

**Part C**

**Child Health:**

**An issue-based perspective**



## Chapter 10

# Communicable Diseases

## Key points

- Approximately 10 percent of child deaths in New Zealand are caused by communicable diseases, with pneumonia and influenza being the leading cause in 1994.
- Infectious disease death rates in New Zealand children have declined substantially in the period 1980–94.
- The most common communicable diseases in children are upper respiratory tract viral infections, which are usually mild and self-limiting. Campylobacteriosis was the most commonly notified communicable disease in children in 1997. Lower respiratory tract infections were the most common communicable diseases leading to the hospitalisation of children in 1995.
- The incidence of several communicable diseases has declined greatly after introduction of routine vaccinations, but few have been eradicated. Rates of meningococcal infection have continued to increase, and the current hyperendemic situation may continue for some years yet.
- Māori and Pacific children have higher rates of a number of communicable diseases. Reasons for this may include genetic components, as well as socioeconomic status and various cultural practices.

## Mortality

In 1994, the leading causes of child communicable disease deaths were pneumonia and influenza, bacterial meningitis (other than meningococcal), meningococcal infection, and congenital pneumonia (Table 10.1). In 1995 there were two deaths from listeriosis (one intrauterine death and one stillbirth) (ESR 1996). Five children younger than 15 years died in the 1991 measles epidemic.

**Table 10.1:** Communicable disease deaths, for 0–14-year-olds, 1994

<i>Disease (ICD-9 code)</i>	<i>Number</i>	<i>Rate per 100,000 children per year</i>
Pneumonia and influenza (480–487)	15	1.8
Bacterial meningitis (other than meningococcal) (320)	8	1.0
Meningococcal infection (036)	6	0.7
Congenital pneumonia (770.0)	6	0.7
Infections specific to perinatal period (771)	4	0.5
Viral infection of central nervous system (045–049)	3	0.4
Other viral infections (070–079)	3	0.4
Chronic bronchitis (491)	3	0.4
Asthma (493)	2	0.2
Tuberculosis (010–018)	1	0.1
Other bacterial diseases (040–041)	1	0.1
Mycoses (110–118)	1	0.1
<b>Total all causes (001–999)</b>	<b>617</b>	<b>75.5</b>

*Source of data:*  
*Ministry of Health 1997a.*

Premature death as an adult from communicable diseases acquired in childhood can occur for hepatitis B infection, HIV infection and rheumatic fever.

Using a re-coding of the International Classification of Diseases adapted from that of Pinner et al (1996) to identify diseases with an infectious aetiology, approximately 11 percent of deaths under five years of age, and 8 percent of deaths in the 5–14 year age group, were caused by infectious diseases in the period 1980–93 in New Zealand (Christie and Tobias 1998).

# Morbidity

Upper respiratory tract viral infections (such as colds) are the most common communicable diseases affecting all age groups. These illnesses are usually mild, self-limiting and do not cause respiratory distress. Lower respiratory tract infections (LRI) are more serious and cause croup, bronchitis, bronchiolitis, and pneumonia. A United States study found a cumulative incidence of first episodes of LRI in infants to be 33 percent (Wright et al 1989). Such respiratory infections are the major causes of hospitalisation of children in New Zealand (Table 10.2).

Diarrhoeal illness from viral enteric agents, such as rotavirus, is also common in the first few years of life. Data for United States children suggest an average total of eight episodes of diarrhoea per child prior to age five, most of which are due to viral infections. The risk of hospitalisation for diarrhoea during this period was reported at 6.5 percent (Glass and Bern 1994). Campylobacteriosis is the most commonly notified enteric disease among children in New Zealand, followed by giardiasis (Table 10.2).

One of the most important causes of serious morbidity from communicable diseases comes from the current hyperendemic situation for meningococcal disease (Wilson et al 1995). The incidence rate of this disease continues to increase (ESR 1997a).

In terms of long-term morbidity, rheumatic fever (associated with rheumatic heart disease) and hepatitis B (associated with chronic liver disease and liver cancer) are probably the most important preventable communicable diseases affecting children in New Zealand (PHC 1995). STDs acquired in adolescence can lead to subsequent infertility, ectopic pregnancy, pelvic inflammatory disease and, in the case of human papilloma virus infection, cervical cancer.

**Table 10.2:** Communicable disease notifications and hospitalisations in the population aged 0–14 years

<i>Disease (ICD-9 code)</i>	<i>Notified cases, 1997</i>		<i>Hospitalisations, 1995</i>	
	<i>Number</i>	<i>Rate per 100,000</i>	<i>Number</i>	<i>Rate per 100,000</i>
<b>General disease groupings and respiratory infections</b>				
Intestinal infectious diseases (001–009)	-	-	3219	388.0
Viral diseases accompanied by exanthema (050–057)	-	-	322	38.8
Other diseases due to viruses and chlamydiae (070–079)	-	-	2189	263.8
Acute laryngitis and tracheitis (464)	-	-	1041	125.5
Acute upper respiratory infection (465)	-	-	2207	266.0
Acute bronchitis & bronchiolitis (466)	-	-	2978	358.9
Pneumonia & influenza (480–487)	-	-	3445	415.2
<b>Vaccine preventable diseases</b>				
Hepatitis B (070.2–070.3)	14	1.6	3	0.4
Hib invasive disease (320.0)	7	0.8	15	1.8
Measles (055)*	1577	184.5	13 <sup>a</sup>	1.6 <sup>a</sup>
Mumps (072)*	74	8.7	19 <sup>b</sup>	2.3 <sup>b</sup>
Pertussis (whooping cough) (033)*	187	21.9	178 <sup>c</sup>	21.5 <sup>c</sup>
Rubella (056)*	65	7.6	5	0.6
Varicella (chickenpox) (052)	-	-	123	14.8
Herpes zoster (053)	-	-	17	2.0
Influenza (487)	-	-	84	10.1
<b>Food and waterborne diseases</b>				
Campylobacteriosis	2044	239.1	-	-
Giardiasis (007.1)*	768	89.9	18	2.2
Salmonellosis (003.0)	485	56.7	34	4.1
Cryptosporidiosis*	237	27.7	-	-
Hepatitis A (070.0, 070.1)	4	0.5	9	1.1
Shigellosis (004)	40	4.7	20	2.4
Yersiniosis*	160	18.7	-	-
Typhoid (002)	2	0.2	3	0.4
Listeriosis (027.0)	0	0.0	2	0.2
<b>HIV &amp; STDs</b>				
HIV/AIDS (042)	0	0.0	1	0.1
Syphilis (090–097)	0	0.0	1	0.1
Gonorrhoea (098)	0	0.0	3	0.4
<b>Other diseases</b>				
Acute rheumatic fever (390–392)	79	9.2	104	12.5
Chronic rheumatic heart disease (393–398)	-	-	38	4.6
Meningococcal disease (036)	474	55.5	247	29.8
Tuberculosis (010–018)	30	3.5	32	3.9
Malaria (084)	1	0.1	11	1.3

\* Became notifiable 1 June 1996.

*a* Outbreaks at least every six years, with 507 child hospitalisations (rate = 86 per 100,000) in 1991 outbreak.

*b* Outbreaks every four or so years, with 150–300 hospitalisations (rate = 20–40 per 100,000) per outbreak.

*c* Outbreaks every four or so years, with 300–600 hospitalisations (rate = 40–70 per 100,000) per outbreak.

Source of data:

ESR 1997 (notifications) and Ministry of Health 1997c (hospitalisations).

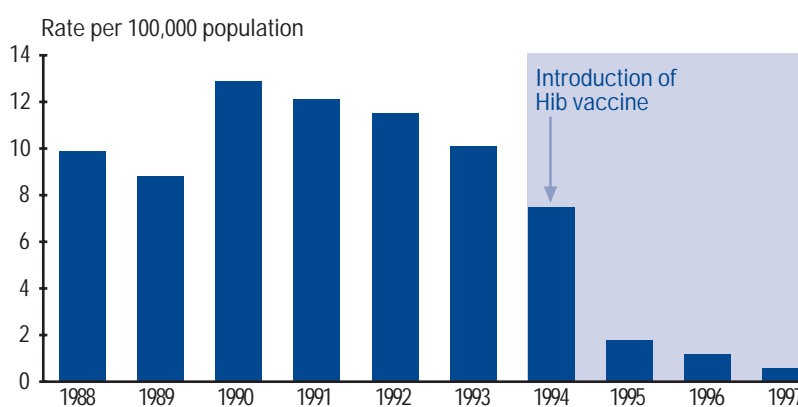
## Changes over time

Child death rates from infectious diseases have declined in New Zealand in recent years. When the methods of Pinner et al (1996) are applied to New Zealand mortality data, it is revealed that infectious disease death rates for children declined from 16.3 per 100,000 in 1980 to 6.8 per 100,000 in 1993. As a proportion of all child deaths, infectious diseases declined from 14 to 9 percent in the 14 years 1980–93.

There has been a decline in the overall incidence of most of the vaccine-preventable diseases detailed in Table 10.2 (Ministry of Health 1996). Exceptions include influenza and varicella (chickenpox), for which routine immunisations are not currently in place. The incidence of *Haemophilus influenzae* type b (Hib) disease was greatly reduced by the addition of Hib vaccine to the National Immunisation Schedule in 1994, but has not yet been eradicated (ESR 1997c, Figure 10.1). Measles epidemics now occur less frequently than before the 1980s, but immunisation coverage is not yet sufficiently high to prevent epidemics (Tobias et al 1997, Figure 10.2). Acute rheumatic fever rates declined substantially in the 1970s and early 1980s, but have remained stable since then (Baker and Chakraborty 1996, Figure 10.3).

New Zealand is experiencing a hyperendemic period of meningococcal disease, with 474 cases of children younger than 15 years old notified in 1997. The meningococcal disease hospitalisation rate continued to increase in 1997 (Figure 10.4). Overseas experience suggests that such hyperendemic periods can persist for a decade or longer (Wilson and Mansoor 1995).

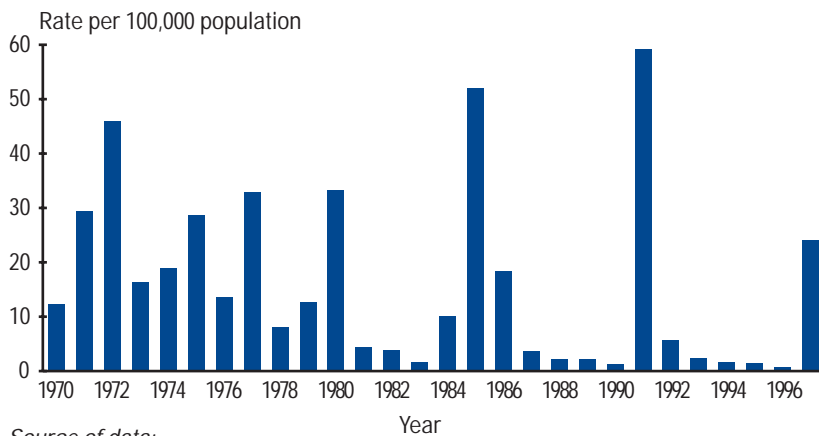
**Figure 10.1:** *Haemophilus influenzae* meningitis (ICD-9 code 320.0) hospitalisations, ages 0–14 years, 1988–97



Source of data:  
Ministry of Health 1997c.

Note:  
Data for 1996 and 1997 are provisional.

**Figure 10.2:** Measles (ICD-9 code 055) hospitalisations, 0–14-year-olds, 1970–97



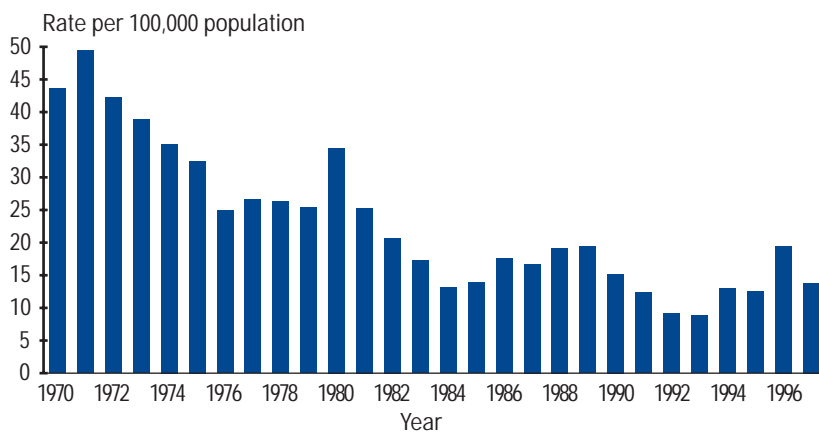
Source of data:

Ministry of Health 1997c.

Note:

Data for 1996 and 1997 are provisional.

**Figure 10.3:** Acute rheumatic fever (ICD-9 codes 390–392) hospitalisations, 0–14-year-olds, 1970–97



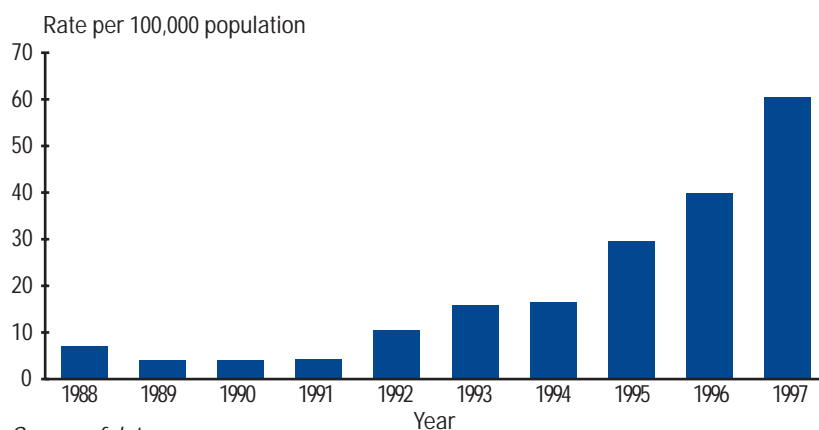
Source of data:

Ministry of Health 1997c.

Note:

Data for 1996 and 1997 are provisional.

**Figure 10.4:** Meningococcal disease (ICD-9 code 036) hospitalisations, 0–14-year-olds, 1988–97



Source of data:

Ministry of Health 1997c.

Note:

Data for 1996 and 1997 are provisional.

## International comparisons

Child death rates from communicable diseases are generally high in New Zealand compared to Australia, Japan, United States, Canada, and United Kingdom (Table 10.3).

**Table 10.3:** Communicable disease death rates for 0–14-year-olds, selected countries

<i>Disease (ICD-9 codes)</i>	<i>Rate per 100,000 per year</i>					
	<i>New Zealand (1990–94)</i>	<i>Australia (1993)</i>	<i>Canada (1993)</i>	<i>Japan (1994)</i>	<i>United Kingdom (1993)</i>	<i>United States of America (1992)</i>
Infectious and parasitic (001–139)	1.8	1.5	1.2	1.7	2.2	1.8
Meningococcal infection (036)	0.4	0.5	0.3	0.0	1.0	0.1
Pneumonia (480–486)	1.7	0.7	0.7	1.3	1.6	1.5
Meningitis other than meningococcal (320–322)	0.9	0.9	0.3	0.2	0.5	0.3
Chronic obstructive respiratory disease (490–496)	0.6	0.5	0.2	0.6	0.4	0.4
Acute respiratory disease (460–466)	0.6	0.2	0.3	0.3	0.6	0.3

*Source of data:*

*World Health Organization 1996 and Ministry of Health 1997a.*

*Note:*

*Rates have been calculated by averaging male and female rates.*

## Risk and protective factors

New Zealand's immunisation schedule for children (Ministry of Health 1996) includes vaccines to protect against smallpox, polio, diphtheria, Hib disease, hepatitis B, mumps, congenital rubella, measles, pertussis, and tetanus. A 1996 survey of vaccine coverage levels in the North Health region of New Zealand indicated that at two years of age, full immunisation had been achieved by 45 percent of Māori children, 53 percent of Pacific children, and 72 percent of other children (North Health 1997).

Unmodifiable risk factors for most of the communicable diseases within the 0–14-year age group include young age and being male. Ethnicity as a risk factor for communicable disease may represent both genetic components which are not modifiable and also modifiable components associated with socioeconomic status and various cultural practices. From the notification data and a number of other studies, Māori and Pacific people are known to have relatively high rates of Hib disease (Ameratunga and Martin 1994), tuberculosis (Galloway and Baker 1995), hepatitis A, hepatitis B, rheumatic fever, and meningococcal disease (ESR 1993). Māori in Northland have been at particularly increased risk from hepatitis A in recent years (Epidemiology Unit 1992) and for being

hospitalised with pertussis (Ministry of Health 1997b). Pacific people also have higher rates of malaria and shigellosis (ESR 1993). Māori and Pacific people also suffer disproportionately from the long-term sequelae such as rheumatic heart disease (Purchas et al 1984; Flight 1984) and primary liver cancer (associated with HBV infection) (Wilson et al 1993).

The components that might explain these ethnic differentials have not been examined but it is possible that such factors as poorer immunisation levels, larger family sizes, higher numbers of occupants per house, poorer housing quality, poorer access to health care, and even psychosocial factors associated with stressful living or concerns about inequality might be relevant. Cultural practices such as greater involvement of the extended family/whānau and shared sleeping arrangements associated with hui on marae may be significant for droplet-borne infections, though there are no New Zealand-specific data on this.

There has been no apparent ethnic differential associated with notifications of AIDS (ESR 1997b). However, Māori may conceivably be at increased risk of HIV because of a number of risk factors such as low socioeconomic status, young age structure, drug use, and lack of access to culturally appropriate services (Te Puni Kōkiri 1994).

Modifiable risk factors for respiratory infections include outdoor air pollution, indoor air pollution (including tobacco smoke exposure), attendance at child care centres, possibly crowding or large family size, possibly low birthweight, and possibly psychosocial factors (as reviewed by Graham 1994). An estimated 54 percent of New Zealand's 0–4-year-olds attend organised early childhood education centres (Ministry of Education 1997).

Modifiable risk factors for other communicable diseases include lack of personal hygiene, absence of breast feeding and unsafe sexual behaviour.

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