Outbreak of cryptosporidiosis in a child day-care centre in Gipuzkoa, Spain, October to December 2011

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From October to December 2011, an outbreak of 26 cases of cryptosporidiosis occurred in a day-care centre in Gipuzkoa, Spain. The infection spread from person to person and affected 24 children under two years of age (attack rate: 38%) and two caregivers. Cryptosporidium oocysts were observed in 10 of 15 samples. During 2010, only four cases of cryptosporidium were detected in Gipuzkoa, and 27 overall in Spain.

On 24 November 2011, a paediatrician notified the epidemiological surveillance service of Gipuzkoa (Basque Country, northern Spain) of a child with diarrhoea in whose stools oocysts of Cryptosporidium had been isolated, as well as of an unusually large number of children with diarrhoea who attended the same day-care centre as the first child. All were tested for Cryptosporidium because our laboratory has a policy of testing for this microorganism in samples from children under the age of five years. In this paper, we present the epidemiological, environmental and parasitological research undertaken to study the outbreak and report the measures taken to control it.

Background
Cryptosporidium is a coccidian parasite. Its infectious forms, oocysts, are excreted in the host’s faeces. The principal zoonotic reservoirs are humans, cattle and other domestic animals. It is transmitted by the faecal-oral route: person-to-person or from animal to person, as well as by ingestion of contaminated water or food. Extensive outbreaks have been reported to be associated with transmission through drinking water or related to swimming pools [1,2]. On the other hand, transmission between humans has resulted in outbreaks in day-care centres with incidence rates of 30–60% [3-7]. Given that oocysts are resistant to chlorine, it is essential that properly functioning filtration systems are used for the safety of public water supplies [8].

During 2010 and the first 25 weeks of 2011, 46 cases of cryptosporidiosis were notified to the Spanish National Microbiology Surveillance System. Thirty-one of these cases were children aged between one and four years, followed by nine children aged five to nine years [9]. Data from other countries in Europe are diverse and notification rates during 2009 vary considerably between countries, with 10 per 100,000 in Ireland, 4.37 per 100,000 in Belgium and 1.35 per 100,000 in Germany [10].

Outbreak investigation
An active search for cases in the day-care centre was undertaken, by three primary care paediatricians and the Microbiology Unit of the referral hospital. A case was defined as a child or staff of the day-care centre who presented between 1 October and 20 December 2011 with frequent, non-bloody, watery diarrhoea, and/or in whose stool Cryptosporidium oocysts had been isolated. The following variables were recorded for the detected cases: sex, age, date of onset, clinical signs and symptoms, diarrhoea in people living in the same household, and complications.

Samples were taken for microbiological and parasitological analysis. Cryptosporidium oocysts were detected by extension on microscope slides, drying, Auramine O staining and observation at 400x magnification in an epifluorescence microscope. The samples were also investigated for the following...
microorganisms: Salmonella, Shigella, Campylobacter, Aeromonas and Yersinia enterocolitica. The laboratory does not look systematically for viruses until the number of suspected cases increases in the population. Cases went up in our community in the last week of December 2011.

The epidemic curve confirmed that an outbreak was ongoing and showed a person-to-person pattern of transmission (Figure). Twenty-six individuals fulfilled the case definition, with onset of symptoms on 14 October in the first case and on 6 December in the last. All those affected presented with diarrhoea and the duration of illness was five to 30 days, with irregular occurrence of symptoms. All except two of the children were seen by a paediatrician and none received drug treatment. The day-care centre occupies a three-story building, with two classrooms on each floor.

At the time of the study, 63 children between 0 and two years of age attended the day-care, as well as the staff that consisted of six caregivers. There were 39 1–2-year-olds in classroom 2 (ground floor) and classrooms 3 and 4 (first floor), 13 in each. In classroom 1 (ground floor) and classrooms 5 and 6 (second floor), there were 24 0–1-year-olds, eight in each. A total of 24 children fell ill (attack rate: 38.1%), and only three of them were in the group of 0–1-year-olds. Children shared some activities by age group. The Table lists the number of children affected and the attack rates in each classroom. Two caregivers also fell ill.

Three household contacts reported diarrhoea during the outbreak period, but their aetiology was not determined. There were no complications except in a pair of two siblings who both lost weight. In the microscopic analysis, Cryptosporidium spp. oocysts were isolated in 10 of 15 stool samples, and no other enteropathogen was found in any of the samples studied.

**Figure**
Cases of diarrhoea caused by Cryptosporidium spp. in a day-care centre, Gipuzkoa, Spain, October–December 2011 (n=26)

<table>
<thead>
<tr>
<th>Classroom</th>
<th>Age (years)</th>
<th>Number of exposed</th>
<th>Number of cases</th>
<th>Attack rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ground floor</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Classroom 1</td>
<td>0–2</td>
<td>8</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Classroom 2</td>
<td>1–2</td>
<td>13</td>
<td>4</td>
<td>31%</td>
</tr>
<tr>
<td>First floor</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Classroom 3</td>
<td>0–1</td>
<td>12</td>
<td>10</td>
<td>77%</td>
</tr>
<tr>
<td>Classroom 4</td>
<td>1–2</td>
<td>12</td>
<td>7</td>
<td>54%</td>
</tr>
<tr>
<td>Second floor</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Classroom 5</td>
<td>0–1</td>
<td>8</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Classroom 6</td>
<td>0–2</td>
<td>8</td>
<td>3</td>
<td>37.5%</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>63</td>
<td>24</td>
<td>38.1%</td>
</tr>
</tbody>
</table>
in the classrooms of the 1–2-year-olds. Consistent with descriptions in the literature [7,12], the illness in this Cryptosporidium outbreak was mild and self-limiting with a relatively long duration.

It is known that the infective dose for Cryptosporidium is relatively low (one to 10 oocysts) and affected individuals excrete a large number of oocysts (up to $10^8$) [12]. In our reference hospital, which covers a population of 75,000 inhabitants, four positive Cryptosporidium cases were detected during 2010, and 17 in 2011. Of these 17 cases, 10 were children in the studied day-care centre.

Further, though routine laboratory tests to determine whether stool samples contain parasites and/or eggs do not identify species of Cryptosporidium. On this occasion, the fact that our laboratory has a policy of testing for this microorganism in under-fives made it possible to identify the aetiology of the outbreak. Although national coverage is not guaranteed, 27 cases were notified to the surveillance system in Spain during 2010. Our laboratory, which covers 0.15% of the Spanish population, notified four cases. This strongly suggests that cryptosporidiosis is an underdiagnosed disease in Spain.

Once the outbreak was declared, efforts were made to detect and remedy problems, as well as the application of stringent hygiene by caregivers as described above, and seemed to be effective in stopping the spread of the infection. Depletion of susceptible hosts could also be considered as a possible reason that stopped the outbreak. Nevertheless, probably thanks to the implemented measures, children under the age of one year were practically not affected, except for those who had close contact with one of the older cases. The Food and Drug Administration (FDA) approved the usage of nitazoxanide as first choice drug against Cryptosporidiosis [8]. However, in this case the drug was not prescribed as it was not readily available and all cases recovered naturally. The possibility of excluding affected children from the centre was considered, but discarded due to the lack of consensus in the literature on its effectivity, as well as the high social cost [3,13-15].

*Erratum: The number 108 was corrected on 3 February 2012.

References