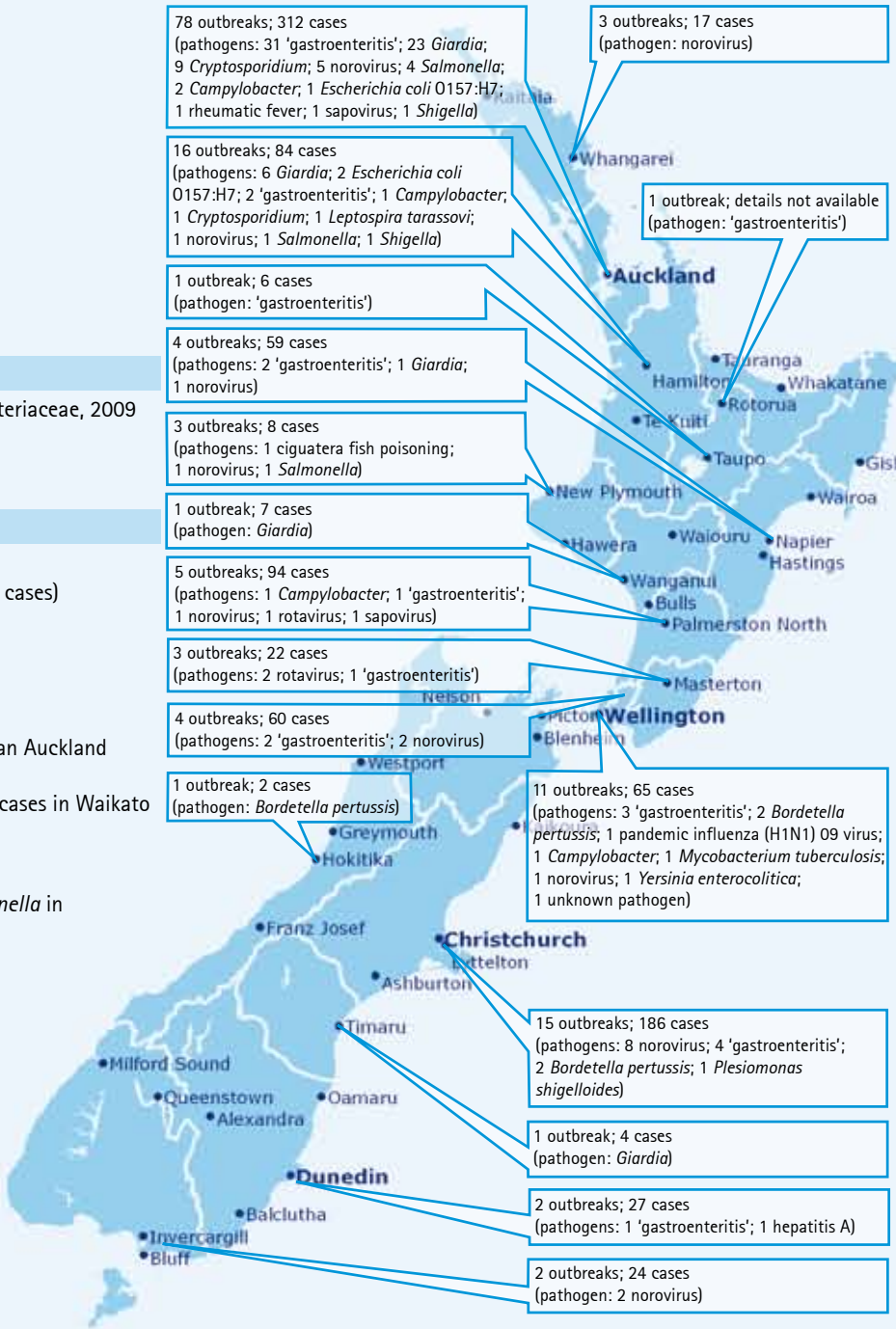
The latest reports from Sexually Transmitted Infections Surveillance, Antimicrobial Resistance, Virology and Enteric Reference Laboratory are available at www.surv.esr.cri.nz

This Quarter's Outbreaks

Notification and outbreak data in this issue are drawn from the April to June 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 5 July 2010.



1. Editorial

All health care workers play a role in fighting tuberculosis

The Guidelines for Tuberculosis Control in New Zealand 2010 will be available on the Ministry of Health website http://www.moh.govt.nz/cd/tbcontrol in September, updating and replacing the 2003 guidelines. The guidelines are now more concise, and can be printed out and bound as a single volume.

The guidelines are intended for all health care providers in New Zealand who may be involved in the diagnosis or management of tuberculosis (TB). They will be particularly useful for physicians, paediatricians, occupational health and infection control staff, and for public health practitioners who manage TB control programmes. Sections of particular relevance to general practitioners are chapter 2 (clinical features, investigation and assessment of active TB disease), and chapter 10 (TB control in people from countries with a high incidence of TB).

There is some good news about TB control, in that overall rates in New Zealand have dropped over the past two years, although not in Auckland. It is too early to say whether this is a sustainable trend, and even with the observed decline there remains a stubborn gap between TB rates in New Zealand and those in Australia. There is no room for complacency: TB remains a critical global health issue. Internationally, multi-drug resistant TB (MDR-TB) is a growing concern, and the number of MDR-TB cases detected in New Zealand is expected to increase in future. As two-thirds of New Zealand's cases are in people born overseas, it may be timely for a review of New Zealand's policy on screening immigrants from high incidence countries to determine whether there is a role for better identification and treatment of latent tuberculosis infection (LTBI), particularly for immigrants coming from countries with the highest rates of TB.

The cornerstone of TB control is early case detection and ensuring completion of treatment. Case detection relies on all clinicians being alert to the possibility of TB, particularly in patients at higher risk of disease. High risk groups include those who have been in contact with cases of infectious TB, people with underlying conditions such as immunosuppression, and people recently arrived from a country of high TB incidence. Other vital activities for TB control include contact tracing to detect linked cases as well as people with LTBI, screening and treatment of LTBI in other high risk-groups, infection control in health care settings, and effective immigration screening and follow-up.

There have been several developments in the management and control of TB since 2003. One of the most significant is the use of Interferon-Gamma Release Assay (IGRA) as a diagnostic test for LTBI. This is a blood test and can therefore be ordered more readily by clinicians than the Mantoux test, but presents challenges as well as opportunities. The role of IGRA as a screening test is not yet clear: it is useful in certain specialised settings but is not yet recommended in primary care. Tests should only be done if there is intent to offer the patient LTBI treatment, which requires good information about the benefits and risks to the patient and presence of a management plan including careful monitoring for side-effects, particularly hepatotoxicity. The guidelines provide advice on these matters.

Other changes to the guidelines include:

- updated treatment regimens, including the treatment of MDR-TB
- twice weekly treatment regimens for TB disease or LTBI is no longer recommended
- recommendations on screening of inmates for correctional facilities
- a clear explanation of current immigration screening requirements.
- removal of the chapter on Bacillus Calmette-Guérin (BCG) vaccination, as BCG recommendations are being reviewed for the next edition of the New Zealand Immunisation Handbook.

Tuberculosis control requires the collective efforts of clinicians, public health services, laboratories, infection control, occupational health and other jurisdictions including immigration and corrections, with good communication between these areas. We also need to engage with the individuals and communities at highest risk of TB to increase awareness of signs and symptoms, and the benefits of early detection and treatment.

Reported by Dr Margot McLean, Chair, Tuberculosis Advisory Group.

2. Notifiable Disease Surveillance

The following is a summary of disease notifications for the April to June quarter of 2010 and cumulative notifications and rates calculated for a 12-month period (July 2009 to June 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 5 July 2010. 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

Hepatitis B

- *Notifications:* 13 notifications in the quarter (2009, 11); 58 notifications over the last 12 months (2009, 38), giving a rate of 1.3 cases per 100,000 population (2009, 0.9), a statistically significant increase.
- *Comments:* cases were aged between 25 and 57 years.

Invasive Pneumococcal Disease

- *Notifications:* 148 notifications in the quarter (2009, 161); 635 notifications over the last 12 months, giving a rate of 14.7 per 100,000 population.
- *Comments:* cases were aged between 5 months and 96 years, with 7 cases under the age of 2 years.
- *Note:* Invasive pneumococcal disease became notifiable on 17 October 2008, therefore comparisons between 12-month rates are not valid.

Measles

- *Notifications:* 11 notifications in the quarter (2009, 13); 249 notifications over the last 12 months (2009, 44), giving a rate of 5.8 cases per 100,000 population (2009, 1.0), a statistically significant increase.
- *Comments:* there has been a statistically significant quarterly decrease from the previous quarter (30 cases); 5 notifications were laboratory confirmed.

Pertussis

- *Notifications:* 185 notifications in the quarter (2009, 318); 1221 notifications over the last 12 months (2009, 933), giving a rate of 28.3 cases per 100,000 population (2009, 21.9), a statistically significant increase.
- *Comments:* there has been a statistically significant quarterly decrease from the previous quarter (291 cases) and from the same quarter last year (318 cases).

Rubella

- *Notifications:* 1 notification in the quarter (2009, 4); 1 notification over the last 12 months (2009, 8), giving a rate of 0.02 cases per 100,000 population (2009, 0.2), a statistically significant decrease.
- *Comments:* this notification was laboratory confirmed.

INFECTIOUS RESPIRATORY DISEASES

Acute Rheumatic Fever

- *Notifications:* 55 notifications in the quarter (2009, 52); 144 notifications over the last 12 months (2009, 166), giving a rate of 3.3 cases per 100,000 population (2009, 3.9), not a statistically significant decrease.

- *Comments:* there has been a statistically significant quarterly increase from the previous quarter (30 cases); cases were distributed by age as follows: 13 (5-9 years), 30 (10-14 years), 6 (15-19 years), 6 (20 years and over); 48 cases were initial attacks of acute rheumatic fever and 7 cases were recurrent attacks.

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

- *Notifications:* 39 notifications in the quarter.
- *Comments:* cases were distributed by age as follows: 2 (<1 year), 6 (1-4 years), 11 (5-14 years), 5 (15-24 years), 12 (25-44 years), 3 (45-64 years); 26 notifications were laboratory confirmed.
- *Note:* non-seasonal influenza became notifiable on 29 April 2009, therefore comparisons between quarters and 12-month rates are not valid.

ENTERIC INFECTIONS

Campylobacteriosis

- *Notifications:* 1412 notifications in the quarter (2009, 1245); 7569 notifications over the last 12 months (2009, 7019), giving a rate of 175.4 cases per 100,000 population (2009, 164.4), a statistically significant increase.
- *Comments:* there has been a statistically significant quarterly decrease from the previous quarter (2119 cases) and a statistically significant quarterly increase from the same quarter last year (1245 cases).

Gastroenteritis

- *Notifications:* 104 notifications in the quarter (2009, 153); 643 notifications over the last 12 months (2009, 686), giving a rate of 14.9 cases per 100,000 population (2009, 16.1), not a statistically significant decrease.
- *Comments:* there has been a statistically significant quarterly decrease from the same quarter last year (153 cases).
- *Note:* that this is not a notifiable disease per se except in persons with a suspected common source or with a high risk occupation. The term 'gastroenteritis' provides a catch-all category for enteric diseases that are not notifiable and for syndromic reports that come through public health units, including direct reports from the public where the causative pathogen may never be known.

Salmonellosis

- *Notifications:* 226 notifications in the quarter (2009, 230); 1022 notifications over the last 12 months (2009, 1234), giving a rate of 23.7 cases per 100,000 population (2009, 28.9), a statistically significant decrease.
- *Comments:* there has been a statistically significant quarterly decrease from the previous quarter (337 cases).

ENVIRONMENTAL EXPOSURES & INFECTIONS

Cryptosporidiosis

- *Notifications:* 186 notifications in the quarter (2009, 163); 978 notifications over the last 12 months (2009, 885), giving a rate of 22.7 cases per 100,000 population (2009, 20.7), a statistically significant increase.
- *Comments:* there has been a statistically significant quarterly decrease from the previous quarter (235 cases).

Giardiasis

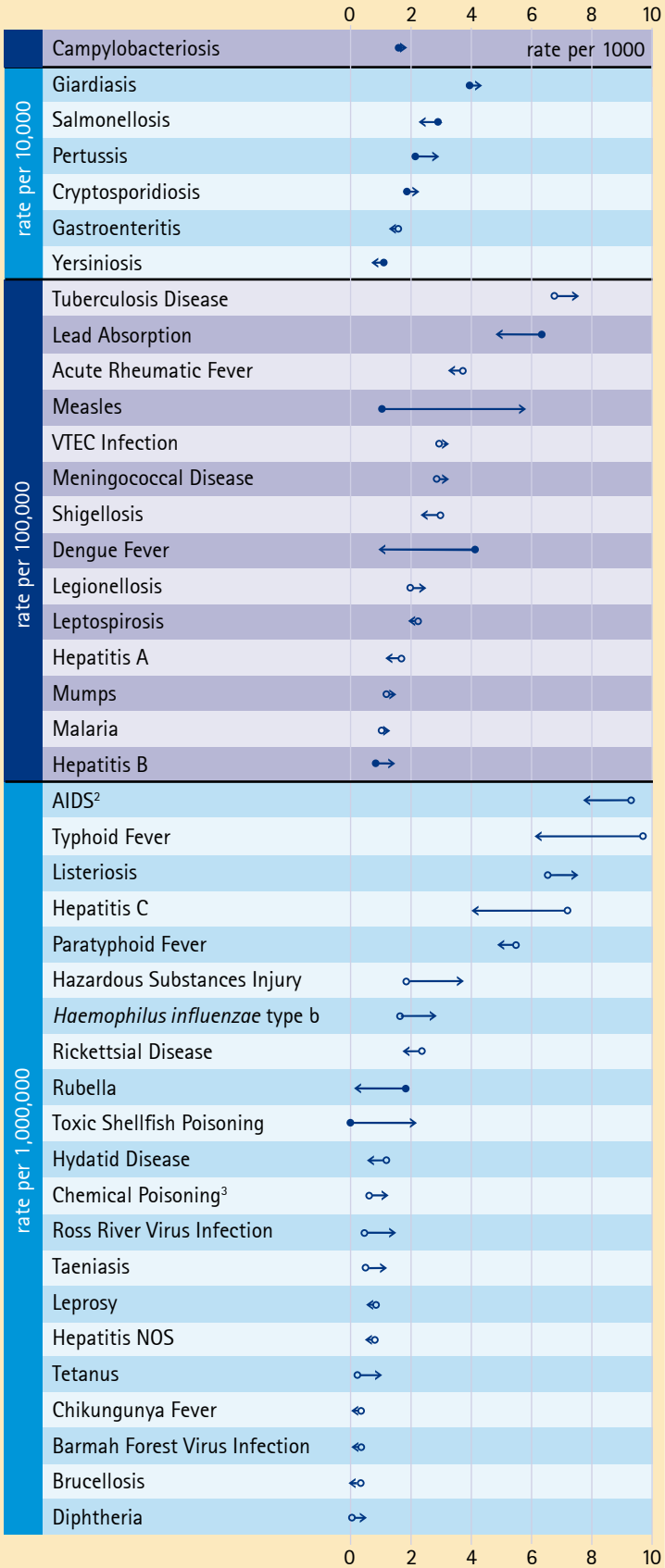
- *Notifications:* 535 cases in the quarter (2009, 412); 1847 notifications over the last 12 months (2009, 1695), giving a rate of 42.8 cases per 100,000 population (2009, 39.7), a statistically significant increase.
- *Comments:* there has been a statistically significant quarterly increase from the same quarter last year (412 cases).

Lead Absorption

- *Notifications:* 58 notifications in the quarter (2009, 86); 216 notifications over the last 12 months (2009, 272), giving a rate of 5.0 per 100,000 population (2009, 6.4), a statistically significant decrease.
- *Comments:* there has been a statistically significant quarterly decrease from the same quarter last year (86 cases); cases were distributed by age as follows: 2 (1-4 years), 3 (15-24 years), 20 (25-44 years), 23 (45-64 years) and 10 (65 years and over); there were 50 male and 8 female

National Surveillance Data

12-Monthly Notification Rate Changes[1]



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

Rate Change Symbol Key:

- > Rate increase from the previous 12-month period
- < Rate decrease from the previous 12-month period
- ● Statistically significant rate change
- ○ Statistically non-significant rate change

[1] Rates are calculated for the 12-month period July 2009 to June 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

cases; 15 cases were recorded as having an occupation that involved exposure to lead: painter (5 cases), builder (2 cases), laboratory worker (2 cases), airline manager, engineer, lead lighter (1 case each) and not specified (3 cases).

Legionellosis

- *Notifications:* 41 notifications in the quarter (2009, 14); 106 notifications over the last 12 months (2009, 83), giving a rate of 2.5 cases per 100,000 population (2009, 1.9), not a statistically significant increase.
- *Comments:* there has been a statistically significant quarterly increase from the same quarter last year (14 cases).

Leptospirosis

- *Notifications:* 14 notifications in the quarter (2009, 15); 88 notifications over the last 12 months (2009, 98), giving a rate of 2.1 cases per 100,000 population (2009, 2.3), not a statistically significant decrease.
- *Comments:* there has been a statistically significant quarterly decrease from the previous quarter (34 cases); there were 11 male and 3 female cases; 9 cases were recorded as having an occupation identified as high risk for exposure: farmers/farm workers (7 cases) and meat process workers (2 cases). Of the 5 cases that did not report a high-risk occupation or have an occupation stated, 3 cases reported animal/outdoor exposures as a risk factor.

Yersiniosis

- *Notifications:* 80 notifications in the quarter (2009, 74); 386 notifications over the last 12 months (2009, 453), giving a rate of 8.9 per 100,000 population (2009, 10.6), a statistically significant decrease.
- *Comments:* there has been a statistically significant quarterly decrease from the previous quarter (112 cases).

NEW, EXOTIC & IMPORTED INFECTIONS

Dengue Fever

- *Notifications:* 11 notifications in the quarter (2009, 44); 48 notifications over the last 12 months (2009, 176), giving a rate of 1.1 cases per 100,000 population (2009, 4.1), a statistically significant decrease.
- *Comments:* there has been a statistically significant quarterly decrease from the same quarter last year (44 cases); all notifications were laboratory confirmed; all cases were overseas during the incubation period. Places visited or resided in were Indonesia (5 cases), Vanuatu (3 cases), Australia, South-East Asia, and Sri Lanka (1 case each).

Malaria

- *Notifications:* 7 notifications in the quarter (2009, 7); 50 notifications over the last 12 months (2009, 46), giving a rate of 1.2 cases per 100,000 population (2009, 1.1), not a statistically significant increase.
- *Comments:* there has been a statistically significant quarterly decrease from the previous quarter (18 cases); all notifications had malaria parasites in a blood film; 6 cases were overseas during the incubation period, the travel history of the remaining case was unknown. Places visited or resided in were India (3 cases), Afghanistan, South Korea, and Zambia (1 case each).

Toxic Shellfish Poisoning

- *Notifications:* no notifications in the quarter (2009, no cases); 9 notifications over the last 12 months (2009, no cases), giving a rate of 0.2 cases per 100,000 population (2009, 0.0), a statistically significant increase.
- *Comments:* there has been a statistically significant quarterly decrease from the previous quarter (8 cases).

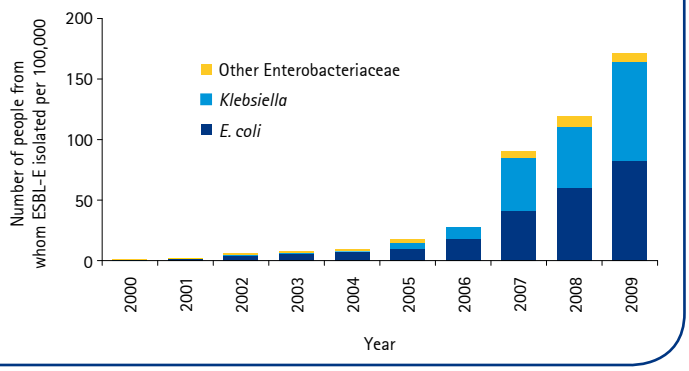
3. Other Surveillance Reports

Extended-spectrum β-lactamase (ESBL)-producing Enterobacteriaceae, 2009

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

ESR conducts annual one-month surveys of ESBL-producing Enterobacteriaceae (ESBL-E) to provide information on the incidence and epidemiology of ESBL-E in New Zealand. For the 2009 survey, hospital and community microbiology laboratories were asked to refer all ESBL-E they isolated during August or October 2009 to ESR. A total of 617 non-duplicate ESBL-E were referred for the survey, which equates to an annualised incidence of 171.6 people with ESBL-E per 100,000 population, a 43.6% increase on the 2008 rate of 119.5 (Figure 1). Information on whether the ESBL-E was causing infection or colonising was received for 580 of the isolates, of which 190 (32.8%) were categorised as from infections.

Figure 1. Annual/annualised incidence of ESBL-producing Enterobacteriaceae, 2000–2009



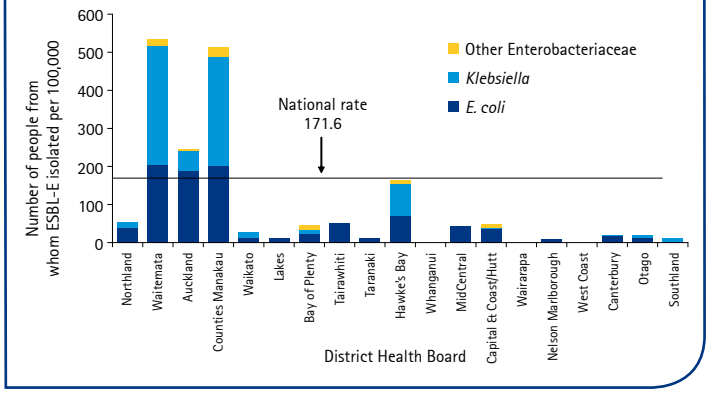
Data for 2000-2005 are based on continuous surveillance of all ESBL-E isolations. Data for 2006-2009 are annualised and based on 4-week or 1-month surveys in these years. The 2006 survey only included urinary *E. coli* and *Klebsiella*, therefore the data for 2006 are not directly comparable with that for other years.

The 617 ESBL-E isolates referred in 2009 comprised 297 (48.1%) *E. coli*, 296 (48.0%) *Klebsiella*, 22 (3.6%) *Enterobacter* species, 1 (0.2%) *Morganella morganii*, and 1 (0.2%) *Proteus mirabilis*.

The patients from whom ESBL-E were isolated were categorised as hospital patients if they were in a healthcare facility (including emergency department, outpatient clinic or residential-care facility) when ESBL-E was isolated or had been in a healthcare facility in the previous 3 months. All other patients were categorised as community patients. The majority of the ESBL-E (84.4%), and notably 95.6% of ESBL-producing *Klebsiella*, were isolated from patients categorised as hospital patients.

Figure 2 shows the incidence of ESBL-E in each District Health Board (DHB). The highest annualised incidence rates, and rates above the national rate of 171.6 per 100,000 population, occurred in the Waitemata (533.7 per 100,000 population), Counties Manukau (513.2 per 100,000) and Auckland (245.9 per 100,000) DHBs.

Figure 2. Annualised incidence of ESBL-producing Enterobacteriaceae by District Health Board, 2009



Data for the Capital & Coast and Hutt Valley DHBs are combined as 'Capital & Coast/Hutt', and data for the Canterbury and South Canterbury DHBs are combined as 'Canterbury'.

A more detailed report is available at http://www.surv.esr.cri.nz/PDF_surveillance/Antimicrobial/ESBL/ESBL_2009.pdf

Reported by Helen Heffernan, Health Programme, ESR.

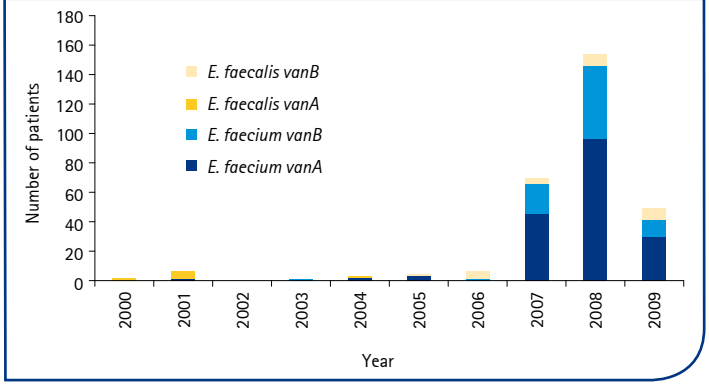
Vancomycin-resistant Enterococci (VRE), 2009

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

In 2009, VRE were referred from 47 patients, less than one-third of the number (153) referred in 2008 (Figure 3). The relatively large numbers of VRE isolated in 2007 and 2008 were due to outbreaks of vancomycin-resistant *E. faecium* in Auckland hospitals and a small outbreak in Waikato Hospital. In 2009, the majority (90.2%) of VRE were also isolated from patients in Auckland hospitals: 47.1% Middlemore Hospital, 33.3% Auckland City Hospital and 9.8% North Shore Hospital. Most (87.8%) of the VRE were isolated from screening swabs.

Unlike the situation during the outbreaks in 2007 and 2008, no VRE strains were predominant in 2009, although the same vanA *E. faecium* strain was isolated from patients in Middlemore, Auckland City and North Shore Hospitals.

Figure 3. Species and van genotype of VRE isolated in New Zealand, 2000–2009



A more detailed report is available at http://www.surv.esr.cri.nz/PDF_surveillance/Antimicrobial/VRE/VRE_2009.pdf

Reported by Helen Heffernan, Health Programme, ESR.

Elevated mercury levels in a family

In May 2010 Auckland Regional Public Health Service (ARPHS) was notified of a four-year-old boy with an elevated whole blood mercury level. The test had been performed as part of investigations for developmental delay, later attributed to autism, and revealed a raised blood mercury level of 96 nmol/L (19.2 µg/L).

Case investigation

Further testing revealed that the boy's mother and father also had elevated blood mercury levels (104 nmol/L (20.8 µg/L) and 118 nmol/L (23.6 µg/L) respectively). Investigations focused on possible sources of dietary and environmental exposure to mercury. Each family member ate two servings per week of either hapuka (*Polyprion oxygeneios*), salmon or snapper, and rarely terakihi. In addition, the son consumed approximately 50 g of smoked salmon 2-3 times a week, and during the period February to March 2010 family members consumed fish soup made from either broadbill (swordfish - *Xiphias gladius*) or hapuka once a week. No sources of non-dietary mercury exposure were identified.

ESR estimates[1] of the family's dietary mercury intake due to fish consumption, based on New Zealand Food Safety Authority data on mercury content of New Zealand fish species, a nominal serving size of 150 g and nominal body weights, indicated that two servings weekly of hapuka and one of marlin could (on average) result in weekly exposures of 12 and 4 µg/kg body weight for a child and adult woman, respectively. These values represent approximately 7.5 and 2.5 times the provisional tolerable weekly intake for mercury of 1.6 µg/kg body weight per week.[2]

Discussion

Currently in New Zealand, a laboratory-defined normal range for mercury in blood is less than 50 nmol/L (10 µg/L).[3] It is unclear at this stage whether public health action is required at this level, however, it is consistent with 1999-2002 data from the National Health and Nutrition Examination Survey performed in the United States by the Centers for Disease Control and Prevention.[4] While elevated mercury levels can be notified to medical officers of health as poisoning resulting from chemical contamination of the environment, unlike lead poisoning the Health Act 1956 does not define a threshold level above which blood mercury levels should be notified, so notifications are currently not being made directly from diagnostic laboratories.

Advice about maximum acceptable levels of mercury varies depending on whether the exposure is *in utero*, occupational or non-occupational. Most concern centres on the risk of exposure to methylmercury (organic mercury) in the developing foetal brain, and hence blood levels in pregnant women. The United States Environmental Protection Agency recommends that blood mercury levels in women of reproductive age should not exceed 5.8 µg/L, based on applying an uncertainty factor of 10 to findings that mercury levels of 58 µg/L in umbilical cord blood have been associated with evidence of subtle neuropsychological deficits in children at 7 years of age.[5] For the general population, excluding pregnant women, infants, and occupationally exposed persons, a whole blood mercury concentration of 20 µg/L is probably still an acceptable level, however levels of 200 µg/L are clearly excessive for anyone and have been associated with a 5% risk of neurological damage to.[6] Occupational exposure is commonly to elemental or inorganic mercury and blood levels exceeding 15 µg/L of inorganic mercury may represent an unacceptable degree of exposure. This is best measured in urine, although an increase in whole blood mercury of >15 µg/L over background is also of concern.

A study exploring the relationship between mercury consumption in fish and blood levels found that subjects with fish consumption in excess of 0.0007 mg/kg body weight per week had a mean mercury concentration of 14.0 µg/L, and 16% of subjects had blood mercury concentrations greater than 20 µg/L.[7]

Based on the investigation findings, it was concluded that this family's estimated dietary exposure to mercury from fish had the potential to result in the blood mercury levels observed. While the son's serving sizes were likely less than 150 g, the shortfall would have been made up by his additional salmon servings. The family was advised that the risk of adverse effects from their current blood mercury levels was very low but that the mother should avoid pregnancy until her blood mercury level was $\leq$ 5.8 µg/L. The family was provided with guidance on fish intake as per Food Standards Australia New Zealand advice.[8] Further research is required to determine the threshold blood mercury levels that should trigger a public health response.

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

Reported by Denise Barnfather, Medical Officer of Health, Joey Chang, Health Protection Officer, and Jenny Wong, Technical Officer, Auckland Regional Public Health Service.

4. Outbreak Surveillance

The following information is a summary of the outbreak trends for New Zealand, from data collected in the last quarter (April to June 2010). Comparisons are made to the previous quarter (January to March 2010), and to the same quarter in the previous year (April to June 2009). Note that the outbreak data in this section are notified to ESR by the Public Health Services.

General

- 151 outbreaks notified in this quarter (977 cases).
- 111 are 'final' reports (760 cases); 40 are 'interim' reports (217 cases) that have yet to be finalised and closed.

All data that follow relate to final reports only.

- 6.8 cases on average per outbreak, compared with 13.8 cases per outbreak in the previous quarter (21.0 cases per outbreak in the same quarter of last year).
- 11 hospitalisations: 'gastroenteritis' (3 cases), *Shigella* (3 cases), rotavirus (2 cases), *Bordetella pertussis*, pandemic influenza (H1N1) 09 virus, and *Mycobacterium tuberculosis* (1 case each).
- No deaths.

Pathogens

- 33 'gastroenteritis' outbreaks (199 cases).
- 29 *Giardia* outbreaks (88 cases).
- 18 norovirus outbreaks (293 cases).
- 8 *Cryptosporidium* outbreaks (23 cases).
- 5 *Salmonella* outbreaks (17 cases).
- 3 *Campylobacter* outbreaks (6 cases).
- 2 *B. pertussis* outbreaks (6 cases).
- 2 *Escherichia coli* O157:H7 outbreaks (6 cases).
- 2 sapovirus outbreaks (50 cases).
- 1 ciguatera fish poisoning outbreak (2 cases).
- 1 pandemic influenza (H1N1) 09 outbreak (9 cases).
- 1 *Leptospira tarassovi* outbreak (2 cases).
- 1 *M. tuberculosis* outbreak (2 cases).
- 1 *Plesiomonas shigelloides* outbreak (23 cases).
- 1 rotavirus outbreak (14 cases).
- 1 *Shigella* outbreak (8 cases).
- 1 *Yersinia enterocolitica* outbreak (5 cases).
- 1 unknown pathogen outbreak (7 cases).

Modes of Transmission

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

- 93 person-to-person, from (non-sexual) contact with an infected person (including droplets): 28 *Giardia* (84 cases), 20 'gastroenteritis' (161 cases), 16 norovirus (289 cases), 8 *Cryptosporidium* (23 cases), 5 *Salmonella* (17 cases), 3 *Campylobacter* (6 cases), 2 *B. pertussis* (6 cases), 2 *E. coli* O157:H7 (6 cases), 2 sapovirus (50 cases), 1 pandemic influenza (H1N1) 09 virus (9 cases), 1 *M. tuberculosis* (2 cases), 1 *P. shigelloides* (23 cases), 1 rotavirus (14 cases), 1 *Shigella* (8 cases), 1 *Y. enterocolitica* (5 cases), and 1 unknown pathogen (7 cases).
- 31 environmental, from contact with an environmental source (e.g. swimming): 9 *Giardia* (23 cases), 8 norovirus (143 cases), 6 'gastroenteritis' (44 cases), 3 *Cryptosporidium* (8 cases), 2 *Campylobacter* (4 cases), 1 *P. shigelloides* (23 cases), 1 *Salmonella* (6 cases), and 1 sapovirus (28 cases).
- 23 foodborne, from consumption of contaminated food or drink (excluding water): 16 'gastroenteritis' (43 cases), 2 *Salmonella* (9 cases), 1 *Campylobacter* (2 cases), 1 ciguatera fish poisoning (2 cases), 1 *E. coli* O157:H7 (3 cases), 1 norovirus (2 cases), and 1 *Y. enterocolitica* (5 cases).
- 11 waterborne, from consumption of contaminated drinking water: 7 *Giardia* (18 cases), 2 *Salmonella* (9 cases), 1 *Campylobacter* (2 cases), and 1 *Cryptosporidium* (5 cases).
- 5 zoonotic, from contact with infected animals: 3 *Giardia* (8 cases), 1 *Campylobacter* (2 cases), and 1 *L. tarassovi* (2 cases).
- 5 other mode of transmission: 2 'gastroenteritis' (24 cases), 2 *Giardia* (4 cases), and 1 rotavirus (14 cases).
- 6 mode of transmission unknown: 3 'gastroenteritis' (12 cases), 2 norovirus (4 cases), and 1 *Giardia* (4 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.

- 57 home: 25 *Giardia* (78 cases), 9 'gastroenteritis' (25 cases), 7 *Cryptosporidium* (21 cases), 5 *Salmonella* (17 cases), 3 norovirus (8 cases), 2 *Campylobacter* (4 cases), 2 *E. coli* O157:H7 (6 cases), 1 ciguatera fish poisoning (2 cases), 1 pandemic influenza (H1N1) 09 virus (9 cases), 1 *M. tuberculosis* (2 cases), and 1 *Shigella* (8 cases).
- 15 rest home: 6 'gastroenteritis' (86 cases), 5 norovirus (119 cases), 2 sapovirus (50 cases), 1 *Campylobacter* (2 cases), and 1 *P. shigelloides* (23 cases).
- 13 restaurant/café: 12 'gastroenteritis' (31 cases) and 1 norovirus (2 cases).
- 13 childcare centre: 4 'gastroenteritis' (51 cases), 4 *Giardia* (11 cases), 2 norovirus (65 cases), 1 rotavirus (14 cases), 1 *Salmonella* (6 cases), and 1 *Y. enterocolitica* (5 cases).
- 12 swimming/spa pool: 9 *Giardia* (25 cases), 2 *Cryptosporidium* (5 cases), and 1 *Salmonella* (6 cases).
- 6 hospital (acute care): 5 norovirus (84 cases) and 1 unknown pathogen (7 cases).
- 5 hospital (continuing care): 2 'gastroenteritis' (14 cases), 2 sapovirus (50 cases), and 1 norovirus (13 cases).
- 5 farm: 3 *Giardia* (8 cases), 1 *L. tarassovi* (2 cases), and 1 *Salmonella* (3 cases)
- 4 takeaways: 'gastroenteritis' (10 cases).
- 2 school: 'gastroenteritis' (6 cases).
- 1 supermarket: 'gastroenteritis' (4 cases).
- 1 workplace: *B. pertussis* (4 cases).
- 2 'other setting': 'gastroenteritis' (5 cases).
- 7 outbreaks with no setting selected: 2 'gastroenteritis' (5 cases), 2 *Giardia* (6 cases), 2 norovirus (4 cases), and 1 *B. pertussis* (2 cases).

5. Outbreak Case Reports

Outbreak of *Clostridium perfringens* gastroenteritis at an Auckland wedding, January 2010

On 18 January 2010, Auckland Regional Public Health Service (ARPHS) was notified of an outbreak of gastroenteritis affecting guests of a wedding held on 16 January. Following a preliminary assessment, the outbreak was jointly investigated by ARPHS (epidemiologic and microbiologic investigation) and the New Zealand Food Safety Authority (NZFSA) (environmental investigation). The epidemiologic investigation used a retrospective cohort study design with a telephone-administered standardised food and drink questionnaire. Cases were defined as persons who consumed food or drinks at the wedding and subsequently developed either diarrhoea or abdominal pain and nausea.

An estimated 180 guests attended the wedding. Contact details were obtained for 106 guests, of whom 101 were interviewed, and among these 66 (65.3%) met the case definition. The median incubation period was 11 hours and median duration of illness was 14 hours. The epidemic curve was consistent with a common event exposure with no secondary cases.

Univariate analysis was performed on each possible food or beverage item available during the wedding reception. Three food items had significantly increased relative risk of illness: chicken curry (RR=3.3), lamb curry (RR=1.7) and roast lamb (RR=1.8) (Table 1).

Table 1. Attack rates and relative risks of food item consumption for guests at the wedding

	Food item consumed			Food item not consumed							
Exposure	Case	Not a Case	Attack Rate	Case	Not a Case	Attack Rate	Odds Ratio	95% C.I.	Risk Ratio	95% C.I.	P-Value (chi-squared)
Chicken Curry	59	13	81.94%	6	18	25.00%	13.62	(4.52, 40.98)	3.28	(1.62, 6.61)	0.00
Lamb Curry	46	10	82.14%	19	21	47.50%	5.08	(2.02, 12.80)	1.73	(1.22, 2.45)	0.00
Roast Lamb	51	14	78.46%	14	18	43.75%	4.68	(1.88, 11.70)	1.79	(1.19, 2.71)	0.00

Logistic regression was used to assess the independent effect of these exposures. The sole food item with a significant independent association with illness was chicken curry (odds ratio: 8.2; 95% confidence interval 2.5–26.8; p=0.0005).

Seven faecal specimens were received from affected guests. Four of these were positive for high (>1.0 x 10^5 vegetative cells) levels of *Clostridium perfringens*, and *C. perfringens* enterotoxin was found in five specimens.

The head chef was spoken to on 18 January prior to his departure on a week's holiday. It was determined that the menu was created specifically for the function and the only leftover food was a cheesecake. An initial Hazard Analysis Critical Control Point assessment and interviews with other kitchen staff were conducted on site on 21 January 2010. A follow-up assessment involving an interview of the head chef was conducted on 26 January.

Key findings from the NZFSA assessment report on the investigation were as follows: there was disagreement between kitchen staff about the key times involved with the chicken curry preparation; the extent to which the chicken curry was heated between production and serving (and whether the temperature was maintained above 60°C) was unknown; a delay of 10-15 minutes occurred between emptying the second tray of chicken curry and replacement with the third tray, suggesting the chicken curry may have been reheated; a hot box without a heat source was used for storing the first tray of chicken curry for a short period prior to setting up the buffet; and no food temperature measurements were taken at any time.

Three common characteristics of *C. perfringens* outbreaks are meat meals[1,2,] time-temperature abuse of the food (the dish has been either cooled too slowly or maintained at a warm temperature for long periods of time)[3], and preparation of large amounts of food. Warm temperatures and inadequate aeration in the middle of large dishes provide an ideal anaerobic environment for *C. perfringens* to multiply (ideal growth occurs between 41-45°C, with maximum temperatures for growth of 50-51°C).[1] This outbreak involved preparation of a large (45 litre) meat dish with potential for time-temperature abuse during the two-hour interval between preparation and serving, illustrating each of these characteristics.

To prevent further outbreaks in the future, a letter was written to the caterer requesting the following: use a hot holding unit that can ensure food is maintained at temperatures above 60°C; join the NZFSA voluntary implementation programme associated with registering and implementing the template Food Safety Programme (off-the-peg Food Control Plan) for food service businesses; and review food safety training for food handlers and waiting staff.

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

Reported by Michael Hale, Public Health Medicine Registrar, Auckland Regional Public Health Service and Kathryn Manning, Senior Food Officer (CIG), New Zealand Food Safety Authority.

An investigation into an increase in notified giardiasis cases in Waikato

Background

Giardiasis is the most commonly notified waterborne disease in New Zealand.[1] It is a gastrointestinal disorder caused by the protozoan *Giardia lamblia*. Symptoms include diarrhoea, abdominal cramps, bloating, flatulence, nausea, weight loss and malabsorption. The incubation period is between 3 and 25 days and the disease is communicable throughout the period of infection.[2] Outbreaks have been associated with recreational water,[3] drinking infected water,[4,5] and attendance at day-care.[6]

New Zealand has a high incidence of giardiasis in comparison with other developed countries,[7] and the most commonly identified risk factor is contact with recreational water.[8]

Waikato Population Health noted an increased number of giardiasis cases notified in the Waikato District Health Board (DHB) region during the period January to April 2010 in comparison to the previous 5 years. An investigation was commenced to establish any common source or risk factors.

Method

Data on all confirmed cases of notified giardiasis occurring in the Waikato DHB during the period 1 January to 30 April 2010 were retrieved from EpiSurv. Electronic data were verified against completed notification forms and were corrected or supplemented if necessary. Data were analysed using Microsoft Excel. The number of notified cases were compared with notifications from 1 January 2005 to 31 December 2009.

Results

Seventy-six cases of giardiasis were notified to Waikato Population Health between 1 January and 30 April 2010. This represented an increase of approximately 50% compared to the same time period in any of the previous 5 years. Basic demographic data was available from EpiSurv for all cases, but risk factor information was consistently available for only 53 cases. Thirty-four cases were female. Over half of the cases were aged over 25 years and approximately one-fifth were aged less than 5 years, with the median age at 33 years. Cases predominantly occurred in Hamilton, Thames-Coromandel and Waipa territorial authority areas.

Of the 53 cases with complete risk factor information, the most common risk factor was drinking untreated water. Twenty-three cases (43.4%) had consumed water from an untreated water supply in the 10 days prior to illness, and for almost two-thirds this water was from their own household supply. Nineteen cases that had consumed untreated water also had additional risk factors for giardiasis infection including contact with farm animals and person-to-person contact. Recreational water contact was identified as a risk factor for 15 cases (28.3%) of those with information available, this included swimming in commercial and non-commercial pools, freshwater and the sea. Other risk factors included overseas travel within the incubation period 10 cases (18.9%), contact with animal faeces nine cases (17.0%), or farm animals eight cases (15.1%), and contact with a baby in nappies five cases (9.4%).

Twenty-three cases (43.4%) had person-to-person contact with another case of giardiasis and were associated with eight separate outbreaks. Of the eight outbreaks, six involved two cases each and the two remaining outbreaks involved four and seven cases respectively. All of the outbreaks involved more than one potential risk factor for giardiasis transmission, and a single aetiology could not be determined. These risk factors included consumption of untreated water (found in 4 outbreaks), contact with farm animals (4) and recreational water exposure (2).

Discussion

The number of notified giardiasis cases in the Waikato DHB region was higher during the period January to April 2010 than during the same period in any of the previous 5 years. This increase could not be attributed to any single common source or risk factor. Common features among cases during this time period were consumption of untreated drinking water and links to outbreaks. However, in many cases multiple risk factors were identified leading to an inability to attribute an individual's infection to a specific cause. The investigation was also hampered by lack of routinely-collected data.

This study has identified the need for improvements in the investigation for giardiasis cases to enable identification of risk factors and prevention measures, particularly through improved completion of questionnaires and use of a specific Waikato Population Health questionnaire on household drinking water supplies.

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

Reported by Richard Wall, Public Health Registrar and Anita Bell, Medical Officer of Health, Population Health Waikato.

6. Laboratory Surveillance

Surveillance of the zoonotic bacterial pathogen *Salmonella* in New Zealand

The Enteric Reference Laboratory (ERL), based at the National Centre for Biosecurity and Infectious Disease (NCBID) in Wallaceville, provides national reference and surveillance laboratory services for human, animal, food and environmental enteric bacterial pathogens. The laboratory surveillance role is achieved through a combination of serotyping, biotyping, phage typing and molecular typing methods. During 2009, ERL confirmed the identity of over 2000 human enteric bacteria, belonging mainly to the following genera: *Salmonella* (44%), *Escherichia* (12%), *Shigella* (4%) and *Yersinia* (14%).

Salmonella enterica serotype 4,[5],12:i:–

Salmonella spp. represents one of the most common causes of bacterial foodborne illnesses around the world. In 2009, salmonellosis was the second most common enteric bacterial infection notified in New Zealand with a notification rate of 26.2 per 100,000 population.[1] The species *Salmonella enterica* contains more than 2500 serotypes, and emergence of new human pathogenic *Salmonella* strains and serotypes represents a major public health issue. Serotyping of *Salmonella* is a widely used method for the initial characterisation of *Salmonella* isolates and is based on the antigenic variability of the somatic (O) and flagellar (H) antigens present in the cell wall of the organism. ERL routinely performs the serotyping of all isolates submitted as presumptive *Salmonella* allowing the detection of outbreaks, unusual clusters, or serotypes new to New Zealand. The most common serotype in New Zealand and in many overseas countries is *Salmonella enterica* subsp. *enterica* serotype Typhimurium, know as *Salmonella* Typhimurium.

Salmonella enterica serotype 4,[5],12:i:– (*Salmonella* 4,[5],12:i:–) is considered a monophasic variant of *S.* Typhimurium (4,[5],12:i:1,2) due to antigenic and genotypic similarities between the two serotypes. Overseas, the prevalence of this serotype among human salmonellosis cases has increased considerably since the mid-1990s.[2] In France, isolation of *Salmonella* 4,[5],12:i:– increased from 99 to 410 between 2005 and 2008 to become the third most common serotype isolated from humans.[3] Cases of infection with *Salmonella* 4,[5],12:i:– have reportedly been severe. A number of sources have been linked to cases including poultry, cattle, and particularly pigs and pork products.[2,3]

In New Zealand, *Salmonella* 4,[5],12:i:– represents only a small proportion of the *Salmonella* serotypes isolated. In 2009, nine cases of *Salmonella* 4,[5],12:i:– were confirmed, five of which had recently travelled to Thailand. It is however difficult to establish the true incidence of this serotype as prior to 2009 they could have been misidentified as *S.* Typhimurium. At present, ERL has not confirmed *Salmonella* 4,[5],12:i:– from animal or food samples.

Antimicrobial resistance is a serious public health problem limiting the therapeutic treatments available to treat invasive *Salmonella* infections. *Salmonella* 4,[5],12:i:– are of increasing concern in Europe as a marked increase in resistance to ampicillin, streptomycin, sulphonamides and tetracycline (R-type ASSuT) has been observed in isolates from clinical and meat samples.[3] For example 62% and 75% of the *Salmonella* 4,[5],12:i:– were of this R-type ASSuT in France (2007) and in Italy (2009), respectively.[3] In response to the rapid increase of this serotype in Europe, eight European laboratories have compared their *Salmonella* 4,[5],12:i:– using phage typing, antimicrobial susceptibility testing, pulsed-field gel electrophoresis (PFGE) and multilocus variable number tandem repeat (MLVA) analysis to evaluate the possibility of clonal spread of this emerging multi-drug resistant (MDR) strain. Phage type DT193 was identified as the most common phage type, followed by DT120. PFGE analysis revealed the diversity of *Salmonella* 4,[5],12:i:–, even among strains from a single country. In New Zealand, DT193 and DT120 are not common, in the last 10 years ERL has confirmed 26 DT193 and two DT120 from human cases. Currently work is being undertaken by ERL and the Antibiotic Reference Laboratory to establish the phage type, PFGE, MLVA and antimicrobial susceptibility profile of the *Salmonella* 4,[5],12:i:– isolates confirmed by ERL.

Outbreak investigation using MLVA

Characterisation of *S.* Typhimurium is vital for identification, tracking, and intervention during outbreaks. *S.* Typhimurium phage type 42 (DT42) is endemic in New Zealand, though infection is not commonly confirmed in humans. Historically non-human DT42 have predominantly been isolated from bovine, poultry and environmental sources. In October 2008, ERL confirmed 10 poultry feed isolates of DT42. By November 2008, there was an increase in human DT42 isolates, mainly from cases in the South Island. In the case of a *Salmonella* outbreak, serotyping and phage typing are complemented by molecular typing techniques to further differentiate the strains with the aim to establish which cases belong to the outbreak. PFGE is a molecular typing method which is considered as the "gold standard" and for which the Centers for Disease Control and Prevention in Atlanta has developed and standardised protocols so that results can be compared worldwide.

PFGE analysis of the DT42 isolates failed to differentiate between isolates thought to be associated with the outbreak and a bovine isolate not associated with the outbreak. Therefore, a more recent typing method, MLVA, relying on differences in short repeat sequences present throughout the genome, was used. MLVA was able to provide some discrimination between DT42 isolates and was used to characterise all DT42 isolates suspected of being associated with the outbreak. This was the first time that MLVA had been used in an outbreak investigation in New Zealand. This allowed the epidemiological team at ESR to start the investigation and epidemiological evidence suggested the consumption of raw flour as a risk factor. By December, DT42 had been isolated from flour samples obtained from outbreak cases. An environmental investigation revealed that the poultry feed contained wheat based product which was sourced from a mill which also produced flour. By the end of January 2009, a total of 75 *S.* Typhimurium DT42 case isolates were received by the ERL. Of these, 65 had the MLVA outbreak profile (3-15-N/A-N/A-311). Close association between ESR laboratories, the ESR epidemiological team, the New Zealand Food Safety Authority (NZFSA) and the Ministry of Health confirmed that the source of the outbreak was the consumption of raw flour.

Based on evidence from the laboratory and epidemiological investigations, the mill voluntarily withdrew from sale flour produced over a four-week period that included the batch confirmed to be contaminated. The NZFSA issued a media release outlining that the cause of the outbreak was likely to be due to the consumption of raw flour and that flour brands implicated were being withdrawn from sale.

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

Reported by Muriel Dufour, Enteric Reference Laboratory, 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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