3.2 Cryptosporidiosis

Summary

Number of cases, 2012: 556
Number of cases, 2011: 428
Crude incidence rate, 2012: 12.12/100,000

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 on the HPSC website.

In 2012, 556 cases of cryptosporidiosis were notified in Ireland, a crude incidence rate (CIR) of 12.12 per 100,000 population (95% CI 11.11-13.13), with 40% of notified cases reported as hospitalised for their illness. There were no reported deaths.

This was a 30% increase on the number of cases notified in 2011 (Figure 1), the third highest annual crude incidence rate since the disease became notifiable in 2004. In 2010 (the most recent year for which data are available), the ECDC reported an incidence rate overall of 2.29 per 100,000 population in the European Union, with Ireland reporting the second highest rate among those countries reporting on this disease at the time.[1] The highest incidence rate among EU Member States in 2010 was reported by the United Kingdom at 7.37 per 100,000.

Consistent with previous years, the highest reported incidence was in children under 5 years, with around 85 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 2012 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 (2.1 per 100,000) than all other HSE areas. The HSE- MW and HSE-W reported the highest crude incidence rates this year (22.41 and 22.0 per 100,000 respectively). Compared to 2011, all areas except HSE-W reported increased rates.

As in previous years, the highest number of cases was recorded in spring (Figure 4), although the number of cases from August onwards was slightly elevated compared to the same time period in previous years.

Risk factors

Reviewing case-based enhanced surveillance data, exposure to farm animals or their faeces either by virtue of residence on a farm or by visiting a farm during the

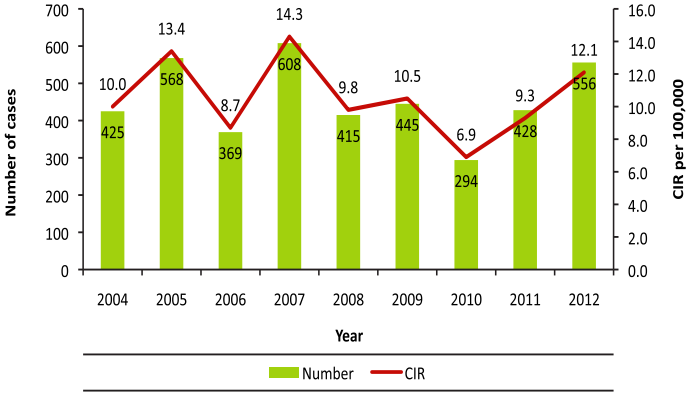

Figure 1: Annual number and crude incidence rate cryptosporidiosis, Ireland 2004-2012

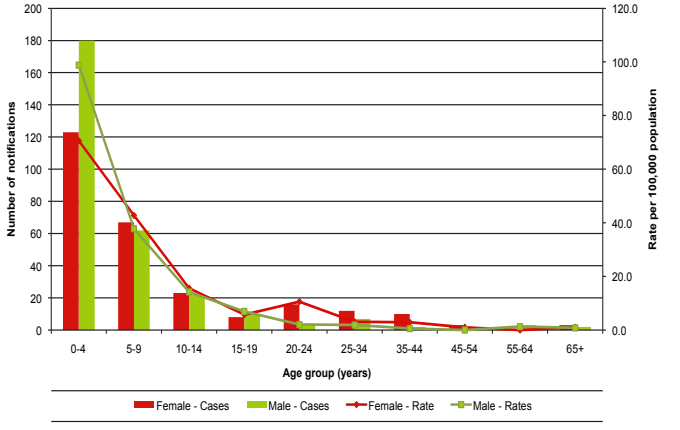

Figure 2: Age-specific incidence rate cryptosporidiosis, Ireland 2012

potential incubation period were common among cases; 32.4% and 32.0% reported these exposures respectively (Table 1). This is 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 (Table 1), with the majority of infections acquired indigenously (92.5%). Although, like the United Kingdom, a higher proportion of cases from late summer/early autumn were reported as being acquired abroad (Figure 5).

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; this was particularly noticeable for private well users. However, 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

In 2012, there were three general and 21 family outbreaks in total (Figure 6). The increase in the number of outbreaks in 2011 and 2012 is most likely due to increased recognition of small family outbreaks following the introduction of enhanced surveillance for cryptosporidiosis cases late in 2010.

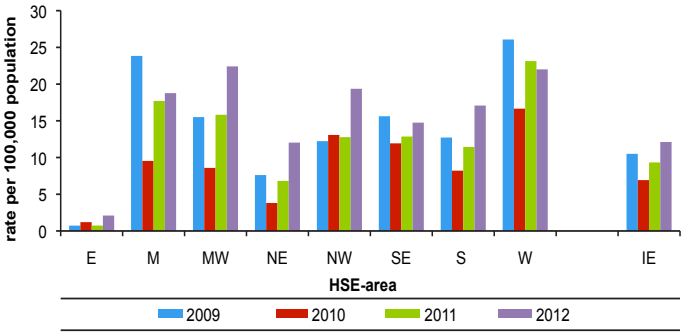

Figure 3: Regional crude incidence rates cryptosporidiosis, Ireland 2009-2012.

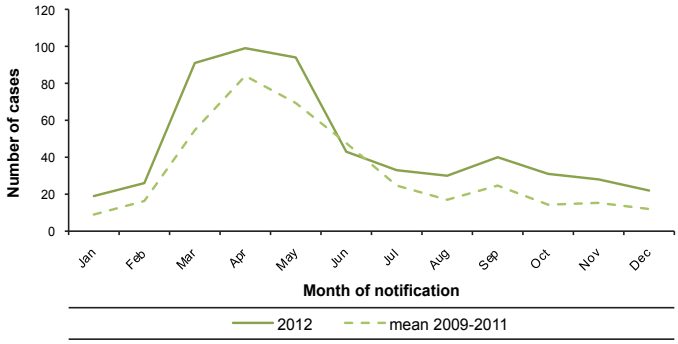

Figure 4. Seasonal distribution of cryptosporidiosis cases, Ireland 2012 compared to the mean for 2009-2011

Table 1: Number of cases (and percentage of cases where information available) where selected risk factors were reported for cryptosporidiosis cases, Ireland 2012

Risk factor	Yes (% of known)	No	Unknown	Not Specified	Total
Travel	36 (7.5%)	442	4	74	556
Lives/cared for on farm	143 (32.4%)	299	11	103	556
Visited farm	2132 (32.0%)	280	5	139	556
Lives/works on or visited farm[a]	*250 (58.8%)*	*175*	*11*	*120*	*556*
Swimming pool visit	112 (25.2%)	332	7	105	556
Pets	281 (64.4%)	155	6	114	556
Other water based activities	19 (5.1%)	356	8	173	556

[a]*Composite of 2 previous variables*

Table 2: Number of cases (and percentage of cases where information available) by home water supply type compared to the number and percentage of households in Ireland by water supply type, Ireland 2012.

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	Fishers exact P value
Group water scheme (private)	18	3.8%	45,774	2.9%	
Group water scheme (public)	45	9.8%	144,428	9.0%	
Other	1	0.2%	2,080	0.1%	P<.001
Private well	114	24.4%	161,532	10.1%	
Public water supply	290	62.0%	1,247,185	77.9%	
Unknown	7				
Not specified	81		48,409		
Total	556	100%	1,649,408	100%	

Comparing the proportion of cases and households served by public water supplies versus all other supply types: X^2=78.3, P<.001

The most common mode of transmission reported in 2012 was person-to-person spread (eight outbreaks due solely to person-to-person transmission resulted in 16 illnesses), with animal contact being the second most common transmission route reported (contact with animals contributed to transmission in four outbreaks resulting in 17 cases) (Table 3 and Figure 7).

The twenty-one family outbreaks ranged in size from two to five persons ill, and the majority occurred in private households, with one reported as being associated with travel to Spain. Among the three general outbreaks reported, one was waterborne, one was due to animal contact and one was reported to be transmitted by person-to-person spread.

For the general waterborne outbreak, 12 confirmed cases were reported, three of whom were hospitalised. A public water supply was implicated on the basis of strong descriptive epidemiological evidence, and evidence of failure of the water treatment process; *Cryptosporidium* was found in the treated drinking water; however the strain identified was not the same species as identified in human cases. Remedial action was taken at the water treatment plant.

The second general outbreak occurred among third level students and was reported to be due to animal contact on a farm. Six students reported gastrointestinal symptoms, one of whom required hospitalisation, and four were confirmed as having cryptosporidiosis. The students spent several days on the farm studying livestock skills. While the farm included a variety of animal species, the most likely cause of the outbreak was contact with calves that were reported to have had diarrhoea.

In the third general outbreak, person-to-person spread in a hospital setting resulted in an outbreak with two persons ill.

Summary

The crude incidence of cryptosporidiosis in Ireland in 2012 was the highest since 2007, with a 90% increase in incidence over the last two years. However, the seasonal, age and regional distribution in incidence reported in 2012 was typical of previous years; consistently there has been a higher incidence in springtime, in young children and in non HSE-E areas.

Increases in incidence were also reported in the United Kingdom, Germany and the Netherlands in 2012, particularly in the latter part of the year; these were attributed to a range of possible factors including climatic drivers, such as the increased rainfall in the summer of 2012 in these countries, or a widely distributed commonly consumed product. [2]

Person-to-person spread appears to be an important mode of transmission within family outbreaks, while both enhanced surveillance data and outbreak surveillance data are consistent with animal contact

Table 3: Number of outbreaks, number ill and number laboratory-confirmed cases by transmission route, Ireland 2012

Transmission mode	Number of outbreaks	Total number ill	Number lab confirmed
Animal contact	3	12	8
Person-to-person	8	16	13
P-P and Animal	1	5	2
P-P and Waterborne	2	4	2
Waterborne	1	12	12
Unknown	8	20	16
Not Specified	1	2	-
Total	**24**	**71**	**53**

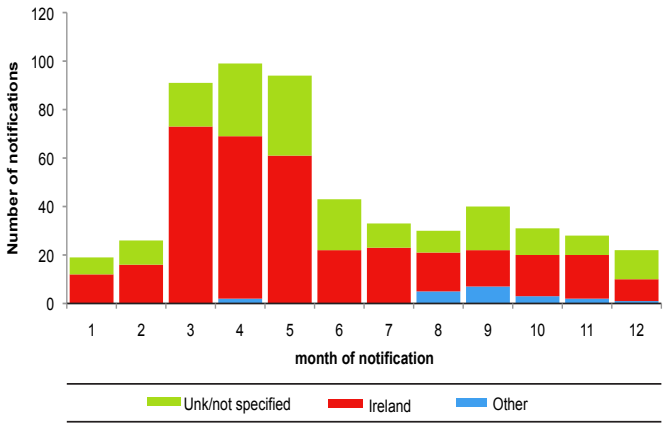

Figure 5. Seasonal distribution of cryptosporidiosis cases by Country of Infection, Ireland 2012

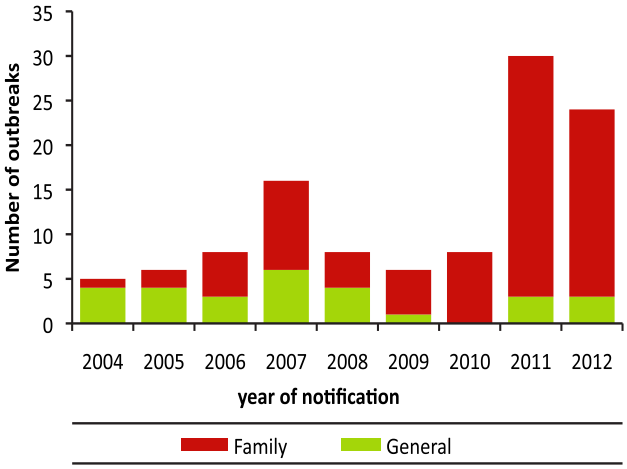

Figure 6: Number of cryptosporidiosis outbreaks notified by type, Ireland 2004-2012

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 have been fewer general waterborne outbreaks reported between 2008 and 2012 relative to earlier years, exposure to water from non-public supplies may present a higher 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*.[3]

1. ECDC. 2012. Annual epidemiological report; Reporting on 2010 surveillance data and 2011 epidemic intelligence data. Available at http://ecdc.europa.eu/en/publications/Publications/Annual-Epidemiological-Report-2012.pdf
2. ECDC. 2012. Rapid Risk Assessment: Increased *Cryptosporidium* infections in the Netherlands, United Kingdom and Germany in 2012 available at http://ecdc.europa.eu/en/publications/publications/cryptosporidium-infectionss-netherlands-united-kingdom-germany-risk-assessment.pdf
3. EPA. 2012. The Provision and *Quality of Drinking* Water in Ireland A Report for the Year 2012. available at http://www.epa.ie/pubs/reports/water/drinking/

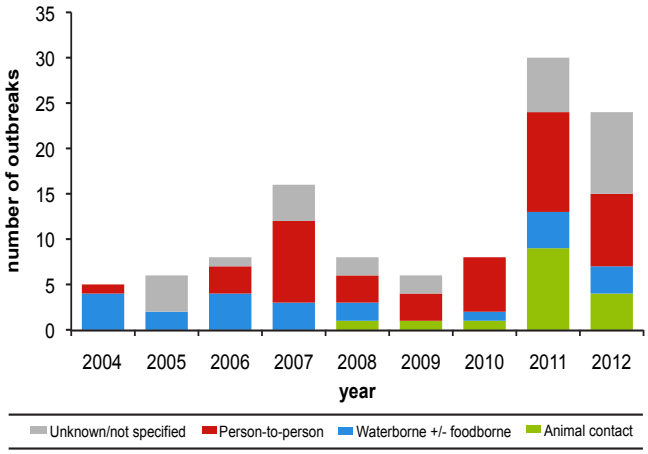

Figure 7: Number of cryptosporidiosis outbreaks notified by reported transmission route, Ireland 2004-2012

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.