3.2 Cryptosporidiosis

Summary

Number of cases, 2011: 428
Number of cases, 2010: 294
Crude incidence rate, 2011: 9.3/100,000

Cryptosporidium is a protozoal parasite that causes a diarrhoeal illness in humans known as cryptosporidiosis. It is transmitted by the faecal-oral route, with both animals and humans serving as potential reservoirs. Human cryptosporidiosis became a notifiable disease in Ireland in 2004, and the case definition in use is published in the HPSC case definition booklet.

In 2011, 428 cases of cryptosporidiosis were notified in Ireland, a crude incidence rate (CIR) of 9.3 per 100,000 population (95% CI 8.4-10.2), with 40% of notified cases reported as hospitalised for their illness. There were no reported deaths.

This was a 46% increase on the number of cases notified in 2010 (Figure 1), being closer to the rate reported in 2009. In 2009 (the most recent year for which data are available), the ECDC reported an incidence rate overall of 2.74 per 100,000 population in the European Union, with Ireland reporting the highest rate among those countries reporting on this disease at the time (ECDC Annual Epidemiological Report). The second highest incidence rate among EU Member States in 2009 was reported by the United Kingdom at 9.1 per 100,000.

Consistent with previous years, the highest reported incidence was in children under 5 years, with around 70 cases per 100,000 population in this age group (Figure 2). While there is likely to be a bias towards testing of diarrhoeal stool specimens from children (as opposed to adults) for *Cryptosporidium,* it is also likely that this distribution reflects to some extent a true difference in risk between adults and children.

The crude incidence (CIR) rates by HSE area for 2011 are reported in Figure 3. As in previous years, there was a strong urban-rural divide, with the HSE-E having a much lower reported incidence rate (0.7 per 100,000) than all other HSE areas. The HSE- W reported the highest crude incidence rate (23.1 per 100,000) –over twice the national rate. Compared to 2010, six areas reported increased rates, aligning more closely with the regional distribution of cases reported in 2009.

As in previous years, the highest number of cases was recorded in spring (Figure 4).

Risk factors

The first complete calendar year for which enhanced surveillance data were available at a national level for cases of *Cryptosporidium* was 2011. Exposure to farm animals or their faeces either by virtue of residence on a farm or by visiting a farm during the potential incubation period were common among cases; 42.7% and 36.1% reported these exposures respectively (Table 1). This is

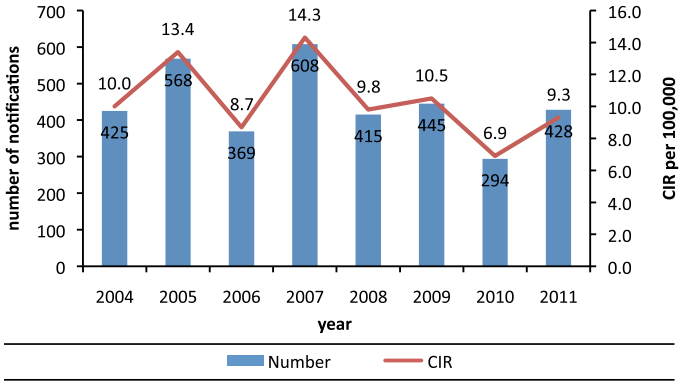

Figure 1: Annual number and crude incidence rate cryptosporidiosis, Ireland 2004-2011

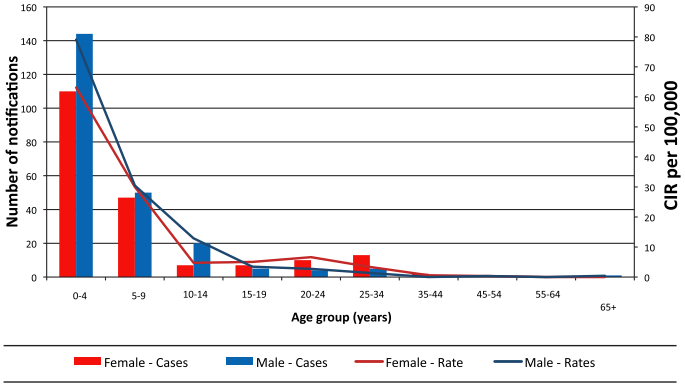

Figure 2: Age-specific incidence rate cryptosporidiosis, Ireland 2011

consistent with the low incidence of cryptosporidiosis among residents in the largely urban HSE-E population and the higher incidence recorded in more rural parts of the country. Unlike salmonellosis, foreign travel plays only a minor role in cryptosporidiosis in Ireland, with the majority of infections acquired indigenously (93.1%).

Table 2 shows the distribution of notified cases by home water supply type. It appears that persons who are not served by public water supplies have an increased risk of cryptosporidiosis as they are over-represented among the cases relative to the distribution of households by water supply type nationally, although it should be borne in mind that persons whose household drinking water is not from a public supply are more likely to be rural dwellers who may also have a higher likelihood of exposure to farm animals and rural environments which is also likely to increase their risk.

Outbreaks

There was a large increase in the number of cryptosporidiosis outbreaks reported in 2011; in total there were three general and 27 family outbreaks (Figure 5). The increase in outbreaks is most likely due to increased recognition of outbreaks (in particular small family outbreaks) following the introduction of enhanced surveillance for cryptosporidiosis cases late in 2010.

The most common mode of transmission reported was person-to-person spread (11 outbreaks due solely to person-to-person transmission resulted in 35 illnesses), with animal contact being the second most common transmission route reported (contact with animals contributed to transmission in nine outbreaks resulting in 36 cases) (Table 3 and Figure 6).

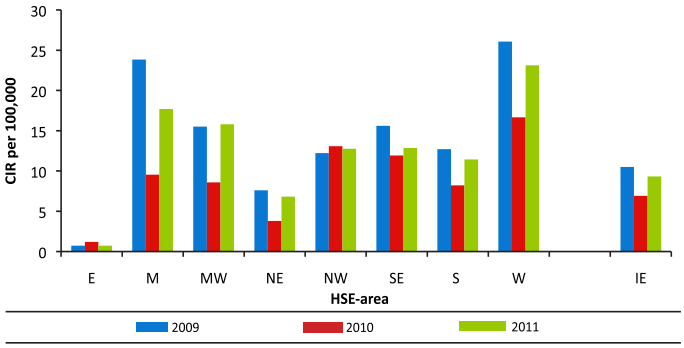

Figure 3: Regional crude incidence rates cryptosporidiosis, Ireland 2009-2011.

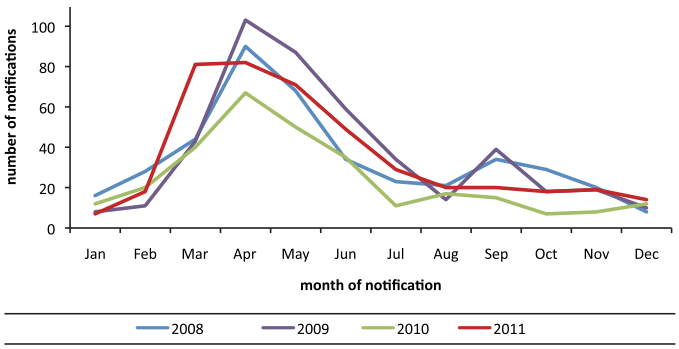

Figure 4. Seasonal distribution of cryptosporidiosis cases 2008-2011

Table 1: Number of cases (and percentage of cases where information available) where selected risk factors were reported for cryptosporidiosis cases, Ireland 2011

Risk factor	Yes (% of known)	No	Unknown	Not Specified	Total
Travel	27(6.9%)	367	1	33	428
Lives/cared for on farm	135 (42.7%)	181	3	109	428
Visited farm	122 (36.1%)	216	4	86	428
Lives/works on or visited farm[a]	*231 (70.6%)*	*96*	*3*	*98*	*428*
Swimming pool visit	68 (19.9%)	274	4	82	428
Pets	221 (68.0%)	104	8	95	428
Other water based activities	16 (6.2%)	244	4	164	428

[a]*Composite of 2 previous variables*

Table 2: Number of cases (and percentage of cases where information available) for cryptosporidiosis cases compared to the number and percentage of households in Ireland by home water supply type, Ireland 2011

Home water supply of notified cases	Number of cases	% of known	No. households served by these water supply types in the general population 2011 (Census 2011)	% of known	X^2 and P value
Group water scheme (private)	24	6.8%	45,774	2.9%	
Group water scheme (public)	51	14.4%	144,428	9.0%	
Other	9	2.5%	2,080	0.1%	
Private well	101	28.5%	161,532	10.1%	X^2=347.1, P<.001
Public water supply	170	47.9%	1,247,185	77.9%	
Unknown	5				
Not specified	68		48,409		
Total	428	100%	1,649,408	100%	

Comparing the proportion of cases and households served by public water supplies versus all other supply types: X^2=185.7, P<.001

Moreover, two of the three general outbreaks were reported to be due to animal contact. In the first, fifteen third-level students out of a group of 43 developed gastrointestinal symptoms following exposure to farm animals as part of their training. Two were confirmed positive for *Cryptosporidium* and one was hospitalised. In a second general outbreak, two schoolchildren developed cryptosporidiosis.

The third general outbreak was reported in a child care facility (CCF); six children were ill in total and two were laboratory confirmed. *Cryptosporidium* was not detected in the water serving the premises, although the small public water supply to which the CCF was connected had a history of being sub-optimal. It was concluded that while the most likely transmission route was person to person (which is a common method of spread among young children), waterborne transmission could not be definitively outruled as the initial source of the infection. The water supply serving the CCF has since been upgraded.

Summary

The overall incidence of cryptosporidiosis in Ireland has remained similar in the eight years since surveillance began in 2004, with no reliable trend up- or downwards. The seasonal and regional incidence reported in 2011 was typical of previous years; consistently there has been a higher incidence in springtime and in non HSE-E areas.

Person-to-person spread appears to be an important mode of transmission within families, while both enhanced surveillance data and outbreak surveillance data are consistent with animal contact being an important risk factor for cryptosporidiosis in Ireland. Unlike in the United Kingdom, travel-associated disease is reported infrequently, and is likely to be a minor contributor to transmission, as is transmission associated with food or swimming pools.

While there are fewer general waterborne outbreaks reported relative to earlier years, water from non-public supplies may present a risk of cryptosporidiosis; from the enhanced dataset, persons who are not served by public water supplies were over-represented among the cases relative to the distribution of households by water supply type nationally. The EPA drinking water reports provide information on improvements in the public water supply sector in relation to *Cryptosporidium*.[1]

1. EPA. 2011. The Provision and Quality of Drinking Water in Ireland A Report for the Year 2010. http://www.epa.ie/downloads/pubs/water/drinking/name,31739,en.html

Table 3: Number of outbreaks, number ill and number laboratory-confirmed cases by transmission route, Ireland 2011

Transmission mode	Number of outbreaks	Total number ill	Number lab confirmed
Animal contact	6	26	8
Person-to-person	11	35	22
P-P and Animal	3	10	8
P-P and Waterborne	3	11	6
Waterborne	1	2	2
Unknown	3	6	6
Not Specified	3	4	4
Total	**30**	**94**	**56**

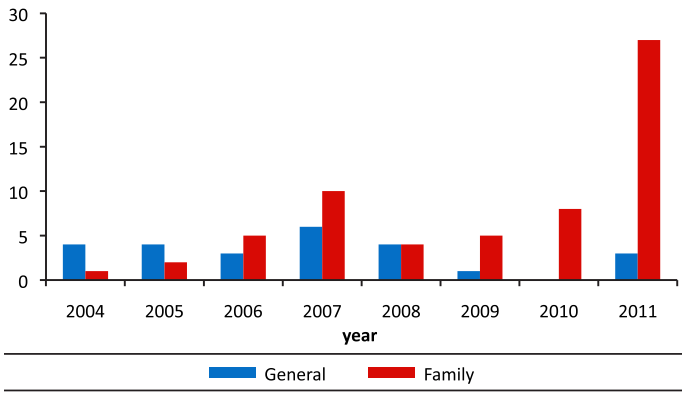

Figure 5: Number of cryptosporidiosis outbreaks notified by type, Ireland 2004-2011

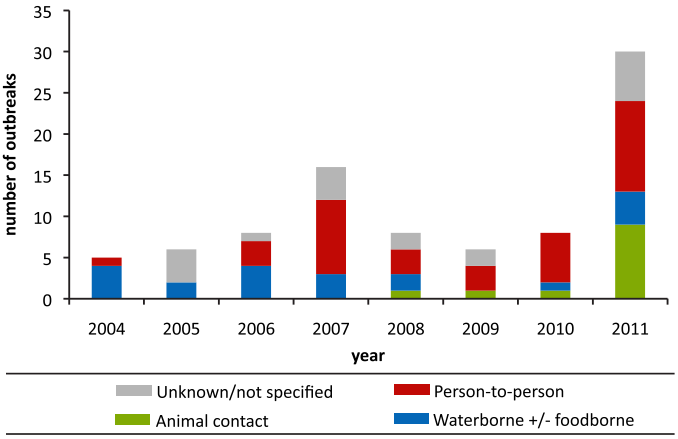

Figure 6: Number of cryptosporidiosis outbreaks notified by reported transmission route, Ireland 2004-2011

Note: In this figure, reported transmission routes were grouped for simplicity. Any outbreak where food contributed was reported as foodborne, any outbreak where water contributed was reported as waterborne, any outbreak where animal contact contributed was reported as Animal contact. Person-to-person outbreaks include only those outbreaks reported as being due only to person-to-person transmission.