

New Zealand Public Health Surveillance Report

December 2004

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Significant Decreases in Notification Rate

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- 33 hospitalisations, 1 death

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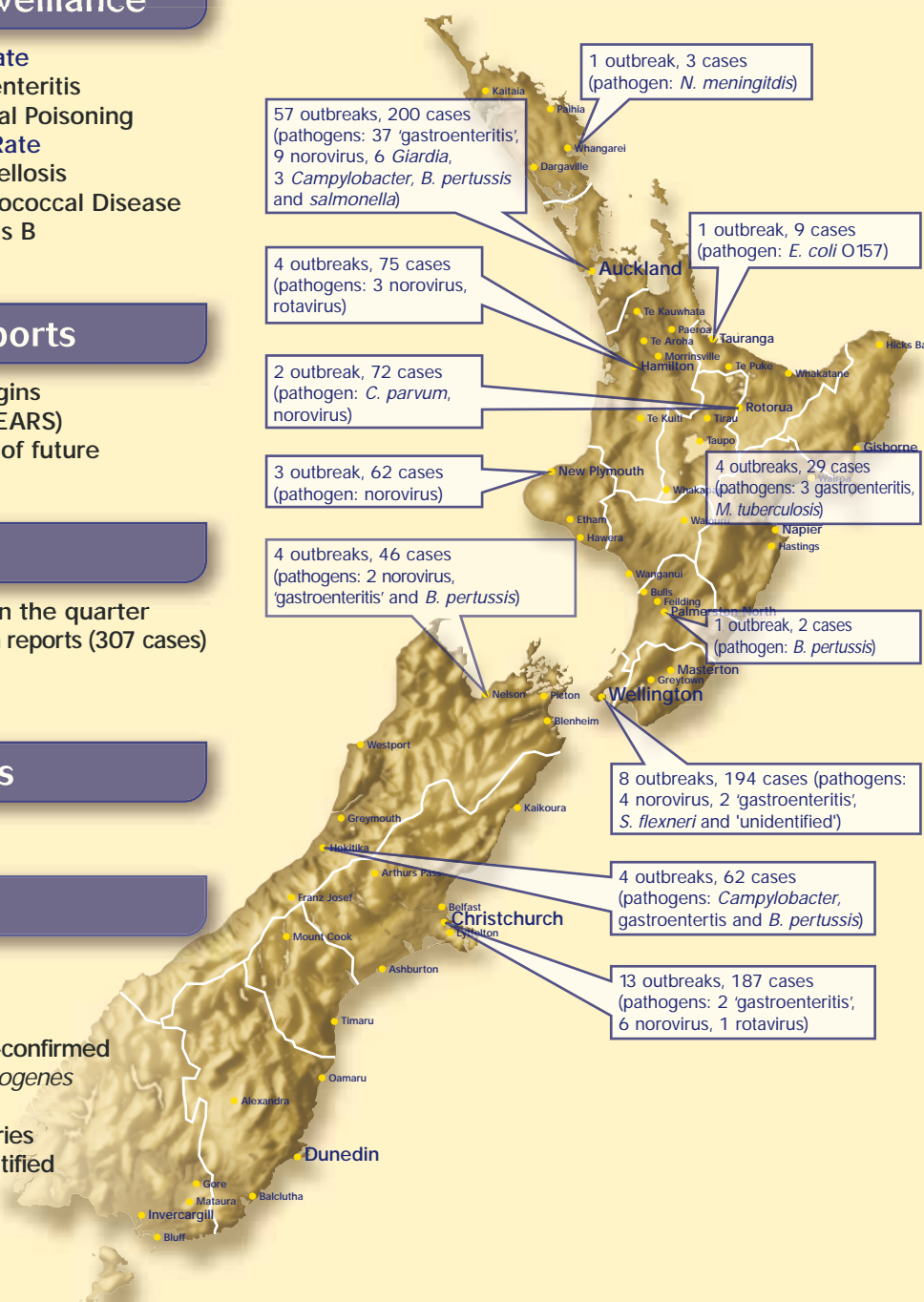
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- Enteric Reference Laboratory online www.surv.esr.cri.nz/enteric
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- 11 legionellosis cases were laboratory-confirmed
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- 2003 antimicrobial resistance data from hospital and community laboratories
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This Quarter's Outbreaks

Notification and outbreak data in this issue are drawn from the July-September quarter of 2004. 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 by 20 October 2004.



READER SURVEY – a quick 1-minute survey online (www.surv.esr.cri.nz) to provide us with some much-needed reader feedback.

1. Editorial

The Continuing Cycle of Pertussis Epidemics

Although another pertussis epidemic is beginning in New Zealand (see Other Surveillance Reports, this issue), we are not the only country experiencing this problem. Indeed, countries with higher immunisation rates appear to be faring little better than New Zealand. There were 1075 New Zealand notifications in the third quarter of 2004, an increase from the 143 notifications in the same quarter of 2003. The CDC in the United States has also reported a resurgence of pertussis¹, despite reported immunisation coverage rates of >94% among US children aged 19-35 months (since 1995 with >3 doses of pertussis vaccine)². Pertussis rates reported during 2004 in the US are now 'beyond historical limits'. While pertussis immunisation schedules, incidence rates, and surveillance methods vary markedly across Europe, several countries have pertussis rates comparable to those in New Zealand^{3,4}.

A vaccine has been available in New Zealand since 1945. The National Immunisation Schedule from February 2002 has been for diphtheria, tetanus, acellular pertussis and inactivated polio vaccine (DTaP-IPV) to be given at six weeks, three months, five months, 15 months (DtaP/Hib) and four years⁵. The later dose of vaccine was introduced to protect children in their early school years and to decrease transmission to younger children. Severe disease is more common in the first months of life.

There are several possible reasons for the resurgence of pertussis. Vaccination is not totally effective with the highest reported efficacy being 88%. Also, vaccination coverage is not

complete, often not timely and herd immunity is therefore not achieved. Additionally, immunity after vaccination appears to wane 4-5 years after it is delivered. Mathematical modelling suggests that the effective vaccination rate may in some cases be as low as 33%. The most infectious stage of the disease is in the early catarrhal phase that precedes the classical paroxysmal cough, which limits the effectiveness of isolation as an intervention. Another feature of the pertussis epidemics in New Zealand is the relatively large number of adult cases, which suggests that herd immunity will be difficult to achieve.

Despite the intervention difficulties, control of infectious spread might most usefully, in the short term, be approached through the isolation of infectious cases from early childhood services, schools or community gatherings until they are well or have received a recommended course of antibiotics. Longer term, improved vaccination programmes that deliver high coverage rates will be critical to any significant reduction in pertussis within the community. The increased awareness of primary care practitioners and the general population is particularly important in ensuring that children are vaccinated at the appropriate intervals.

¹www.cdc.gov/mmwr/preview/mmwrhtml/mm5153a1.htm

²www.cdc.gov/mmwr/preview/mmwrhtml/mm5329a3.htm

³www.eurosurveillance.org/ew/2004/041007.asp

⁴www.ssi.dk/graphics/html/EUVAC/index.html

⁵www.moh.govt.nz/immunisation.html

2. Notifiable Disease Surveillance

The following is a summary of disease notifications for the July-September quarter of 2004 and cumulative notifications and rates calculated for a 12-month period (October 2003-September 2004). For comparative purposes notification numbers and rates are presented in brackets for the same periods in the previous year. A robust method of constructing 95% confidence intervals is used to determine 'statistically significant differences' throughout this report unless otherwise stated [see Newcombe, R. G. and D. G. Altman. Proportions and their differences. In: *Statistics with Confidence*. 2000. BMJ Books. Bristol]. **Data contained within this report are based on information reported by public health service staff up to 11 October 2004.** The number of notifications reported for this quarter is provisional and subject to change, as cases may be entered at a later date or retracted upon further investigation.

The National Surveillance data tables are available online www.surv.esr.cri.nz

VACCINE PREVENTABLE DISEASE

Measles

- **Notifications:** 3 notifications in the quarter (2003, 16); 48 notifications over the last 12-months (2003, 46) giving a rate of 1.3 cases per 100,000 population (2003, 1.2); not a statistically significant increase
- **Comments:** no cases were confirmed, one case was under investigation and the other two were probable cases. There has been a statistically significant drop in notifications compared with the same quarter previous year.

Pertussis

- **Notifications:** 1075 notifications in the quarter (2003, 143); 1,964 notifications over the last 12-months (2003, 686) giving a rate of 52.6 cases per 100,000 population (2003, 18.4); statistically significant increase
- **Comments:** this is the second highest number of pertussis notifications recorded for a July-September quarter since the last epidemic in 2000 (1099 notifications). Current quarter notifications are nearly three times more than the April-June quarter (379 notifications), see Section 3, 'Other Surveillance Reports' in this issue.

INFECTIOUS RESPIRATORY DISEASES

Meningococcal Disease

- **Notifications:** 129 notifications in the quarter (2003, 205); 377 notifications over the last 12-months (2003, 533) giving a rate of 10.1 cases per 100,000 population (2003, 14.3); statistically significant decrease
- **Comments:** notifications were distributed by age as follows, 16 under 1 years of age; 34 (1-4 years); 17 (5-9 years); 16 (10-14 years); 12 (15-19 years); and, 34 in the 20 and over category. Two deaths were recorded in the current quarter. The epidemic strain continues to dominate, accounting for 75.1% of all notified cases so far in 2004 (72.5%, 2002-2003).

Acute Rheumatic Fever

- **Notifications:** 14 notifications in the quarter (2003, 67); 72 notifications over the last 12-months (2003, 147) giving a rate of 1.9 cases per 100,000 population (2003, 3.9); statistically significant decrease
- **Comments:** all cases were in the 5-14 year age range and one case of rheumatic fever recurrence was notified in addition to the cases reported above.

ENTERIC INFECTIONS

Campylobacteriosis

- **Notifications:** 2,660 notifications in the quarter (2003, 3,853); 13,096 notifications over the last 12-months (2003, 13,800) giving a rate of 350.4 cases per 100,000 population (2003, 369.3); statistically significant decrease

Salmonellosis

- **Notifications:** 225 notifications in the quarter (2003, 284); 1,150 notifications over the last 12-months (2003, 1,470) giving a rate of 30.8 cases per 100,000 population (2003, 39.3); statistically significant decrease

Shigellosis

- **Notifications:** 38 notifications in the quarter (2003, 19); 125 notifications over the last 12-months (2003, 85) giving a rate of 3.3 cases per 100,000 population (2003, 2.3); statistically significant increase

Gastroenteritis

- **Notifications:** 245 notifications in the quarter (2003, 228); 1,282 notifications over the last 12-months (2003, 1,109) giving a rate of 34.3 cases per 100,000 population (2003, 29.6); statistically significant increase
- **Comments:** note that this is not a notifiable disease *per se* and the term 'gastroenteritis' provides a catch-all category for enteric diseases that are not notifiable and for syndromic reports that come through public health units, including direct reports from the public.

ENVIRONMENTAL EXPOSURES AND INFECTIONS

Cryptosporidiosis

- **Notifications:** 223 notifications in the quarter (2003, 257); 638 notifications over the last 12-months (2003, 902) giving a rate of 17.1 cases per 100,000 population (2003, 24.1); statistically significant decrease

Hepatitis B

- **Notifications:** 13 notifications in the quarter (2003, 19); 44 notifications over the last 12-months (2003, 66) giving a rate of 1.2 cases per 100,000 population (2003, 1.8); statistically significant decrease

Hepatitis C

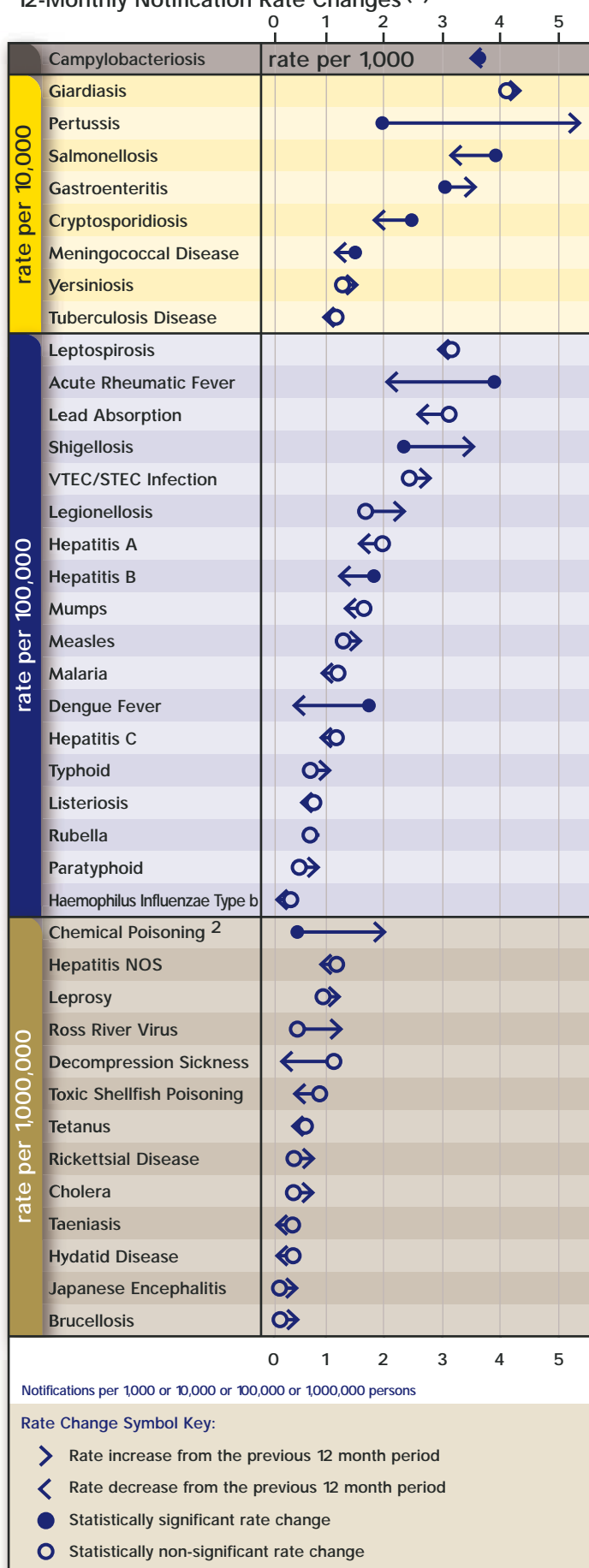
- **Notifications:** 6 notifications in the quarter (2003, 16); 31 notifications over the last 12-months (2003, 40) giving a rate of 0.8 cases per 100,000 population (2003, 1.1); not a statistically significant decrease
- **Comments:** there has been a statistically significant drop in notifications this quarter compared with the same quarter previous year

Yersiniosis

- **Notifications:** 79 notifications in the quarter (2003, 115); 468 notifications over the last 12-months (2003, 440) giving a rate of 12.5 cases per 100,000 population (2003, 11.8); not a statistically significant increase
- **Comments:** there were statistically significant quarterly decreases from the previous quarter and the same quarter last year

National Surveillance Data

12-Monthly Notification Rate Changes ⁽¹⁾



continued...

(1) Rates are calculated for the 12-month period to the end of this quarter.

(2) from the Environment

Chemical Poisoning

- **Notifications:** 6 notifications in the quarter (2003, 0); 7 notifications over the last 12-months (2003, 1) giving a rate of 0.19 cases per 100,000 population (2003, 0.03); statistically significant increase
- **Comments:** five cases were from a single event and were confirmed with elevated carboxyhaemoglobin due to exposure to a domestic gas supply to a hot water cylinder. The cases ranged in age from 12 to 49 years, all from the same family. All cases were hospitalised.

NEW, EXOTIC AND IMPORTED INFECTIONS

Dengue Fever

- **Notifications:** no notifications in the quarter (2003, 0); 9 notifications over the last 12-months (2003, 64) giving a rate of 0.24 cases per 100,000 population (2003, 1.71); statistically significant decrease

Brucellosis

- **Notifications:** one notification in the quarter, first of 2004
- **Comments:** This is the first notification since March 2002. The case was a male farmer, 40-49 years of age, from Southland DHB, who is not known to have had any recent contact with wild animals.

Japanese Encephalitis

- **Notifications:** one notification in the quarter, first of 2004
- **Comments:** The confirmed case was an adult female with a recent travel history including Hong Kong, Japan and China. Hospitalisation was required.

Rickettsial Disease

- **Notifications:** 1 notification in the quarter (2003, 1); 2 notifications over the last 12-months (2003, 1) giving a rate of 0.05 cases per 100,000 population (2003, 0.03); not a statistically significant increase
- **Comments:** probable case with a raised Q fever (*Coxiella burnetii*) titre was reported from Otago DHB. The case was a male, 40-49 years of age, who had been resident in Australia for 20 years, most recently in Townsville, North Queensland.

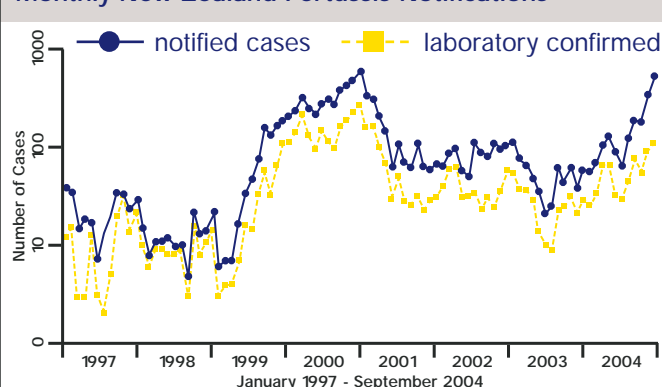
3. Other Surveillance Reports

The New Zealand Pertussis Epidemic Begins

Pertussis is a highly infectious respiratory disease caused by *Bordetella pertussis* and transmitted by droplet infection. It has been a notifiable disease in New Zealand since 1996. Outbreaks of pertussis tend to occur every four to five years. The last epidemic in New Zealand occurred over 1999-2001, peaking in late 2000 with a total of 4,140 notifications in that year. In early 2001 the number of notifications dropped rapidly, levelling off to a rate higher than before the epidemic (Figure). Notifications have begun to rise again in 2004 with 1,779 notifications during the first nine months of the year.

These totals include confirmed and probable cases. A confirmed case must have a positive nasal swab, with the organism identified by isolation or PCR, or be epidemiologically linked to such a case. Positive serology is not accepted as a confirmatory test for a current episode of pertussis. A case with positive serology and appropriate clinical features is classified as

Monthly New Zealand Pertussis Notifications



probable. It has been estimated that no more than 25% of all cases are actually notified.

In the current outbreak the highest rates for cases are from Southland, Nelson-Marlborough and Canterbury. This is a similar geographical distribution to the 2000 outbreak where the highest rates occurred in West Coast, Nelson-Marlborough and Canterbury.

Another feature of the 2004 outbreak is the high percentage of adult cases. These account for some 37% of the total cases compared with 21% in the 2000 outbreak. Since 1997 New Zealand has always had a substantial number of adult cases as is illustrated in the table below.

New Zealand Pertussis Notifications • 1997 - 2004

Year	Total Pertussis cases	Cases aged 20+ years	Percentage cases aged 20+ years
1997	284	83	29%
1998	153	72	47%
1999	1046	174	17%
2000	4140	864	21%
2001	1334	319	24%
2002	1068	249	23%
2003	584	143	25%
2004*	1779	651	37%

* Total number of cases to 30.9.2004. Source EpiSurv data to 14.10.2004

Adults often do not have the paroxysmal cough and whoop of children. It has been suggested that up to 20% of episodes of cough lasting for one week or more in adolescents and young adults are due to pertussis infections. Serological studies also indicate that pertussis infection is a common event in adult life. This indicates that particular care needs to be taken to protect very young children from adults with a persistent cough.

Reported by Dr Graham MacBride-Stewart, Population & Environmental Health Programme, Institute of Environmental Science and Research

Early Aberration Reporting System (EARS) How much warning might we have of future pertussis epidemics?

The Early Aberration Reporting System (EARS) is a widely used public health surveillance tool developed by the U.S. Centers for Disease Control and Prevention (CDC). The EARS system uses aberration detection algorithms to flag events for follow-up. It has been applied to notifiable disease surveillance data, sentinel influenza data, chemical poisoning data and vaccine safety data.

EARS has been used for 'drop in' surveillance at a number of U.S. public events such as the Democratic Convention 2001, Super Bowl 2001 and World Series 2001. Analysts arrive shortly

before the event to collect and monitor syndromic data such as emergency department data. During the event the EARS system is applied to the data and flags any anomalies.

The EARS system has also been applied to syndromic data such as emergency department data, 911 call data, absenteeism (workplace and school) data and over the counter drug sales.

What is EARS?

The EARS system applies aberration detection algorithms to surveillance data and flags anomalies. Three types of flags are currently implemented. A flag is calculated using a seasonally adjusted CUSUM quality control statistic (A CUSUM is a 'cumulative summation' of positive differences from the mean). When this sum exceeds preset levels established to provide a balance between sensitivity and specificity, the CUSUM flag is raised.

A second flag calculates a historical limits model that compares the current 4-week total to the mean of nine 4-week periods (using the previous, comparable and subsequent 4-week periods over the past three years). When the current 4-week total is two standard deviations from the mean the flag is raised. A third flag is raised when both the CUSUM and historical models exceed the established thresholds.

The EARS system can be applied to daily, weekly and monthly data and allows for stratification of the data, e.g. by geographic region and specified threshold limits. For rare diseases such as typhoid, the system can be set to flag every occurrence of a case.

Not all flags will be of public health interest and the system relies on people who understand the data and system well to provide context to the data, e.g. the aberration may be caused by a change in the laboratory testing method for an organism. Flags can also be an isolated anomaly and as users become more familiar with their data, they are able to determine which flagging behaviour warrants an investigation. Effective communication between public health professionals is essential in determining whether the aberration requires public health response.

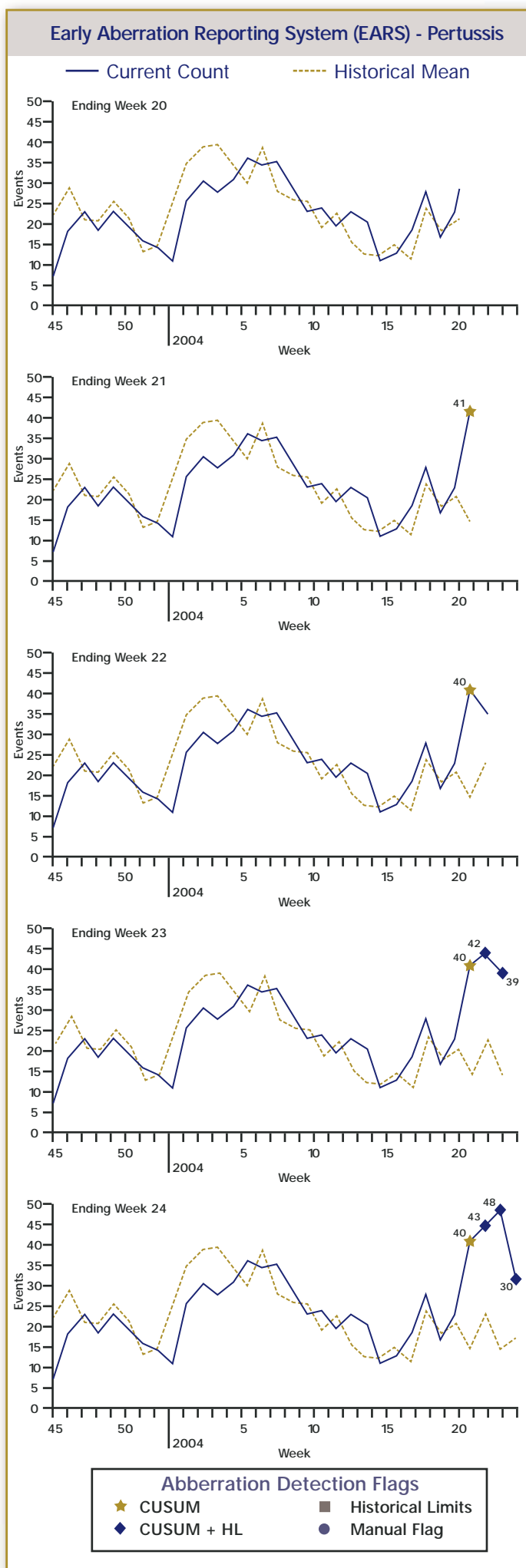
Applying EARS to the New Zealand pertussis epidemic

EARS was applied to pertussis notifications from weeks 20-24 of 2004 (8 May- 11 June). Each time series graph represents what an analyst would have seen that week. An aberrant event is flagged by the CUSUM model in week 21 and as the weeks progress both historical limits and CUSUM flags provide further evidence of an aberrant event.

Reporting lags (the time taken for notification and reporting of cases into EpiSurv) affect the ability of the system to identify anomalies. For example, week 22 is not initially flagged, but as reporting catches up in week 23, it is subsequently flagged. Consequently, analysis in week 22 would have been inconclusive and it is not until weeks 23 and 24 that the occurrence of an aberrant event becomes more convincing.

Regional EARS output in the form of maps (not shown) have 'flagged' six DHBs by week 24, three of which have both flags raised, i.e. we can have more confidence that these three are more likely to be experiencing aberrant events. ESR is currently trialling EARS on New Zealand notification data and as part of this trial EARS analyses will be made available next year to public health services to use and evaluate. The EARS system along with an alert system for rare diseases will form part of an early warning module to be developed as part of the notifiable disease surveillance system.

Reported by Michael Eglinton, Population & Environmental Health Programme, Institute of Environmental Science and Research



4. Outbreak Surveillance

The following information is a summary of the outbreak trends for New Zealand, from data collected July-September 2004. The outbreak data in this section are notified to ESR by the Public Health Services.

General

- 102 outbreaks notified in (934 cases)
- 46 are 'final' reports (627 cases); 56 are 'interim' reports (307 cases) that have yet to be finalised and closed (all further comments relate to 'final' reports only)
- 13.6 cases on average per outbreak, compared with 10.6 cases per outbreak in the previous quarter
- 33 hospitalisations and 1 death (norovirus outbreak in Wellington resthome)
- **Comments:** 1 norovirus outbreak in a continuing care hospital in Hokitika accounted for 22 hospitalisations, while two more norovirus outbreaks (one in New Plymouth, the other in Lower Hutt) accounted for a further hospitalisation each; 6 people were hospitalised with *S. flexneri* in Lower Hutt, and three more were hospitalised due to *N. meningitidis* in Whangarei

Pathogens

- 20 norovirus outbreaks (482 cases) in Auckland, Canterbury, Nelson, Taranaki, West Coast and Wellington
- 11 gastroenteritis outbreaks (88 cases) in Auckland, Hawke's Bay and Wellington
- 5 *Giardia* outbreaks (12 cases) all in Auckland
- 3 *Campylobacter* outbreaks (17 cases) in Auckland and West Coast
- 2 *B. pertussis* outbreaks (4 cases) in West Coast and Manawatu

- 1 outbreak caused by each of the following: *S. flexneri* (12 cases) in Wellington, *M. tuberculosis* (5 cases) in Hawke's Bay, *N. meningitidis* (3 cases) in Northland, *Salmonella* (2 cases) in Auckland and *E. coli* O157 (2 cases) in Tauranga

Modes of Transmission

Note that the reporting of outbreaks allows for multiple modes of transmission to be selected. Additionally, in many instances, no modes of transmission are identified. Consequently, the number of outbreaks in each category may not add up to the total number of outbreaks reported.

- 31 person-to-person outbreaks, from (non-sexual contact with an infected person): 16 norovirus (471 cases), 4 gastroenteritis (66 cases), 3 *Giardia* (8 cases), 2 *B. pertussis* (4 cases), and 1 outbreak each of: *S. flexneri* (12 cases), *M. tuberculosis* (5 cases), *N. meningitidis* (3 cases), *E. coli* O157 (2 cases), *Campylobacter* (2 cases), *Salmonella* (2 cases).
- 9 outbreaks where the mode of transmission is unknown: 4 gastroenteritis (13 cases), 3 norovirus (8 cases), and 1 outbreak each of: *Campylobacter* (2 cases), and *Giardia* (2 cases)
- 8 food borne outbreaks, from consumption of contaminated food or drink (excluding water): 4 gastroenteritis (12 cases), 2 *Campylobacter* (14 cases), and 1 outbreak each of *S. flexneri* (12 cases), and norovirus (3 cases)

- 5 environmental outbreaks, from contact with an environmental source (e.g. swimming): all caused by norovirus (166 cases).
- 4 waterborne outbreaks, from consumption of contaminated drinking water: 2 *Giardia* (4 cases) and 1 outbreak each of gastroenteritis (3 cases) and *E. coli* O157 (2 cases)

Circumstances of Exposure/Transmission

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

- 12 rest home outbreaks: 10 norovirus outbreaks (340 cases) and 2 gastroenteritis outbreaks (59 cases)
- 4 café outbreaks: 2 gastroenteritis (5 cases), and 1 outbreak each of: *Campylobacter* (12 cases) and norovirus (3 cases)
- 4 hospital (continuing care) outbreaks; all of which were caused by norovirus (122 cases).
- 2 hospital (acute care) outbreaks: 1 each of norovirus (16 cases) and *S. flexneri* (12 cases)
- 1 takeaway-food outbreak: gastroenteritis (5 cases)
- 1 childcare outbreak: *N. meningitidis* (3 cases)

5. Outbreak Case Reports

Pertussis in Otago and Southland

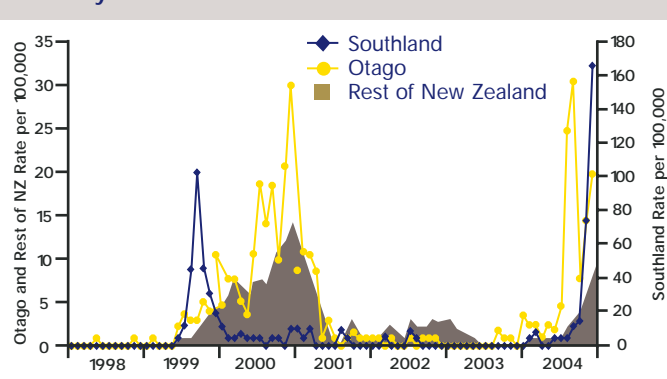
The experience of pertussis notifications in Otago and Southland during the last major outbreak (1999-2001) was of high monthly rates preceding the national peak in notifications. The annual rate of pertussis notifications in Southland in 1999 was 274 cases per 100,000 population. In Otago the outbreak occurred about one year later and coincided with the peak of cases in the rest of New Zealand. The overall annual rate of pertussis notifications for Otago in 2000 was 154 cases per 100,000.

The national age standardised rates in 1999 and 2000 were applied to the local populations and a standardised infection ratio was obtained for Southland and Otago. The ratios for 1999 were: Southland 10.30 (95% CI 9.14, 11.45) and Otago 1.91 (95% CI 1.15, 1.91). For 2000 the ratios were Southland 0.50 (95% CI 0.37, 0.63) and Otago 1.63 (95% CI 1.44, 1.83). The highest monthly rate of notifications in Southland was August 1999 when 104 cases per 100,000 population were recorded.

1999 - 2001 Outbreak

The age specific rates of pertussis cases in Southland (notified during the outbreak) were significantly higher than Otago in the 5-9 and 10-14 age groups. While the highest rates of disease in Otago were in the younger age groups, older children were more affected in Southland. The relative risk for Southland 5-9 year olds with confirmed disease when compared with Otago was 2.05 (95% CI 1.37, 3.07 $p < 0.01$) and for the 10-14 year age group the relative risk was 4.18 (95% CI 2.24, 7.81 $p < 0.01$). Overall, 73% of the notified cases were reported as being immunized, with the coverage differing between Otago (69%) and Southland (77%).

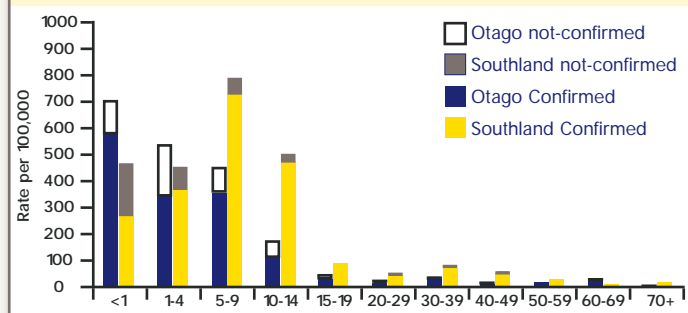
Monthly Notifications of Pertussis



Current Outbreak

There have been occasional cases of pertussis reported each month for the past two years, but there was a significant increase in notifications of laboratory confirmed cases in Otago during May 2004 and a much greater increase in notifications in Southland from July 2004 onwards.

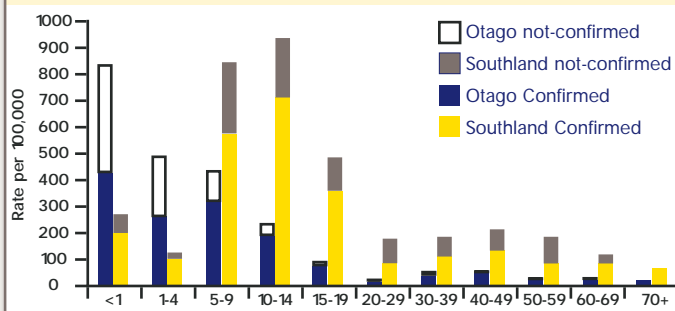
Pertussis Notifications 199/2000



The relative risk for Southland 5-9 year olds with confirmed disease when compared with Otago was 1.80 (95% CI 1.15, 2.80 $p < 0.01$), 10-14 year olds 3.81 (95% CI 2.32, 6.27 $p < 0.01$), 15-19 year olds 4.22 (95% CI 2.13, 8.35 $p < 0.01$) and 20-29 year olds 3.83 (95% CI 1.33, 11.02 $p < 0.01$).

The reported immunisation status was 64% of the confirmed and probable cases in Otago compared with 58% in Southland. The large variation between the notifications and the confirmed

Pertussis Notifications 2004



and probable cases seen in both regions and in all age groups may reflect a greater awareness of pertussis in some general practices.

The data for 2004 is for the first nine months and a more detailed study will be carried out early next year.

Reported by Dr John Holmes, Medical Officer of Health, Public Health South, Dunedin

6. Pathogen Surveillance

Unless otherwise reported, pathogen surveillance covers the July-September quarter, 2004.

ENTERIC PATHOGENS

A new service is available ONLINE www.surv.esr.cri.nz/enteric that will include monthly human and quarterly non-human Salmonella sero/phage-typing results and *ad hoc* items of interest.

Salmonella (Enteric Reference Laboratory)

- 274 human and 485 non-human isolates (2003:283, 294 respectively)
- non-human isolates are predominantly *S. Brandenburg* from bovine and ovine abortions in the South Island
- human isolates of *S. Brandenburg* from the endemic areas have also increased
- *S. Paratyphi B* isolated in a child and from tank water from the family aquarium
- 3 isolates, Group E 3,10 : r : - (a group staying at the same hotel in Fiji).
- 15% isolates indicate overseas travel

VTEC/STEC (Enteric Reference Laboratory)

- 12 laboratory confirmed human cases of *E. coli* O157:H7 (2003, 12 cases)
- 3 non-O157:H7 cases, O117:H7, O177:HNM and ONT:HNM

Shigella (Enteric Reference Laboratory)

- PFGE analysis of seven isolates of *Shigella flexneri* 3a from a hospital outbreak demonstrated a strain of clonal origin closely related to other isolates of this serotype circulating in New Zealand.

Norovirus (Norovirus Reference Laboratory)

- 69 outbreaks
- 48 (69.5%) occurred in rest homes and hospitals
- 5 norovirus outbreaks were associated with consumption of New Zealand oysters (Norovirus was identified in 3 batches of oysters, 2 were directly linked to consumption and 1 was harvested from the growing area)
- 6 outbreaks occurred in food or catered settings, 2 were associated with school/childcare settings, 1 was on a cruise ship, 1 in a hotel and 1 outbreak occurred in a military camp

- several variants of the GII/1,4,8 genotype, the common global strain, have been circulating and have been identified in all institutional outbreaks
- only 1 outbreak had a different genotype (GII/6,7,9) identified

LEGIONELLOSIS AND ENVIRONMENTAL LEGIONELLA

- 11 legionellosis cases were laboratory-confirmed by the Legionella Reference Laboratory (LRL) at ESR
- all cases were sporadic in nature
- 8 cases fitted the confirmed case definition and 3 fitted the probable case definition
- 9 of the 11 cases had been notified by 20 October
- a further 3 notified cases have been laboratory-tested at LRL and not proven to be cases
- no deaths due to legionellosis have been reported this quarter
- all case-confirmed cases demonstrated either antibody titres >512 on two or more occasions, or at least a four-fold rise in antibody titre by the legionella IFAT
- 2 of the probable cases were PCR positive only and the legionella agent identified as *L. micdadei* and *L. dumoffii* using DNA sequencing
- the other probable case has been determined on a single antibody titre of 512 to *L. pneumophila* serogroup 1
- *L. pneumophila* serogroup 1 strains were identified as the causative agent in 5 confirmed cases, 2 of which were associated with travel outside New Zealand
- other *L. pneumophila* serogroups (sg) identified were one case of sg 4 and another of sg 11 or 12
- *L. longbeachae* and *L. gormanii* infection were identified by serology in a further two cases

MYCOLOGY

A summary table of opportunistic mycoses and aerobic actinomycetes in New Zealand, January-June 2004 is available online (www.surv.esr.cri.nz).

continued...

SPECIAL BACTERIOLOGY

Listeria monocytogenes

- 5 isolates of *Listeria monocytogenes* from human cases were referred (for human *L. monocytogenes* isolates detail, see www.surv.esr.cri.nz)
- 2 cases were perinatal with one foetal death, the 3 remaining cases were in adults who had an underlying illness and/or were elderly

Corynebacterium diphtheriae

- 4 cutaneous isolates of *Corynebacterium diphtheriae* [var. *mitis* (2), var. *gravis* (2)] were received for toxigenicity testing, typing and surveillance purposes
- patients were aged between 7 months and 54 years, from Auckland (3) and Wellington (1)
- isolates were non-toxicogenic by PCR examination for the toxin gene

ANTIMICROBIAL RESISTANCE

2003 antimicrobial resistance data from hospital and community laboratories

Each year ESR collects antimicrobial resistance data from hospital and community diagnostic laboratories throughout New Zealand. The data are derived from the results of the laboratories' routine antimicrobial susceptibility testing. A record 35 laboratories were able to provide their 2003 resistance data. The data are collated and analysed to provide estimates of national rates of resistance. The 2003 rates are published in full on the ESR

surveillance website at www.surv.esr.cri.nz/PDF_surveillance/Antimicrobial/National_AR_2003.pdf

Some of the key points:

- Rates of resistance in *Escherichia coli* were similar among blood and urinary isolates, with, respectively, 1.5% and 1.8% second-generation cephalosporin resistance, 0.4% and 0.9% third-generation cephalosporin resistance, 11.1% and 9.4% co-amoxiclav resistance, and 4.0% and 3.1% fluoroquinolone resistance. Trimethoprim resistance among urinary isolates is stable, with a 2003 rate of 22.2%.
- Fluoroquinolone resistance continues to increase in *Neisseria gonorrhoeae* and reached 8.1% in 2003, while penicillin resistance was 5.1%.
- Fluoroquinolone and erythromycin resistance remains relatively rare in *Campylobacter* at 1.9% and 1.1%, respectively.
- Methicillin resistance in *Staphylococcus aureus* appears to have stabilised with 7.5% resistance in 2003 and 7.7% in 2002. However, there are wide geographical variations. There was 17.5% resistance to mupirocin and 9.3% resistance to fluoroquinolones.
- Continuing high rates of penicillin resistance among non-invasive *Streptococcus pneumoniae*, with 15.7% penicillin resistance (MIC ≥ 2.0 mg/L) and 10.6% intermediate resistance (MIC 0.12–1.0 mg/L) equating to a total 26.3% penicillin non-susceptibility. There was 6.1% cefotaxime/ceftriaxone resistance (MIC ≥ 4.0 mg/L). These rates are much higher than those among invasive pneumococcal isolates tested at ESR, which were 7.5%, 16.4% and 1.7% respectively for penicillin resistance, penicillin non-susceptibility and cefotaxime resistance.

Reported by Helen Heffernan, Communicable Disease Group, Institute of Environmental Science & Research, Kenepuru Science Centre

LEGIONELLA SEROLOGY TESTING ISSUES IDENTIFIED

The detection of a four-fold or greater rise in the levels of Legionella antibodies in acute and convalescent serum samples using indirect fluorescent antibody (IFA) testing is the basis for confirming the majority of cases of legionellosis in New Zealand. The main limitation of the IFA test is that limiting the range of antigens used in the test can result in missing some cases of the disease, or incorrectly identifying the causative agent. Cross-reactivity can also occur between different legionella species and serogroups.

Most New Zealand laboratories that routinely carry out legionella serology testing use the MarDx® Legionella omni screen, an IFA test kit. The kit works well if the manufacturer's instructions are followed, but problems can occur when non-proprietary conjugates and control sera are used and are inappropriately diluted.

Legionella pneumophila was cultured from the sputum of a patient admitted to hospital and the isolate was typed as serogroup 1 using monospecific FITC-conjugated DFA reagents. Serum samples were collected from the patient both on admission and three weeks later. These were tested in parallel for the presence of legionella antibodies using the MarDx® Legionella omni screen following the manufacturer's instructions. Initial screening of the patient's acute and convalescent sera showed a greater than four-fold rise in antibody titre in the serogroups 7 to 14 antigen pool. Serotyping with monovalent antigens from the Lpn7-14 pool identified serogroup 12 as the causative agent. The corresponding endpoint titres in serogroups 1 to 6 antigen pool changed from < 64 to 128 between the acute and convalescent sera. The endpoint titres in the b-j antigen pool remained unchanged at < 64.

Relying solely on the findings of the legionella serology results from the MarDx® IFA test, the incorrect conclusion that the causative agent was *L. pneumophila* serogroup 12 could be made.

The paired sera were also tested using an ESR in-house Legionella IFA test method. This method differs from the MarDx® Legionella omni screen IFA test in three significant areas:

- 1) It uses a greater range of legionella antigens, especially for *L. pneumophila* serogroup 1, with the inclusion of the Lpn1 strains Bellingham, Knoxville, OLDA, and Philadelphia.
- 2) The conjugate is an FITC-labelled sheep anti-human immunoglobulin (Chemicon International, Australia) enabling any anti-legionella immunoglobulin present to be detected.
- 3) All serum samples for legionella antibody testing are subjected to adsorption against *Campylobacter jejuni* soluble antigens to remove cross-reactive campylobacter antibodies that can cause false-positive results in the Legionella IFA test.

The ESR Legionella IFA method uses 33 different plate-grown, heat-killed type strains of *Legionella* species prepared in five different pools (Pools A to E).

Using preparations of the individual antigens making up the pools that gave a high titre from the initial screen, the convalescent serum was retested to identify the specific legionella antigen causing the observed fluorescence. An endpoint titre of 1024 was observed in the convalescent serum to both *L. pneumophila* serogroup 1 strain OLDA and strain Bellingham, but only an endpoint titre of 128 to *L. pneumophila* serogroup 1 strain Philadelphia, the only Lpn1 strain currently in the MarDx® omni kit.

Recognising that the reduced specificity may cause misdiagnoses, Trinity Biotech, the manufacturers of the MarDx® omni kit are modifying the antigen components of the kit. ESR will be involved in validating the kit prior to its release.

Reported by David Harte and Anne Southern, Legionella Reference Laboratory, Communicable Disease Group, Institute of Environmental Science & Research, Kenepuru Science Centre



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

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