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Rheumatic fever registers in New Zealand

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This paper reports 1995-2000 acute rheumatic fever (ARF) rates and the results of surveys of register-based prevention programmes in New Zealand conducted in 1996, 1998 and 2001. New Zealand continues to have high rates of ARF for an industrialised country. Individuals who have had ARF are at increased risk of further episodes (recurrent ARF), which increase progression to chronic rheumatic heart disease (CRHD). Regular delivery of antibiotic prophylaxis prevents recurrent ARF and reduces progression to CRHD. Disease registers are effective in supporting prophylaxis delivery. An average of 101 cases of ARF were notified each year between 1995 and 2000, a rate of 2.8 per 100 000 population. The annual rate among those aged 5-14 years was 13.8 per 100 000. In 2001, there were six programmes using register-based approaches to manage prophylaxis. Three further programmes provided a surveillance function without links to prophylaxis provision. Public health services operated the majority (7/9) of programmes. Management programmes have varying links with primary health care providers of recurrent ARF prophylaxis. One programme has been discontinued and three programmes re-established or enhanced in the last three years. Considerable variation exists in register roles and configuration. The effectiveness of recurrent ARF prevention programmes should be evaluated to help optimise management of recurrent ARF prophylaxis in New Zealand. Suspected ARF cases, either first or recurrent, should usually be referred to a paediatrician, cardiologist or adult internal medicine physician to confirm diagnosis, usually requiring echocardiography. Confirmed cases should be referred to a register-based ARF recurrence prevention programme for prophylaxis provision, if available. First and recurrent ARF cases are notifiable.

Acute rheumatic fever (ARF) and its sequela chronic rheumatic heart disease (CRHD) continue to be major health problems in New Zealand, particularly among Maori and Pacific Islands people.¹ The optimal strategy to prevent primary ARF in New Zealand has not been determined,² although current research on the efficacy of school-based detection and treatment of sore throat may provide evidence for policy development in this area.³ In contrast, secondary prevention of ARF is of proven effectiveness.⁴

Individuals who have had an ARF episode are at increased risk of further episodes.⁵ Such recurrent ARF episodes compound the valvular damage produced by the initial episode⁶ and increase CRHD severity.⁷ Regular parenteral penicillin injections prevent recurrent ARF,⁸ minimise cardiac sequelae,⁴ and have been found to be cost-effective when compared with the expenses associated with hospitalisation of recurrent ARF cases.⁹ Maintenance of continuous prophylaxis over many years can, however, be difficult to achieve.¹⁰ Failure of satisfactory prophylaxis can occur

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when, despite clinical expertise, an organisational system to coordinate prophylaxis delivery in the community is absent.¹¹

Registers are data files of all cases of a particular disease in a defined population.¹² In 1978, the World Health Organization promoted the use of disease registers as part of community programmes to help coordinate prevention of ARF recurrences and CRHD.^{13,14} Subsequent adoption of

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this approach has been associated with reduced ARF recurrence rates^{15,16} and with reduced incidence of carditis.¹⁷

Background to prevention of ARF recurrences in New Zealand: ARF recurrence prevention programmes in New Zealand were first developed in the mid-1970s, at a time of recognition that reductions in ARF incidence of the magnitude observed in other developed countries had not occurred in New Zealand.¹⁸ High CRHD prevalence of 7.0 per 1000 was reported among Wairoa 12-17 year olds¹⁹ and 6.5 per 1000 among 5-19 year old Maori in Waikato.²⁰

The high CRHD burden was considered partly attributable to inadequate prevention of recurrent ARF episodes. Individuals with recurrent ARF made up approximately 20% of individuals hospitalised with ARF in several case series up to the early 1980s: 21% in Gisborne between 1958 and 1973,²¹ 24% in Northland 1969-81,²² and 18% in Auckland 1962-82.¹¹ Failure to prevent recurrent ARF in New Zealand was considered to be related to non-recognition that parenteral prophylaxis was superior to oral prophylaxis; to inadequate patient compliance with oral prophylaxis if used; to inability of clinicians to retain long-term contact and therefore to maintain parenteral prophylaxis among ARF patients; and to a lack of reliable data about ARF epidemiology.²³

A programme designed to address these problems commenced in Gisborne in 1974.²³ A review of this and other programmes recommended that recurrent ARF prevention programmes in New Zealand should contain four key elements: register-based coordination of prophylaxis provision; community prophylaxis provision by public health or district nurses; strong emphasis on parenteral prophylaxis instead of oral; and a monitoring system to enable detection and investigation of dose delivery failure.²⁴ ARF prevention programmes incorporating these elements were implemented in Waikato in 1978,¹⁰ Northland in 1980,²² Auckland in 1981²⁵ and Rotorua in 1983.²⁶ Despite similarities, each programme developed independently of any national framework.

Subsequent evaluations showed that admissions for recurrent ARF declined from 35% to 18% of total ARF admissions in Gisborne²³ and from 22% to 8% in Auckland.²⁷ ARF recurrences in Waikato declined from 11 to 5.5 episodes annually following programme implementation, although this decline was accompanied by a similar decline in first ARF cases.²⁸ In Auckland, ARF recurrences among patients receiving parenteral prophylaxis declined from 1.6 to 0.3 episodes per 100 patients per year following introduction of a coordinated service assisted by register-generated prescriptions for community nurses.²⁷

During the 1980s, the Department of Health²⁹ and a ministerial advisory committee³⁰ advocated register-based programmes for recurrent ARF prevention. Under a national ARF surveillance and management framework, ARF became notifiable in 1986 and a national register was proposed to coordinate prophylaxis provision. The national register was not put in place due to data privacy concerns (based on the experience of one of the authors (DL) who was involved in the register development).

A 1993 survey of ARF registers found that the Rotorua register-based programme, covering Bay of Plenty, had been discontinued.³¹ Clinicians reported that the programme register had been discontinued "when the health region was fragmented as Rotorua, Tauranga and Whakatane districts."³² Two further surveys in 1996³³ and 1998³⁴ showed no re-establishment of a Bay of Plenty programme register or extension of other recurrent ARF prevention programmes.

Current structural changes to the health and disability sector in New Zealand suggest that a stocktake of these programmes is timely. The aims of the surveys were to describe current programme coverage, and to examine the scope of functions performed by these programmes.

Methods

Register-based recurrent ARF prevention programmes in New Zealand are described based on surveys conducted in 1996, 1998 and 2001. These surveys did not examine other aspects of prophylaxis delivery that occur outside register-based programmes. The 1996 and 1998 surveys involved semi-structured interviews with key informants working with each register. Detailed information was collected on register coverage area and the functions of each register. A telephone survey was conducted in April 2001 to identify changes since 1998.

National and health district annual ARF rates were calculated from ARF cases reported to the national disease notification system between

1 January 1995 and 31 December 2000, and the 1996 census figures for the usually resident population of each health district (using the 1997 health district boundaries). Since 1995, notified ARF cases have been recorded as first, recurrent or unspecified episodes to enable estimation of the total number of recurrent ARF episodes. Health district comparisons of recurrent ARF rates were not possible because there was uncertainty whether compliance with the requirement to notify recurrent ARF was uniform nationwide.

Results

During 1995-2000, 608 cases of ARF were notified, an average of 101 per year, giving an annual rate of 2.8 per 100 000 population. Of these, 75.3% were aged 5-14 years, an age-specific annual rate of 13.8. Among those aged 5-14 years the annual rate for Pacific Islands people was 64.5 and for Maori was 31.9, compared with a European rate of 1.7. Forty-eight ARF cases during 1995-2000 were notified as recurrent episodes, 8.9% of the total notified ARF cases excluding 69 unspecified as either first or recurrent episodes.

Register-based ARF programmes operating at the time of the 2001 survey were grouped either as 'management' or as 'surveillance' programmes. Register-based management programmes were closest to the model described by Neutze.²⁴ Each management programme used a register to coordinate community-based prophylaxis provision predominantly by outreach nursing services, collated information on timeliness of prophylaxis delivery, and encouraged parenteral prophylaxis. Management programmes also used their registers to perform a varying range of other functions including routinely informing health care workers (eg, dentists) of clients receiving prophylaxis, generating or prompting prophylaxis prescriptions, and accumulating data for auditing prophylaxis uptake.

Six register-based management programmes were operating in New Zealand in 2001. These were based in Northland, Auckland, Rotorua, Gisborne, Hawkes Bay and Lower Hutt. Collectively, these programmes covered nine health districts containing 51.1% of the population and 81.9% of ARF notifications between 1995 and 2000 (Table 1). All management programmes covered at least one health district with annual notified ARF incidence of at least 3.0 cases per 100 000 population during 1995-2000. There have been several changes to management programmes over the survey periods:

- The Lower Hutt register, previously performing surveillance functions only, was upgraded into a management programme.

Table 1: New Zealand register-based recurrent ARF prevention programmes in 2001, and ARF incidence, by health district

Health district	ARF 1995-2000		Register-based recurrent ARF prevention programmes in 2001	
	Total notified cases	Annual incidence (per 100 000)	Register base	Programme type
Northland	56	6.8	Whangarei	Management
Northwest Auckland	29	1.2	Auckland	Management
Central Auckland	96	4.6		
South Auckland	177	8.6		
Waikato	61	3.4	nil	n/a
Ruapehu	5	5.0	nil	n/a
Eastern Bay of Plenty	10	3.3	Whakatane	Surveillance
Tauranga	11	1.6	nil	n/a
Rotorua	14	3.6	Rotorua	Management
Taupo	1	0.5	nil	n/a
Gisborne	36	13.1	Gisborne	Management
Hawkes Bay	35	4.1	Napier	Management
Taranaki	4	0.6	nil	n/a
Wanganui	0	0.0	Wanganui	Surveillance
Manawatu	1	0.1	Palmerston North	Surveillance
Wairarapa	5	2.2	nil	n/a
Wellington	43	3.0	Lower Hutt	Management
Hutt	12	1.5		
Nelson-Marlborough	1	0.1	nil	n/a
West Coast	0	0.0	nil	n/a
Canterbury	3	0.1	nil	n/a
South Canterbury	0	0.0	nil	n/a
Otago	0	0.0	nil	n/a
Southland	8	1.2	nil	n/a
New Zealand	608	2.8		

- The Waikato register, previously coordinating prophylaxis provision through the district nursing service in Waikato and Ruapehu, had ceased to have systematic links with prophylaxis providers and was also unable to contribute to surveillance.
- In Rotorua, an independent practitioner association (IPA) of general practitioners established a register-based recurrent ARF prevention programme.

Four management programmes were run by public health units, one was run by a hospital paediatric department, and the remaining one was run by an IPA. Some public health unit programmes involved collaboration with clinicians.

Prophylaxis in each of the six management programmes was predominantly provided by outreach nursing services. Two of the six also coordinated and monitored general practice (GP) prophylaxis provision; one maintained GP clients on the register but did not actively monitor their prophylaxis provision; and the remaining three had no links with GP prophylaxis provision.

In contrast with management programmes, surveillance programmes used their registers to maintain a longitudinal record of clients receiving prophylaxis, but did not have a role in coordinating prophylaxis provision. Register-based surveillance programmes were based in public health units in Wanganui, Palmerston North and Whakatane, and collectively covered 10.2% of the population and 2.5% of ARF notifications received between 1995 and 2000. Changes have also occurred with surveillance programmes over the survey periods. The Whakatane surveillance programme has been newly re-established and as noted the Lower Hutt programme has been converted into a management programme.

Twelve districts were without a surveillance or management programme when surveyed in 2001. These districts covered 38.7% of the population and 15.6% of ARF notifications during 1995-2000. Half (6/12) of these districts had an annual ARF incidence of 0.5 per 100 000 or less during 1995-2000, although two (Waikato and Ruapehu) had an annual ARF incidence greater than 3.0 per 100 000.

Discussion

Several key findings emerge from this review of register-based recurrent ARF prevention programmes in New Zealand: the incidence of ARF, and hence the need for these programmes, remains high; current programmes vary considerably in format and application; and recent developments have seen new programmes emerge and one disestablished.

The annual rate of notified ARF in New Zealand during 1995-2000, 2.8 per 100 000, has increased by 12% from that reported for 1990-95.¹ The disproportionately heavy burden of disease on young people of Maori and Pacific Islands ethnicity remains. Almost 9% of notified ARF cases with specified first or recurrent episode status are recurrences, but this is likely to be only a broad estimate of the national rate because 11% of cases were not specified as either first or recurrent episodes and there was uncertainty whether compliance with the requirement to notify recurrent ARF was uniform nationwide. For these reasons, we considered that a breakdown of recurrence rates by health district would be inaccurate and misleading. Analyses of data collected by longitudinal datasets (ie, registers) are required to better determine ARF recurrence rates at health district level.

Register-based recurrent ARF prevention programmes in New Zealand owe their existence to local action, often mobilised through the efforts of key individuals. The nature of locally driven initiatives means that the roles of these programmes vary considerably. Six programmes coordinate and monitor prophylaxis, but each has a different format and way of functioning. None of the operational attributes examined in this study had been adopted uniformly by all registers. Three programmes primarily act as surveillance tools that maintain lists of individuals requiring prophylaxis but do not monitor prophylaxis delivery. ARF was made notifiable primarily to facilitate prophylaxis delivery to a highly mobile population, and registers that provide surveillance without a link to prophylaxis delivery do not meet this requirement. USA research has shown that ARF registers that passively receive data can be inaccurate and incomplete³⁵ and suggests that active clinician monitoring is essential.³⁶

Absence of a register-based programme to coordinate prophylaxis provision does not necessarily imply unsatisfactory provision. With or without a register-based programme, individuals with ARF are still

referred to a provider responsible for maintaining contact with the client and administering prophylaxis. There is currently no published evidence to show that register-based programmes lead to better outcomes than provision by outreach (eg, public health or community nursing) services without a register. There is evidence that register-based programmes can be better than general practitioners or hospital outpatient services in maintaining client contact¹⁰ and preventing recurrent ARF episodes,²⁷ but further research in this area is required. There are several reasons why register-based programmes are likely to improve the effectiveness of prophylaxis delivery: registers enable estimation of disease prevalence across a population, aiding decisions for resource allocation; registers can act as a central clearing-house for referrals between health districts and provide a back-up for individual prophylaxis providers; and registers in some areas provide prescriptions to enable nurses to deliver prophylaxis by delegated authority.

The recent discontinuation of the Waikato register shows that previous longevity does not assure continuity of register-based programmes. The Rotorua experience in the early 1990s suggests that, despite local leadership, these programmes may be vulnerable to the effects of health sector restructuring.³¹

This paper also reports the emergence of a new form of register-based recurrent ARF prevention programme. The Rotorua programme is based within an IPA, and monitors prophylaxis provision by district nurses and by general practitioners. Whether this approach has potential for other regions (all general practitioners in Rotorua belong to a single IPA) remains to be seen. The current evaluation of this programme will therefore be of considerable value. Development of recurrent ARF prevention programmes within Maori or Pacific provider organisations could be a natural extension of this approach.

Population health imperatives for district health boards³⁷ and for primary health organisations³⁸ suggest that a re-evaluation of the role of recurrent ARF prevention programmes in New Zealand is timely, as recurrent ARF prophylaxis is cost effective and well established as a public health measure.^{5,13} Evaluation of the effectiveness of prophylaxis delivery methods requires accurate ascertainment of ARF recurrence rates, as was done by a rheumatic fever working party convened in 1994. Reissuing prophylaxis guidelines, originally circulated to medical practitioners by the Department of Health in 1988,³⁹ would also be useful.

Suspected ARF cases, either first or recurrent, should usually be referred to a paediatrician, cardiologist or adult internal medicine physician to confirm diagnosis, usually requiring echocardiography. Hospitalisation may also be required. Confirmed cases should be promptly referred to a register-based ARF recurrence prevention programme for prophylaxis provision. Each recurrent ARF case should be investigated to identify reasons for the recurrence. All first and recurrent ARF cases are notifiable.

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Surveillance and control notes

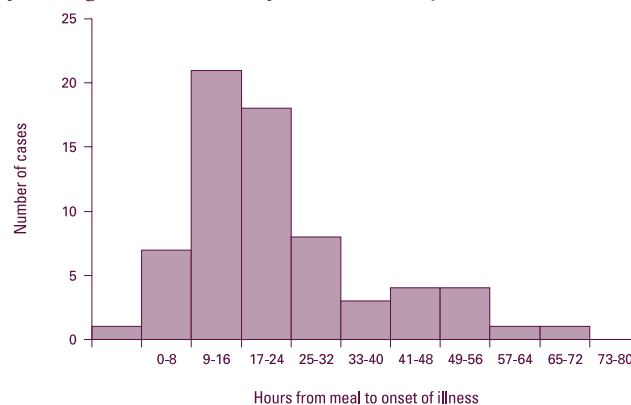
Outbreak of *Salmonella* Typhimurium phage type 160 in Auckland linked to an umu function

An outbreak of gastroenteritis followed a South Auckland umu function in February. In the absence of a guest list attendees were traced by word of mouth. The investigation was greatly enhanced by the assistance of a culturally competent investigator on the team.

Of the 100 umu attendees who were interviewed (response rate 88.4%), 70 became ill; an attack rate of 70.0%. Of those becoming ill, 53 (75.7%) had consulted a doctor, 27 (38.6%) were laboratory confirmed to have *Salmonella* Typhimurium phage type 160 (STM 160) infection, and six (8.6%) were hospitalised. The median incubation period was 24 hours and the median duration of illness was five days. The epidemic curve (excluding one case with an incubation period of 165 hours, and one with an unknown time of illness onset) is shown in *Figure 1*. The most commonly reported symptoms were fever, diarrhoea, stomach cramps, nausea, lethargy and vomiting. Outbreak investigation revealed the most likely source to be potato salad (relative risk 2.0, 95% confidence interval 1.4-2.9, $p < 0.001$). STM 160 was cultured from leftover potato salad. None of the food handlers involved in its preparation provided faecal samples for testing, however none reported symptoms of enteric illness prior to the event. A food safety audit revealed multiple potential sources for contamination of the potato salad: the potato salad was mixed with bare hands; the mayonnaise used for the salad was unrefrigerated for eight hours prior to preparation of the salad; and the prepared salad was left for five hours in ambient temperatures as high as 27°C. This outbreak provides an opportunity for promotion of the 'clean,

cover and chill' domestic food safety themes advocated by the New Zealand Foodsafe Partnership: clean (hand hygiene and utensils); cover (to prevent contamination) and chill (to prevent growth of bacteria in foods). Auckland Public Health Protection is planning to use these themes in a Pacific Island food safety campaign to be run in 2001-02.

Figure 1: Time to onset of illness among 68 cases of gastroenteritis following an Auckland umu function, February 2001



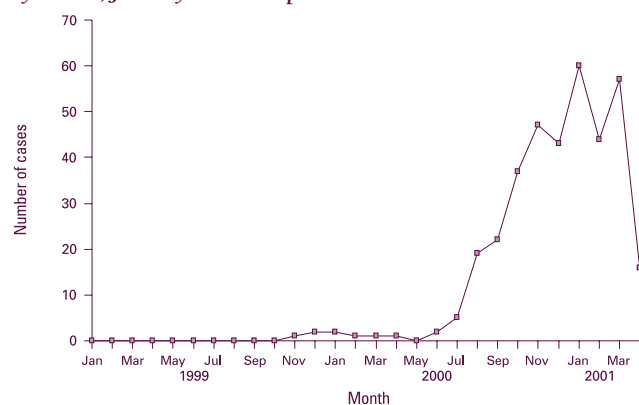
The incidence of STM 160 infection has increased markedly since mid-2000. Between January 1999 and April 2001, 360 STM 160 human isolates have been reported by the enteric reference laboratory at ESR (*Figure 2*).

In 1999, STM 160 was only reported in Canterbury health district with a rate of 0.8 per 100 000. In 2000, STM 160 spread to 17 of the

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24 health districts. Canterbury had the highest rate of 21.5 per 100 000 followed by South Canterbury (18.9), Southland (12.6) and Manawatu health districts (11.3). Among the 157 cases notified from 1999-2000, 17.2% (27 of the 157 cases for which this information was recorded) had a reported history of contact with animals, 6.4% (7/109) of contact with a case, 17.2% (27/157) of suspected or definite contact with contaminated food or water and 2.3% (3/131) of overseas travel. Notifications of STM 160 had an almost even gender age distribution, (53.5% in females and 46.5% in males). The highest rates were among those of European ethnicity (4.7 per 100 000) and in infants aged less than one year and children aged 1-4 years (20.1 and 10.0, respectively).

Figure 2: Salmonella Typhimurium phage type 160 human isolates by month, January 1999 to April 2001



The epidemic of STM 160 infection among humans follows the emergence of STM 160 among birds and animals. From June 2000, increasing numbers of dead sparrows as well as a reduction in the number of living sparrows were reported from Christchurch and the surrounding rural districts. The Department of Conservation (DOC) and Ministry of Agriculture and Forestries (MAF) jointly issued a press release in September 2000 requesting that the public report bird deaths to DOC. By the end of September 2000, reports of dead birds were received from all over New Zealand and from a range of avian species, predominantly among sparrows. By early October there had been a total of 170 public reports of sparrow deaths and 66 reports of deaths among other birds, equating to totals of 1303 dead sparrows and 97 other dead birds including blackbirds (15) waxeyes (11), and ducks (10). STM 160 was isolated from specimens collected from animals during this time period, including from some of the dead sparrows included in these public reports, and is believed to be the most likely cause of the bird deaths. Routes of transmission between birds and humans have not been identified (Outbreak reported by Megan Callaghan and Greg Simmons, Auckland District Health Board).

Hospitalisations and fatalities from notifiable communicable diseases in 2000

There were 64 deaths due to notifiable communicable diseases in 2000, compared with 65 cases in 1999 (Table 1). The case-fatality rates presented in Table 1 generally reflect acute mortality as, except for AIDS, only deaths among cases both notified and dying in 2000 are included. The 13 deaths recorded for AIDS are all the deaths from AIDS in 2000, and therefore include deaths among cases notified before 2000. Consequently, a case-fatality rate has not been calculated for AIDS.

Meningococcal disease accounted for the largest number of deaths from a notifiable communicable disease in 2000. The number of meningococcal disease fatalities in 2000 (17) was lower than in 1999 (23), and the case-fatality rate was also lower in 2000 (3.5%) than in 1999 (4.6%). The fatalities due to primary amoebic meningoencephalitis and due to hydatid disease in 2000 were the first fatalities from these diseases reported in the last four years.

Deaths from notifiable communicable diseases are relatively rare,

and need to be accurately recorded. Under the Health Act 1956, funeral directors are legally required to notify the local medical officer of health of any deaths from infectious diseases. This requirement of funeral directors is in addition to the requirement for medical practitioners to report notifiable diseases. Other communicable diseases that are not notifiable, for example influenza, also cause significant numbers of fatalities.

Table 1: Fatal cases of notifiable communicable diseases, 2000¹

Disease	Number of fatal cases	Total number of cases	Case-fatality rate (%)
AIDS	13	27	-
Campylobacteriosis	3	8430	0.04
Creutzfeldt-Jakob disease	3	3	100
Hydatid disease	1	3	33.3
Legionellosis	5	63	7.9
Listeriosis	6 ²	22	27.3
Meningococcal disease	17	480	3.5
Primary amoebic meningoencephalitis	1	1	100
Salmonellosis	7	1802	0.4
Tuberculosis ³	8	353	2.3
Total	64	-	-

- Notes: 1 Based on data recorded with the case notification
 2 There were four fatalities from perinatal listeriosis and two from non-perinatal listeriosis.
 3 Tuberculosis is a treatable disease, so it is possible that several of these deaths were in people who did not receive treatment in New Zealand. The diagnosis of tuberculosis may have been made at autopsy.

The total number of hospitalisations due to notifiable communicable diseases increased from 1766 in 1999 to 1982 in 2000 (Table 2). Meningococcal disease accounted for the largest number of hospitalisations, followed by campylobacteriosis, then pertussis and salmonellosis. The current pertussis epidemic resulted in 291 hospitalisations for this disease in 2000, an increase from 110 in 1999.

Table 2: Hospitalised cases of notifiable communicable diseases, 2000¹

Disease	Number of hospitalised cases	Number of cases for which hospitalisation status reported	Hospitalisation rate (%)
Campylobacteriosis	373	5883	6.3
Cryptosporidiosis	52	668	7.8
Dengue fever	1	7	14.3
Gastroenteritis	25	561	4.5
Giardiasis	27	1208	2.2
Haemophilus influenzae type b disease	10	12	83.3
Hepatitis A	17	100	17.0
Hepatitis B (acute)	15	62	24.2
Hepatitis C (acute)	5	43	11.6
Hydatid disease	1	2	50.0
Lead absorption	3	103	2.9
Legionellosis	47	55	85.5
Leprosy	1	3	33.3
Leptospirosis	33	73	45.2
Listeriosis	22	22	100
Malaria	25	52	48.1
Measles	1	48	2.1
Meningococcal disease	472	480	98.3
Mumps	3	42	7.1
Paratyphoid	4	19	21.1
Pertussis	291	3854	7.6
Rheumatic fever	49	53	41.5
Rubella	0	26	0
Salmonellosis	215	1554	13.8
Shigellosis	27	92	29.3
Tetanus	1	1	100
Tuberculosis	199	314	63.4
Typhoid	17	21	81.0
VTEC/STEC infection	11	65	16.9
Yersiniosis	35	301	11.6
Total	1982	15723	12.6

- Notes: 1 Based on data recorded with the case notification. Hospitalisation data are not available for AIDS or Creutzfeldt-Jakob disease.

Surveillance data

National surveillance data - April 2001

Disease ¹	Current year - 2001 ²			Previous year - 2000			Trends - April 2001
	Apr 2001 cases	Cumulative total year-to-date	Current rate ³	Apr 2000 cases	Cumulative total year-to-date	Previous rate ³	
AIDS	2	9	0.7	5	11	0.9	
Campylobacteriosis	484	2973	223.6	561	3313	240.8	***
Cholera	0	0	0	0	0	0	
Creutzfeldt-Jakob disease	1	1	0.1	0	0	0.1	
Cryptosporidiosis	119	367	29.4	19	81	18.4	***
Dengue fever	0	1	0.2	0	1	0.1	→ 250
Gastroenteritis ⁴	43	254	20.6	47	242	18.2	*
Giardiasis	118	496	44.6	112	570	44.6	
<i>H influenzae</i> type b disease	2	4	0.4	1	4	0.3	
Hepatitis A	3	19	2.9	7	22	2.5	
Hepatitis B (acute) ⁵	4	23	2.0	3	28	2.4	
Hepatitis C (acute) ⁵	5	18	2.1	3	24	2.3	
Hydatid disease	0	1	0.1	0	0	0.1	
Influenza ⁶	4	17	7.2	0	4	21.8	***
Lead absorption	13	47	3.6	11	42	3.8	
Legionellosis ⁶	10	29	2.1	5	21	2.0	
Leprosy	0	0	0.1	0	1	0.2	
Leptospirosis	8	32	2.5	7	39	2.3	
Listeriosis	0	5	0.4	2	11	0.7	
Malaria	3	24	3.2	4	21	1.4	*** 133
Measles	0	17	1.4	4	29	3.0	***
Meningococcal disease	38	142	14.3	36	103	14.2	
Mumps	3	16	1.4	4	17	1.5	
Paratyphoid	0	5	0.7	1	3	0.4	
Pertussis	61	730	106.2	220	1027	56.3	***
Rheumatic fever	6	12	2.8	3	20	1.7	**
Rubella	1	10	0.9	0	3	0.8	
Salmonellosis	132	794	53.9	169	643	45.0	***
Shigellosis	8	65	3.9	3	40	3.3	
Tetanus	1	1	0.1	0	0	0.1	
Tuberculosis	22	128	10.1	22	115	11.7	
Typhoid	4	12	0.7	1	9	0.4	
VTEC/STEC infection	6	24	1.6	6	32	1.9	
Yersiniosis	28	157	10.6	15	169	12.5	*

Notes: 1 Other notifiable infectious diseases reported in April: Ross River virus infection

2 These data are provisional

3 Rate is based on the cumulative total for the current year (12 months up to and including April 2001) or the previous year (12 months up to and including April 2000), expressed as cases per 100 000

4 Includes both acute and non-notifiable cases.

5 Only acute cases of this disease are currently notifiable

6 Surveillance data based on laboratory-reported cases only

7 Percentage change is the difference between the number of cases in the current year (12 months up to and including April 2001) and the previous year (12 months up to and including April 2000). This difference is expressed as a percentage of the number of cases in the previous year.

Surveillance data

Surveillance data by health district - April 2001

Cases this month Current rate¹

Disease	Cases for April 2001, ² and current rate ^{1,2} by health district ^{3,4}																								
	Northland	NW Auck	Central Auck	South Auck	Waikato	Tauranga	Eastem BoP	Gisborne	Rotorua	Taupo	Taranaki	Ruapehu	Hawkes Bay	Wanganui	Manawatu	Wairarapa	Wellington	Hutt	Nelson-Marl	West Coast	Canterbury	South Cant	Otago	Southland	
AIDS ³	0		1		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
	0.7		1.6		0												0.5		0.9		0.8	0	0	0	
Campylobacteriosis	9	66	59	54	50	13	5	8	10	6	8	0	30	2	2	1	62	14	6	3	36	13	12	15	
	151.7	219.9	217.8	179.4	277.0	166.7	115.3	144.3	144.1	198.7	187.2	83.6	246.7	135.1	95.7	182.0	306.7	205.9	112.3	188.1	317.1	338.2	253.7	301.8	
Cholera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Creutzfeldt-Jakob disease	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	
	0	0	0.3	0	0	0	0	0	0	0	0	0	0.7	0	0	0	0	0	0	0	0.5	0	0	0	
Cryptosporidiosis	1	14	28	17	3	2	0	3	1	2	0	0	25	2	0	0	18	1	0	0	1	1	1	0	
	19.0	14.5	27.2	20.8	45.3	19.5	4.0	37.2	72.8	29.3	15.0	0	105.9	27.7	22.6	31.2	25.1	32.4	0.9	33.9	19.9	76.7	31.9	35.9	
Dengue fever	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	0	0	1.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	0.8	0	0	0	1.3	0	0	
Gastroenteritis	1	7	4	2	2	1	0	0	0	0	0	0	0	0	1	3	1	1	1	2	15	1	1	0	
	8.0	21.8	24.6	13.8	2.6	14.2	8.0	6.6	20.1	39.1	34.6	0	1.4	3.3	32.6	28.6	10.3	9.0	23.2	21.6	57.9	45.3	13.3	5.4	
Giardiasis	1	19	18	12	10	5	1	1	3	0	1	0	13	2	2	0	8	5	0	2	10	3	2	0	
	35.0	49.5	72.6	39.2	57.8	63.8	29.8	26.2	69.7	35.8	15.9	6.0	76.0	14.7	21.3	23.4	65.9	33.2	14.6	95.6	32.6	37.7	26.1	21.6	
H influenzae type b disease	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	0	0.5	0.3	0.9	0.3	0.9	2.0	2.2	0	0	0	0	0	0	0	0	0	1.5	0	0	0.3	0	0	0	
Hepatitis A	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	
	0	1.8	3.8	5.6	0.7	0.9	0	15.3	3.1	0	0	0	0	0	0	0	1.2	0.8	1.7	0	10.6	2.5	1.2	1.8	
Hepatitis B	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	1	0	0	0	
	2.2	2.0	2.0	1.8	4.0	0.9	2.0	2.2	1.5	3.3	0	4.9	0	1.3	10.4	0.8	0.8	1.7	3.1	2.8	1.3	0.6	0.9		
Hepatitis C	1	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	
	0.7	1.0	0.3	0.9	1.0	15.1	8.0	4.4	12.4	0	0.9	0	2.8	0	0	0	1.6	3.0	2.6	3.1	2.8	2.5	1.7	0.9	
Hydatids	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	0	0	0	0	0.3	0.9	0	2.2	0	0	0	0	0	0	0	0	0.4	0	0	0	0	0	0	0	
Influenza ⁵	0	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	
	0	0	20.0	0.3	11.6	0	0	0	0	0	0	0	0	0	0	0	8.2	0	0	0	34.4	0	2.3	0	
Lead absorption	0	0	1	0	3	0	0	0	0	0	1	0	0	0	0	0	1	0	1	0	1	5	0	0	
	2.2	0.8	1.4	0.9	5.3	2.7	0	6.6	1.5	3.3	1.9	23.9	2.1	9.8	4.7	2.6	3.7	0	6.0	3.1	7.2	16.3	5.8	0.9	
Legionellosis ⁵	1	0	0	0	4	1	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0	0	0	
	2.2	1.5	0.6	0.6	7.3	0.9	0	0	0	0	0.9	0	0	3.3	1.3	5.2	2.5	4.5	0	3.1	3.9	0	2.3	0.9	
Leprosy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	0	0.3	0	0.6	0	0	0	0	0	0	0	0	0	0	0	0	0.4	0	0	0	0	0	0	0	
Leptospirosis	0	0	0	0	2	1	0	1	1	0	0	0	0	0	1	0	0	0	1	0	1	0	0	0	
	2.2	1.0	0.6	0.3	5.3	5.3	0	15.3	1.5	0	3.7	6.0	6.3	1.6	3.3	2.6	0.4	0	6.0	6.2	1.6	12.6	1.7	1.8	
Listeriosis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	0	0.5	0.6	1.2	0.3	0	0	0	0	0	0	0	0	0	0	0	0.4	1.5	0	0	0.8	1.3	0	0	
Malaria	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	
	1.5	0.5	1.2	1.8	3.3	0	0	2.2	0	3.3	1.9	23.9	0.7	0	36.6	0	2.9	2.3	1.7	0	1.6	5.0	0.6	2.7	
Measles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	2.2	2.3	1.7	0.3	0	0	0	2.2	1.5	0	0	0	3.5	1.6	1.3	0	0.4	0.8	1.7	0	3.4	1.3	0.6	3.6	
Meningococcal disease	3	2	4	9	5	1	0	0	0	0	1	0	4	0	0	1	1	0	1	0	1	0	4	1	
	22.6	10.7	22.6	35.7	15.5	12.4	21.9	28.4	20.1	19.5	5.6	17.9	14.6	11.4	6.0	18.2	9.1	6.8	6.0	0	4.7	5.0	12.2	5.4	
Mumps	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	
	2.9	1.3	1.7	1.2	0	0	2.0	0	1.5	0	0	6.0	3.5	1.6	1.3	0	2.5	0.8	3.4	0	1.3	2.5	0.6	0	
Paratyphoid	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	0	0.3	1.2	0.6	1.0	0	0	0	0	0.9	0	1.4	1.6	0	2.0	0	0.4	2.3	0	0	1.0	0	0	0	
Pertussis	0	9	2	4	4	2	1	0	1	0	0	0	0	0	0	1	3	10	10	1	9	1	1	2	
	81.0	38.8	49.7	39.8	169.2	67.4	93.5	91.8	82.1	58.6	4.7	89.5	53.0	13.0	8.6	208.0	62.6	143.3	368.7	650.7	237.5	104.4	161.6	56.6	
Rheumatic fever	1	0	0	0	3	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	8.0	1.3	6.7	8.5	3.6	1.8	15.9	2.2	3.1	0	0	0	2.1	0	0	0	1.6	1.5	0	0	0	0	0	0	
Rubella	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	0	0.8	0.9	0.3	0	0	0	0	0	0	0.9	0	3.5	0	0	0	1.6	2.3	1.7	0	2.3	0	1.2	0	
Salmonellosis	6	10	8	15	10	4	3	0	0	1	5	6	4	5	8	0	19	2	3	0	15	0	6	2	
	38.7	38.6	38.5	33.7	47.9	39.0	37.8	37.2	27.9	52.1	48.7	47.8	51.6	50.5	76.5	83.2	51.9	43.7	72.9	27.8	68.0	98.1	99.6	121.3	
Shigellosis	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	2	0	0	0	
	2.2	4.3	10.7	9.7	2.3	0	0	0	1.5	0	0	0	2.1	0	0	0	3.7	3.8	0.9	0	4.9	3.8	1.2	0	
Tetanus	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	0.7	0	0	0	0	0	0	0	0	0	0	0	0	1.6	0	0	0	0	0	0	0	0	0	0	
Tuberculosis	1	2	4	6	2	0	1	0	0	0	0	0	0	0	0	0	5	1	0	0	0	0	0	0	
	6.6	8.6	23.7	21.9	6.9	5.3	13.9	8.7	4.6	6.5	1.9	11.9	7.0	0	9.3	7.8	20.6	12.8	1.7	0	2.6	1.3	5.2	3.6	
Typhoid	0	1	0	1	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	
	0	1.0	1.7	1.8	0.3	0	0	1.5	0	1.9	0	0	0	0	0	0	0.4	0	0	0	0.5	0	0.6	0	
VTEC/STEC infection	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	1	0	1	1	
	0	0.3	0	0.6	5.0	3.5	2.0	0	4.6	0	5.6	6.0	2.8	3.3	0	0	0.4	0	0.9	0	0.8	5.0	4.6	2.7	
Yersiniosis	0	5	0	1	4	1	0	0	0	0	0	2	0	2	0	2	3	3	0	0	4	1	1	1	
	1.5	11.4	13.3	8.2	13.2	20.4	13.9	13.1	17.0	16.3	2.8	6.0	7.0	1.6	3.3	2.6	11.9	10.6	6.9	12.3	14.7	17.6	5.2	14.4	

Alcohol-based hand disinfection to reduce hospital-acquired infections

Hand hygiene is the single most important measure to prevent hospital-acquired infections (HAIs), but compliance with recommended instructions is often poor. Hand hygiene practices were monitored by observational surveys before and during a three year campaign to improve hand hygiene in a Swiss teaching hospital. Compliance with recommended guidelines improved from 48% before the campaign to 66% at the end of the campaign. This improvement was largely due to increased use of hand disinfection (with an alcohol-based handrub solution containing chlorhexidine and skin emollients) at the bedside. The frequency of handwashing with soap and water remained unchanged. The prevalence of HAIs and incidence of methicillin resistant *Staphylococcus aureus* (MRSA) transmission reduced

significantly during the three years of the campaign (Pittet D, Hugonnet S, Harbarth S, et al. Effectiveness of a hospital-wide programme to improve compliance with hand hygiene. *Lancet* 2000; 356: 1307-12).

Editorial note: A notable feature of this study was that the improvement in hand hygiene practices was sustained. Usually, any improvements after such a campaign are only temporary. In addition, the study results support the recommendation from the UK handwashing initiative to investigate the possible benefit of promoting bedside, alcohol-based handrub to improve hand hygiene compliance. Hand disinfection reduces hand contamination more than handwashing in certain clinical situations, and handrubs offer the advantage of being less time-consuming.

Raised lipid levels are a common and undertreated risk factor

A cross-sectional survey in 1998 of 13 586 adults in England has estimated that 67.5% of the study population have total serum cholesterol level ≥ 5 mmol/l and 26.5% have a ratio of total cholesterol to HDL cholesterol ≥ 5 . The mean total cholesterol level for men was 5.5 mmol/l and for women was 5.6 mmol/l. Only 30% (114/385) of those with a history of coronary heart disease (CHD) eligible for lipid lowering medication were taking this treatment. Three percent (4/117) of participants with no history of cardiovascular disease (CVD) but with an estimated 10 year CHD risk of 30% (using the Framingham risk equation) and a total cholesterol ≥ 5 mmol/l were taking lipid lowering medication. The total cholesterol concentration was reduced to recommended target levels in only a minority of treated patients (Primatesta P, Poulter NR. Lipid concentrations and the use of lipid lowering drugs: evidence from a national cross sectional survey. *BMJ* 2000; 321: 1322-5).

Editorial note: New Zealand data show a similar pattern to

England with only 40% of those eligible for statin treatment actually receiving these drugs. Three HMG CoA reductase inhibitor ('statin') class lipid lowering drugs, Lipitor (atorvastatin), Lescol (fluvastatin) and Zocor (simvastatin), are now fully subsidised in New Zealand but require completion of a special authority form. Criteria for eligibility (in the pharmaceutical schedule) follow similar lines to National Heart Foundation treatment guidelines, and include factors such as established CVD, genetic lipid disorders, diabetic nephropathy, and those identified to be at risk from assessment tables (based on Framingham study findings). The access criteria are currently being reviewed. In the mid-1990s, the WHO MONICA project in 38 participating centres worldwide found that men and women aged 35-64 had a mean total cholesterol level of 5.8 mmol/l. MONICA included values of 5.7 mmol/l for men and 5.6 mmol/l for women taken from the 1993-4 Auckland University Heart and Health study.

Travel health

Rabies exposures in long term travellers

The risk of rabies exposures in long-term travellers is poorly defined. This paper reported the results of a survey of 695 current or recently returned missionaries and their family members about knowledge of rabies risk, compliance with preventive recommendations and rabies exposures. Of the 308 respondents who had been stationed in countries where rabies is established, only 37% knew there was a rabies risk and only 28% received pre-exposure prophylaxis. There were 38 potential rabies exposures in 22 people. Dogs were responsible for 66% of exposures and humans 20%. The highest rate was in African countries at one exposure per 1000 persons per month. Only three of the 38 exposures received rabies immune globulin and vaccine. (Arguin PH, Krebs JW, Mandel E, et al. Survey of rabies preexposure and postexposure prophylaxis among missionary personnel stationed outside the United States. *J Travel Med* 2000; 7: 10-4).

Editorial note: New Zealand guidelines are that pre-exposure vaccination with human diploid cell rabies vaccine (HDCV) is recommended for person living in or visiting for more than 30 days countries where rabies is a constant threat, as well as for veterinarians and animal handlers working in such places. Up to date data on the global distribution of rabies can be found on the World Health Organization's online rabies database RABNET (<http://oms.b3e.jussieu.fr/rabnet/>). Australia needs to be included in the scope of these recommendations, because of the presence of Australian bat lyssavirus (ABL) which is closely related to rabies virus. Visitors to Australia should avoid contact with bats, and if scratched or bitten need similar post-exposure prophylaxis to those exposed to infected animals in rabies endemic countries.

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