

CRYPTOSPORIDIOSIS IN NSW, 1990–2000

Robert Menzies

*Communicable Disease Surveillance and Control Unit
NSW Department of Health*

BACKGROUND

Cryptosporidium parvum is an intracellular protozoan parasite that causes disease in humans and other mammals. It was first described in 1907,¹ but was not shown to cause human illness until 1976.² Transmission occurs by the faecal–oral route; consequently, person-to-person transmission can occur—especially between household members, sexual partners, and children in day-care. Animal-to-human transmission may occur, especially from farm animals. The organism is resistant to most water purification techniques, and many outbreaks have been documented originating from drinking water,³ and through swimming in contaminated pools.⁴ Food-borne outbreaks are rarely reported.

The incubation period is usually 7–10 days. In those with healthy immune systems, incubation is usually followed by a self-limiting diarrhoea that lasts 2–26 days. The diarrhoea may be mild or severe. Asymptomatic infections are common.⁵ There is no curative treatment. In those with weak immune systems, particularly those with concurrent HIV infection, cryptosporidiosis often persists and can

become life-threatening. The disease is widespread throughout the world, and affects people of all ages, although it is most common in young children.

This article describes the epidemiology of cryptosporidiosis in NSW between 1990 and 2000, and draws upon several sources of data.

METHODS

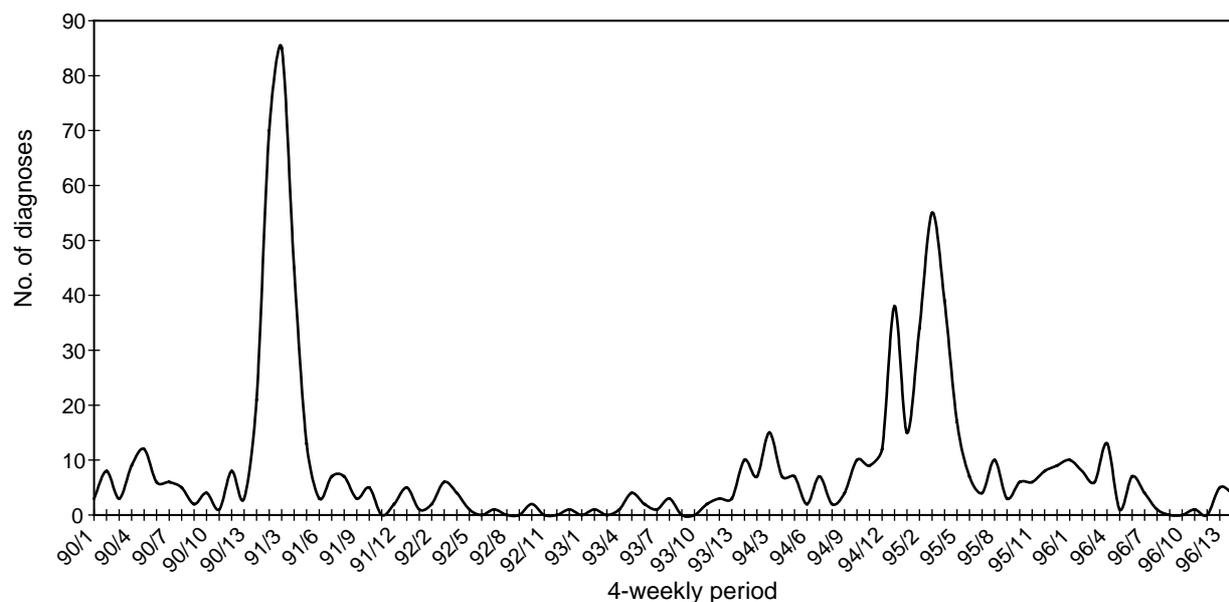
Between 1990 and 1996, the Eastern Sydney Laboratory Surveillance Program collected data from microbiology laboratories describing many non-notifiable communicable diseases, including cryptosporidiosis. Participating laboratories were those serving public hospitals in Eastern Sydney; as well as the Royal Alexandra Hospital for Children in Camperdown; and several private pathology services, some of which have collection services in many parts of NSW.

Since December 1996, cryptosporidiosis has been a notifiable condition under the NSW Public Health Act. Notifications from all NSW laboratories to public health units between 1997 and 2000 were included in this analysis.

Since July 1996, the NSW Department of Health's Inpatient Statistics Collection (ISC) has included an ICD-9 code

FIGURE 1

REPORTS OF CRYPTOSPORIDIOSIS FROM THE EASTERN SYDNEY LABORATORY SURVEILLANCE PROGRAM, 1990-1996



Source: * Eastern Sydney Laboratory Surveillance Program, South Eastern Sydney Public Health Units

for cryptosporidiosis (007.4). Data were available up to June 2000. Hospitalisations were included in the analysis if cryptosporidiosis was entered as either the principal diagnosis responsible for the admission, or was the first additional diagnosis that affected treatment or length of stay.

Cryptosporidiosis is one of 26 illnesses that, when combined with HIV infection, defines the Acquired Immune Deficiency Syndrome (AIDS). Since 1982 AIDS has been notifiable by medical practitioners and hospitals under the NSW Public Health Act. NSW notifications for the period 1991–2000 were analysed.

Rates were calculated by determining the age of populations in NSW using Australian Bureau of Statistics Estimated Residential Populations for 1998, which is based on the 1996 Census. Data on disease notifications, hospital separations, and populations, were analysed using the NSW Department of Health's Health Outcome Indicator Statistical Toolkit (HOIST). Data were analysed by age group, sex, area health service of residence, and month and year of specimen collection or admission to hospital.

RESULTS

Laboratory Diagnoses

Between 1990 and 1996, 773 cases of cryptosporidiosis were reported to the Eastern Sydney Laboratory Surveillance Program. There was considerable variation

TABLE 1

CRYPTOSPORIDIOSIS BY YEAR, NSW 1990–2000

Year	ESLSP*	Notifications	Hospitalisations**
1990	70	-	-
1991	266	-	-
1992	18	-	-
1993	20	-	-
1994	130	-	-
1995	213	-	-
1996	56	-	15
1997	-	157	36
1998	-	1129	140
1999	-	121	36
2000	-	133	7

* Eastern Sydney Laboratory Surveillance Program

** Data from July 1996 to June 2000

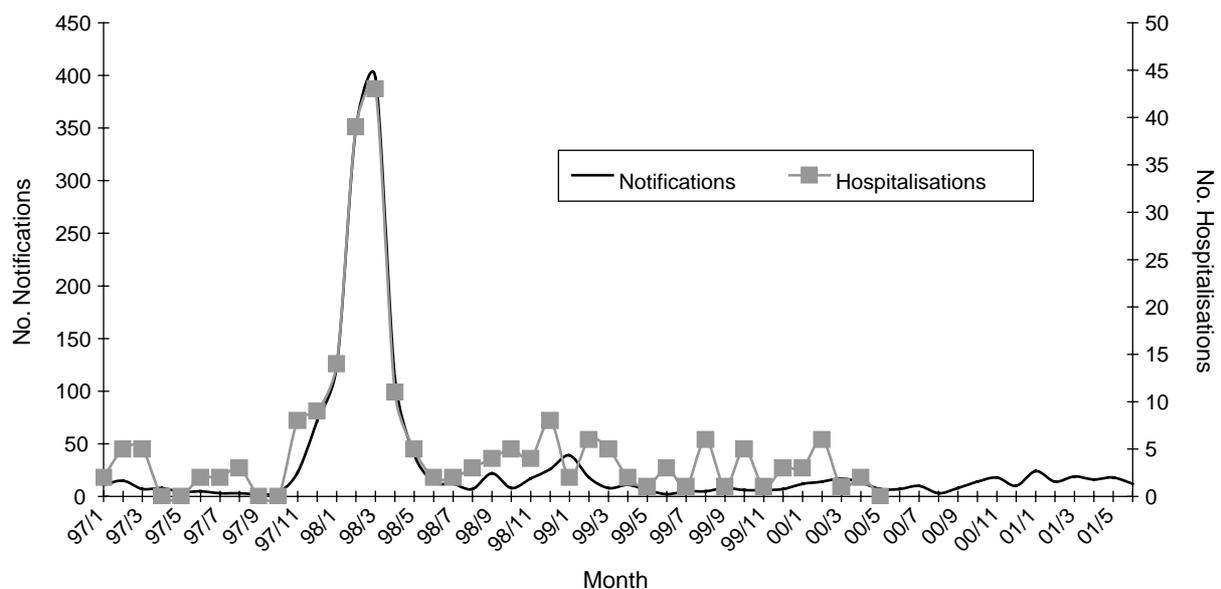
in the yearly totals (Table 1), with peaks in 1991 and 1995 (Figure 1). No annual seasonal cycle was evident.

Notifications

Between 1997 and 2000, 1540 cases were notified to public health units by NSW laboratories. Again there was wide variation in yearly totals (Table 1), with a large peak in 1998, and no evident annual seasonal cycle (Figure 2). Of all notifications in the four-year period, 71 per cent (1096) occurred during a six-month period in 1997–1998. Males had a slightly higher notification rate than females

FIGURE 2

CRYPTOSPORIDIOSIS NOTIFICATIONS AND HOSPITALISATIONS, 1997–2001



Source: Notifiable Disease Database, Inpatient Statistics Collection, Health Outcome Indicator Statistical Toolkit

(6.3/100,000 and 5.8/100,000, respectively). Average yearly notification rates were highest in the 0–4 year age group (43.4/100,000 population), followed by 5–9 years (14.8/100,000), compared to 6.1/100,000 for the total population (Table 2). Among the area health services, New England had the highest notification rate (18.6/100,000) followed by Northern Rivers (17.2/100,000), Mid North Coast (14.0/100,000), and Macquarie (12.9/100,000).

Hospitalisations

There were 239 hospitalisations due to cryptosporidiosis between July 1996 and June 2000, an average annual rate of 0.9/100,000 in the total population (Table 2). Hospitalisations peaked in 1998, at the same time as notifications. As with notifications, males had a slightly higher rate than females (1.1 and 0.8 per 100,000, respectively), and the 0–4 year and 5–9 year age groups had the highest rates (6.0 and 2.7/100,000). The area health services with the highest hospitalisation rates were New

England (3.4/100,000) and Mid North Coast (3.1/100,000).

Twenty-nine (12.1 per cent) hospitalisations for cryptosporidiosis were also reported to have HIV infection. Of those, all were over 30 years of age. Six of those 29 (21 per cent) occurred during the epidemic of 1997–98.

AIDS notifications and cryptosporidiosis

There were 3260 cases of AIDS notified in NSW between 1991 and 2000. Of those, 164 (5.0 per cent) reported having cryptosporidiosis at the time of their AIDS diagnosis. Between 1997 and 2000 there was a considerable decline in AIDS notifications, with 576 cases of AIDS notified, 27 (4.7 per cent) of whom had cryptosporidiosis.

DISCUSSION

Between 1990 and 2000 the epidemiology of cryptosporidiosis in NSW was dominated by epidemics

TABLE 2

CRYPTOSPORIDIOSIS NOTIFICATIONS AND HOSPITALISATIONS, NSW 1997–2000

	Notifications	Average annual rate / 100,000*	Hospitalisations*	Average annual Rate / 100,000
Gender				
Male	796	6.3	134	1.1
Female	740	5.8	105	0.8
Age Group (yrs)				
0–4	755	43.4	104	6.0
5–9	263	14.8	48	2.7
10–14	94	5.4	13	0.7
15–19	32	1.8	3	0.2
20–29	111	3.0	20	0.5
30–39	159	4.0	30	0.8
40–49	49	1.4	13	0.4
50–59	26	0.9	2	0.1
60+	47	1.1	6	0.1
Area Health Service				
Central Coast	54	4.8	9	0.8
Central Sydney	100	5.2	11	0.6
Far West	8	4.1	3	1.5
Greater Murray	64	6.2	6	0.6
Hunter	102	4.8	15	0.7
Illawarra	59	4.3	2	0.1
Macquarie	53	12.9	4	1.0
Mid North Coast	143	14.0	32	3.1
Mid West	11	1.7	1	0.2
New England	131	18.6	24	3.4
Northern Rivers	175	17.2	15	1.5
Northern Sydney	68	2.2	16	0.5
South Eastern Sydney	191	6.3	23	0.8
Southern	70	9.7	13	1.8
South Western Sydney	128	4.2	21	0.7
Wentworth	70	5.7	13	1.1
Western Sydney	108	4.1	28	1.1
Total	1540	6.1	239	0.9
* Hospitalisations from July 1996 to June 2000				

every 3–4 years, with little seasonal pattern in between. This pattern extended beyond NSW to other parts of Australia.^{6–8} There were three epidemics during that time: 1991, 1994–1995, and 1997–1998. The 1991 epidemic was simultaneously documented in Adelaide and Sydney.⁶ A study in Adelaide at the time found a protective effect from drinking only rain water.⁷ For the epidemic in 1994–95, the peak was recorded in Sydney, Melbourne and Brisbane.⁸ In Southern Sydney, infection was associated with swimming in one public swimming pool.⁴ During the 1997–98 epidemic, cases were documented in Sydney, Canberra, Melbourne, and Brisbane; and in NSW infection was associated with swimming in public pools, rivers or lakes, and with not drinking bottled water.⁹ In these epidemics, most cases were young children. Data since 1997 show that those living in non-metropolitan areas had a higher rate of infection. Cryptosporidiosis resulted in 239 recorded hospitalisations in NSW over a four-year period, and those hospitalised had a similar age and geographic distribution to the cases notified by laboratories.

In July–September 1998 a series of ‘boil water’ alerts were made to Sydney residents, following the detection of high levels of *Cryptosporidium parvum* and *Giardia lamblia* in samples of drinking water. Figure 2 shows that these alerts occurred shortly after the end of the epidemic of 1997–98, and that there was no detectable rise in notifications. A household survey also found no measurable increase in illness attributable to drinking Sydney water at that time.¹⁰

Cryptosporidiosis can be a very serious illness in those with HIV infection. Cases with HIV co-infection represent a small proportion of people diagnosed with cryptosporidiosis. Twelve per cent of hospitalisations for cryptosporidiosis had known HIV co-infection. AIDS notifications record cryptosporidiosis only if it occurs at the time of AIDS diagnosis and not later. AIDS notifications probably underestimate the total number of people with concurrent infection with HIV and cryptosporidium. The introduction of more effective drug therapies in mid-1996 has resulted in a decline in the already small number of reported AIDS cases due to cryptosporidiosis. The 1997–98 epidemic resulted in a big increase in total hospitalisations for cryptosporidiosis, but had little or no effect on the number of people hospitalised at the time who also had HIV infection.

The two laboratory surveillance schemes presented here covered different geographic areas, and therefore the total numbers should not be compared. Also, both schemes record only a small proportion of the total number of cases that occur in the community, because they capture only cases that had symptoms, sought medical care, and had a

positive stool test result that was reported. However, the data they provide have allowed us to describe the epidemiology of cryptosporidiosis in NSW.

CONCLUSION

The investigation of outbreaks, both overseas and in Australia, have provided important information to assist in preventing infection.¹¹ Notifications will continue to play an important role in accurately describing the patterns of cryptosporidiosis in the community, and provide triggers for the investigation of outbreaks and public health interventions.

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