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EPIDEMIOLOGY OF CRYPTOSPORIDIOSIS IN IRELAND

cidr

Table of Contents

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Summary

- In 2006, there was a 36% decrease in the number of cryptosporidiosis notifications in Ireland relative to 2005
- A similar seasonal distribution was reported as in the previous two years, with the highest number of cases reported in late spring
- Disease was reported most frequently in children under 5 years of age
- Drinking water remains an important transmission route for general outbreaks of cryptosporidiosis.

Introduction

Cryptosporidium is a protozoal parasite that causes a diarrhoeal illness in humans known as cryptosporidiosis. Human cryptosporidiosis became a notifiable disease in 2004, and 431 and 570 cases were reported respectively in the last two years. It is transmitted by the faecal-oral route, with both ruminants and humans serving as reservoirs.

Two aspects of *Cryptosporidium* make it of particular public health significance. While it causes severe watery non-bloody diarrhoea in immuno-competent individuals, it can cause chronic persistent gastroenteritis in the immuno-compromised. The second important feature of *Cryptosporidium* from a public health perspective is its relative resistance to chlorination, which results in the potential for outbreaks associated with water supplies that rely on chlorination for treatment.

This report describes the burden of illness and epidemiology of human cryptosporidiosis in Ireland 2006.

Case Definitions

Clinical description
Clinical picture compatible with cryptosporidiosis, characterised by diarrhoea, abdominal cramps, loss of appetite, nausea and vomiting.

Laboratory criteria for diagnosis
One of the following:
• Demonstration of *Cryptosporidium* oocysts in stool
• Demonstration of *Cryptosporidium* sp. in intestinal fluid or small-bowel biopsy specimens
• Demonstration of *Cryptosporidium* antigen in stool

Case classification
Possible: N/A
Probable: A clinically compatible case with an epidemiological link*
Confirmed: A case that is laboratory confirmed.

Materials and Methods

Cases of cryptosporidiosis are notified, by both clinicians and laboratory directors, to the medical officer of health in each HSE area. Notification a data are maintained in the CIDR (Computerised Infectious Disease Reporting) system. The data used in this report are based on information retrieved from the CIDR database (as of October 2nd 2007) on cryptosporidiosis cases notified in 2006. Census data from 2006 (CSO) were used to calculate incidence rates.

Results

Incidence

In 2006, 367 cases of cryptosporidiosis were notified in Ireland, a crude incidence rate of 8.7 per 100,000 population (table 1). This was a 36% decrease on the number of cases notified in 2005, and was the lowest annual number of cases since the disease became notifiable in 2004.

Table 1. *Number of notified cases, crude incidence rate and age-standardised incidence rate cryptosporidiosis by HSE area, 2006, and annual number of cryptosporidiosis notifications and crude incidence rate, Ireland 2004-2006*

HSE area	Number of notifications	CIR (95% CI)*	ASIR (95% CI)*
ER	7	0.5 (0.1-0.8)	0.5 (0.1-0.8)
M	39	15.5 (10.6-20.4)	14.4 (9.9-18.9)
MW	56	15.5 (11.5-19.6)	15.7 (11.6-19.8)
NE	28	7.1 (4.5-9.8)	6.5 (4.1-9.0)
NW	30	12.7 (8.1-17.2)	12.5 (8.0-17.0)
SE	61	13.2 (9.9-16.6)	13.3 (9.9-16.6)
S	74	11.9 (9.2-14.6)	12.2 (9.4-15.0)
W	72	17.4 (13.4-21.4)	17.9 (13.8-22.0)
Total 2006	**367**	**8.7 (7.8-9.5)**	**-**
Total 2005	**568**	**13.4 (12.3-14.5)**	**-**
Total 2004	**431**	**10.2 (9.2-11.1)**	**-**

*Rate calculations based on CSO census 2006, and may differ from rate published previously based on 2002 census

The crude incidence (CIR) and age standardised incidence (ASIR) rates by HSE-area for 2006 are also reported in table 1. As in 2004 and 2005, the HSE E reported the lowest crude incidence rate. In all, for six of the eight HSE-areas, there was a decrease in the crude incidence rates compared to 2005. In particular, the rates in the NE and W were only about half that recorded in 2005, decreasing to around the same levels as were reported in 2004. When interpreting these data, it should be borne in mind that in addition to a possible true regional difference in risk, regional variation in incidence may also reflect regional variation in laboratory screening and case-finding policies.

Age distribution

Typically, the highest reported incidence rates are in children under 5 years, and this year, the trend was similar (figure 1). Overall, there were more males (n=198) than females (n=169) reported (table 2). When cases were examined by age and sex, it was notable that while there were more males among cases less than 5 years, there were more females among adult cases (table 2).

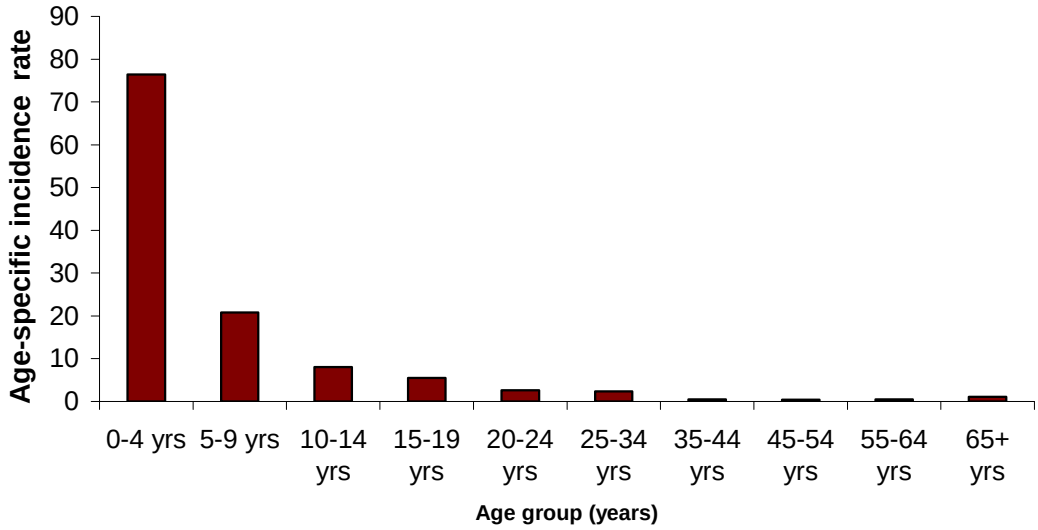

Figure 1. *Age-specific incidence rates for cryptosporidiosis in Ireland, 2006*

Table 2 *Age and sex distribution of cryptosporidiosis notifications, Ireland 2006*

Age group	Number of males (%)	Number of females (%)	Total
Less than 5 yrs	138 (60%)	93 (40%)	**231**
5 to 14 yrs	39 (48%)	43 (52%)	**82**
15 to 44 yrs	16 (36%)	29 (64%)	**45**
45+ yrs	5 (56%)	4 (46%)	**9**
Total	**198 (54%)**	**169 (46%)**	**367**

Seasonality

Disease incidence in 2006 peaked in quarter 2, with 52% of cases notified during the 3 months April to June (figure 2). The trend in 2006 mirrored closely the seasonal distribution of cases in 2004.

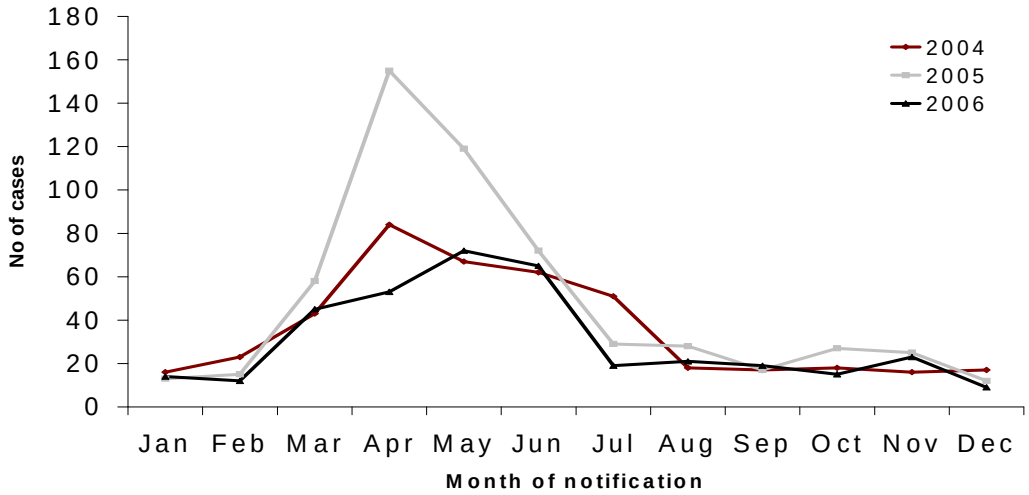

Figure 2. *Seasonal distribution of cryptosporidiosis cases 2004-2006*

Hospitalisation rates

As the CIDR system is progressively implemented across more HSE-areas, data fields are becoming available that would not have been analysed at a national level previously. There were five HSE areas where CIDR was implemented for all of 2006 -M, NE, NW, SE and S. [CIDR is also now implemented in the HSE-E but was so only for part of the year 2006, and so is excluded from these analyses, as are the HSE-W and HSE-MW as CIDR is not yet implemented in those regions.] Table 3 shows the patient type as recorded on CIDR for all patients reported from the five areas 'live' in 2006. Almost 40% of cases in these areas were reported to have required hospitalisation.

Table 3. *Number of cryptosporidiosis notifications by patient type Ireland 2006, [Live CIDR HSE-areas (M, NE, NW, SE and S)]*

Patient type	Number	Percentage
Hospital In-patient	92	39.7%
Hospital Out-patient	8	3.4%
GP-patient	110	47.4%
Other	1	0.4%
Not known	4	1.7%
Not specified	17	7.3%
Total	**232**	**100%**

Outbreaks of cryptosporidiosis

Eight outbreaks of cryptosporidiosis were reported in 2006: three general outbreaks and five family outbreaks (table 4). Sixty people were reported ill as a result of these outbreaks. The suspected mode of transmission for three outbreaks was person-to-person, and for four outbreaks, water was suspected to have played a role in transmission (recreational water for two family outbreaks and drinking water for two general outbreaks). One family outbreak was associated with foreign travel.

Table 4. *Cryptosporidiosis outbreaks Ireland 2006*

Month	HSE area	Transmission route*	Location	Type	Number ill	Number hospitalised
Mar	S	Not specified	Community	General	10	-
May	SE	Person-person	Private House	Family	2	1
Jul	S	P-P/WB	Private House	Family	2	-
Jul	S	FB/WB	Other	General	28	-
Sep	NE	Person-person	Private House	Family	2	1
Ocy	NE	Person-person	Private House	Family	2	0
Oct	W	Waterborne	Travel-related	Family	6	-
Nov	SE	Waterborne	Community	General	8	1

* P-P denotes person-to-person transmission; WB denotes waterborne transmission, FB denotes foodborne transmission

For the general drinking water-associated outbreak in the SE, the water supply was a public supply and a boil water notice was issued.[1] This supply had a ground water source and had on risk assessment been found to have a moderate risk for *Cryptosporidium*. Following identification of the outbreak,

additional source protection measures were put in place and a UV treatment unit was commissioned, which resulted in the risk being reduced to 'low' after these measures were implemented. This outbreak was reported to be due to *C. parvum*. [1]

Discussion

Since cryptosporidiosis became a notifiable disease in 2004, this was the lowest annual number of cases reported, with 36% fewer cases than were reported in 2005. The decrease was spread across six of the eight HSE areas, with particularly large reductions in the number of cases reported in the NE and W. In fact, by both regional and seasonal distribution, the year 2006 was more similar to 2004 than 2005. Notwithstanding this, there were over 350 confirmed cases reported, with at least 92 people admitted to hospital, confirming that cryptosporidiosis is an important cause of gastrointestinal illness in Ireland.

The seasonal trend was similar to 2004 and 2005 in that the peak period for notifications was late spring. This, however, contrasted strongly with the seasonal distribution of cases reported in the United Kingdom, Sweden and Germany in 2005, where the highest number of cases occurred in autumn, and with Spain, where the seasonal peak in 2005 occurred in June, suggesting that the epidemiology of cryptosporidiosis in Ireland differs from the current epidemiology of cryptosporidiosis in these countries. [2]

Drinking water from a public water supply was again associated with a general outbreak in 2006, this time a small supply that was deemed at moderate risk for *Cryptosporidium* serving a community of circa 1000 people. New measures implemented on foot of this outbreak resulted in this supply being re-categorised as being low risk. In a review carried out by the EPA in 2005 of 363 *Cryptosporidium* risk assessments carried out on public water supplies in Ireland, it was reported that, at that time, 8% of supplies were in the high-risk category and 13% in the very high-risk category for *Cryptosporidium*. [3]

Some of the best evidence on the epidemiology of *Cryptosporidium* has been gathered in the United Kingdom. One particular study by Lake *et al.* (2007) presented evidence that the new drinking water regulations implemented in England and Wales during 2000 led to significantly fewer cryptosporidiosis cases reported since that time, in particular in the first half of the year.[4] The authors concluded that these findings indicated that regulations such as those implemented in England and Wales can have a significant public health benefit in reducing the number of cases of human cryptosporidiosis.

A summary of the surveillance and epidemiology of *Cryptosporidium* infection in England and Wales was published in late 2006.[5] The value of having species information on cases when investigating the epidemiology of this disease was highlighted in that publication and elsewhere. [5,6] A small number of hospital laboratories in Ireland have started to have positive *Cryptosporidium* specimens typed on a routine basis in 2007, and the results of these studies will provide invaluable systematic evidence of the relative importance of the different species here.

Recreational water may have played a role in two family outbreaks reported in 2006. The role of recreational water in the transmission of cryptosporidiosis has been highlighted recently in the United Kingdom. [7,8]

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