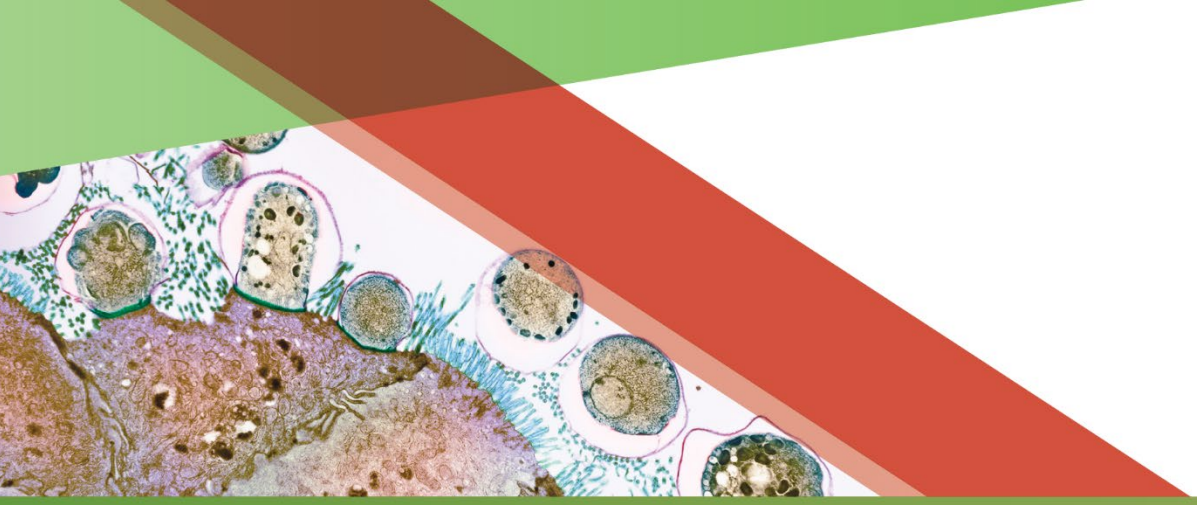


SURVEILLANCE REPORT

Cryptosporidiosis

Annual Epidemiological Report for 2021

Key facts

- For 2021, 24 European Union and European Economic Area (EU/EEA) countries reported 4 476 confirmed cryptosporidiosis cases.
- The notification rate was 1.8 confirmed cases per 100 000 population.
- Six countries accounted for 94% of all confirmed cases, with notification rates between 1.8 and 16.7 cases per 100 000 population.
- As in previous years, most of the cases were reported in autumn (peak in September), with a smaller peak also observed in spring (April).
- Children aged 0–4 years had the highest notification rate of 6.4 cases per 100 000 population.

Introduction

Cryptosporidiosis is an acute diarrhoeal disease caused by the intracellular protozoan parasite *Cryptosporidium*. It infects a variety of animals (e.g. cattle, sheep, rodents, cats, dogs, birds, fish and reptiles), as well as humans. Most human cases are due to two species: *Cryptosporidium hominis*, which mainly infects humans, and the zoonotic species *Cryptosporidium parvum*, which also infects domestic animals, in particular young calves and lambs. The infection can be asymptomatic or can cause diarrhoea that spontaneously resolves over a couple of weeks. It may be life-threatening for people with impaired immune systems, who may develop profuse, life-threatening, watery diarrhoea that is very difficult to treat with currently available drugs. Transmission is faecal-oral through ingestion of infectious oocysts, direct contact with infected people or animals, or ingestion of contaminated water or food. *Cryptosporidium* oocysts can survive for months in moist soil or water and survive harsh environmental conditions (e.g. heat, cold) for extended periods of time.

Methods

This report is based on data for 2021 retrieved from The European Surveillance System (TESSy) on 9 October 2022. TESSy is a system for the collection, analysis and dissemination of data on communicable diseases.

For a detailed description of the methods used to produce this report, please refer to the Methods chapter of the 'ECDC Annual Epidemiological Report' [1]. An overview of the national surveillance systems is available online [2]. A subset of the data used for this report is available through ECDC's online 'Surveillance Atlas of Infectious Diseases' [3].

Suggested citation: European Centre for Disease Prevention and Control. Cryptosporidiosis. In: ECDC. Annual epidemiological report for 2021. Stockholm: ECDC; 2024.

Stockholm, February 2024

For 2021, cryptosporidiosis data were reported by 24 EU/EEA countries. Notification of cryptosporidiosis was mandatory in 20 EU Member States, Iceland and Norway. In two Member States, notification was voluntary (Belgium and Greece). Austria, Denmark, France, Italy, the Netherlands and Liechtenstein did not report data since no surveillance systems exists in these countries. In the Netherlands, a cryptosporidiosis project was conducted, and available data from 2013 to 2018 were reported to ECDC. In 2018, Greece established a surveillance system for cryptosporidiosis based on voluntary reporting of laboratory-confirmed cases collected from public hospitals. In Luxembourg, the notification system changed in 2020 to include all electronic laboratory reports rather than only reports from general practitioners. This change resulted in a major increase in cases. The United Kingdom (UK) stopped reporting data in 2020 due to its withdrawal from the EU on 1 February 2020. For 2020 and 2021, Spain did not receive data from all of its regions, resulting in lower case numbers than expected; therefore, notification rates were not calculated. For the remaining reporting countries, the surveillance systems for cryptosporidiosis had full national coverage.

Most reporting countries submitted case-based data, but Belgium, Bulgaria and Greece submitted aggregated data. Both data formats were included to calculate numbers of cases, notification rates, disease trends, and age and gender distributions [2].

Epidemiology

Of the 24 EU/EEA countries reporting data for 2021, 19 countries reported 4 489 cryptosporidiosis cases, of which 4 476 (99.7%) were confirmed (Table 1). Belgium, Finland, Germany, Ireland, Norway and Sweden accounted for 94% of all confirmed cases. Croatia, Cyprus, Lithuania, Romania and Slovakia reported zero cases.

The overall EU/EEA notification rate in 2021 (1.8 cases per 100 000 population) was similar to that reported in 2020 (1.7 cases per 100 000 population). Country-specific notification rates ranged from 16.7 cases per 100 000 population in Ireland and 10.7 cases per 100 000 population in Luxembourg to <1 case per 100 000 population in 14 EU/EEA countries (Figure 1).

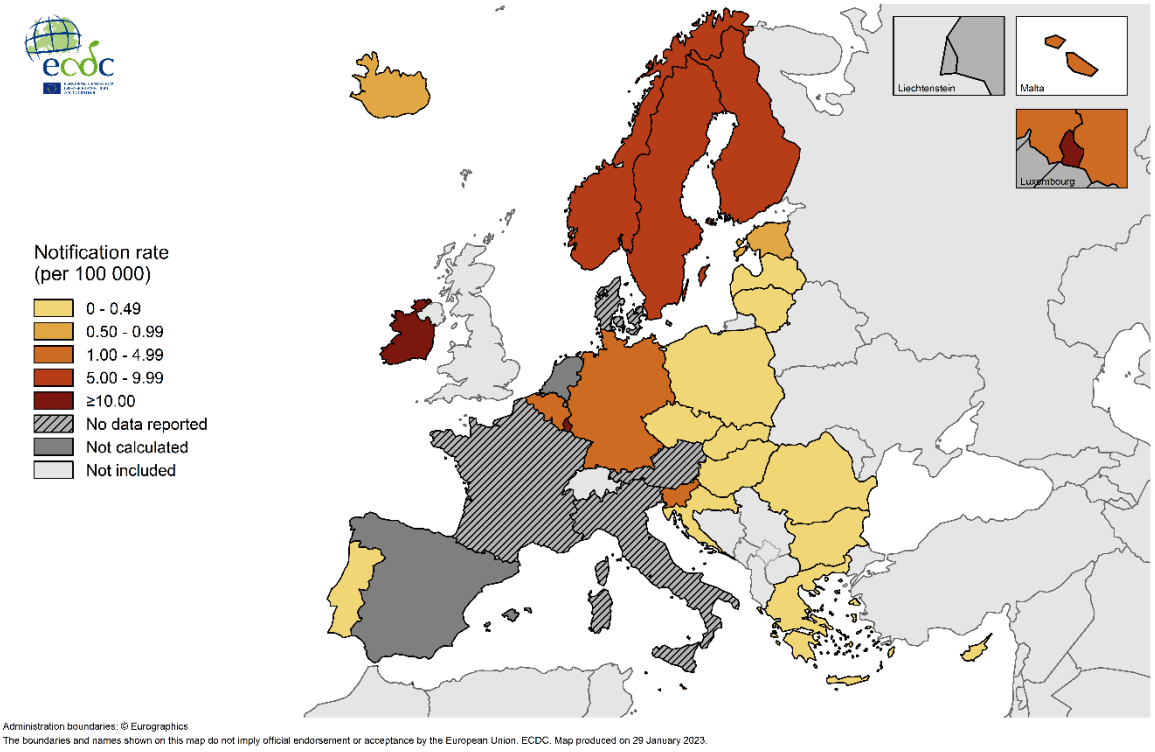
In 2021, seven countries reported information on species for 932 cases. Most cases were *Cryptosporidium parvum* (96%) and the remaining cases were *Cryptosporidium hominis* (2%) or 'other species' (2%).

Table 1. Confirmed cryptosporidiosis cases and notification rates per 100 000 population by country and year, EU/EEA, 2017–2021

Country	2017		2018		2019		2020		2021		
	Number	Rate	Number	Rate	Number	Rate	Number	Rate	Number	Rate	ASR
Austria	NDR	NRC	NDR	NRC	NDR	NRC	NDR	NRC	NDR	NRC	NRC
Belgium	716	6.3	1 255	11.0	856	7.5	500	4.3	503	4.3	4.5
Bulgaria	6	0.1	0	0.0	1	0.0	2	0.0	3	0.0	0.0
Croatia	17	0.4	7	0.2	2	0.0	2	0.0	0	0.0	0.0
Cyprus	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0.0
Czechia	5	0.0	6	0.1	13	0.1	3	0.0	2	0.0	0.0
Denmark	NDR	NRC	NDR	NRC	NDR	NRC	NDR	NRC	NDR	NRC	NRC
Estonia	0	0.0	3	0.2	0	0.0	5	0.4	7	0.5	0.5
Finland	250	4.5	348	6.3	485	8.8	571	10.3	504	9.1	9.8
France	NDR	NRC	NDR	NRC	NDR	NRC	NDR	NRC	NDR	NRC	NRC
Germany	1 695	2.1	1 774	2.1	1 965	2.4	1 178	1.4	1 502	1.8	2.0
Greece	16	0.1	26	0.2	110	1.0	91	0.8	28	0.3	NR
Hungary	7	0.1	11	0.1	10	0.1	4	0.0	13	0.1	0.1
Iceland	11	3.3	18	5.2	9	2.5	12	3.3	3	0.8	0.8
Ireland	572	12.0	619	12.8	601	12.3	511	10.3	837	16.7	14.5
Italy	NDR	NRC	NDR	NRC	NDR	NRC	NDR	NRC	NDR	NRC	NRC
Latvia	4	0.2	2	0.1	3	0.2	2	0.1	3	0.2	0.2
Liechtenstein	NDR	NRC	NDR	NRC	NDR	NRC	NDR	NRC	NDR	NRC	NRC
Lithuania	1	0.0	0	0.0	2	0.1	0	0.0	0	0.0	0.0
Luxembourg	0	0.0	0	0.0	0	0.0	66	10.5	68	10.7	10.6
Malta	0	0.0	0	0.0	5	1.0	10	1.9	12	2.3	2.5
Netherlands	1 347	15.2	1 787	20.0	NDR	NRC	NDR	NRC	NDR	NRC	NRC
Norway	379	7.2	327	6.2	378	7.1	481	9.0	355	6.6	6.7
Poland	7	0.0	3	0.0	1	0.0	2	0.0	3	0.0	0.0
Portugal	6	0.1	4	0.0	7	0.1	1	0.0	3	0.0	0.0
Romania	5	0.0	0	0.0	5	0.0	0	0.0	0	0.0	0.0
Slovakia	2	0.0	1	0.0	1	0.0	0	0.0	0	0.0	0.0
Slovenia	20	1.0	16	0.8	26	1.2	21	1.0	32	1.5	1.7
Spain	554	NRC	1 511	NRC	261	NRC	64	NRC	74	NRC	NRC
Sweden	779	7.8	715	7.1	1 088	10.6	641	6.2	524	5.0	5.2
United Kingdom	5 051	7.7	5 820	8.8	5 303	8.0	NDR	NRC	NDR	NRC	NRC
EU/EEA	**11 450**	**3.7**	**14 253**	**4.4**	**11 132**	**3.5**	**4 167**	**1.7**	**4 476**	**1.8**	**1.8**

Source: Country reports.
ASR: age-standardised rate; NDR: no data reported; NRC: no rate calculated.

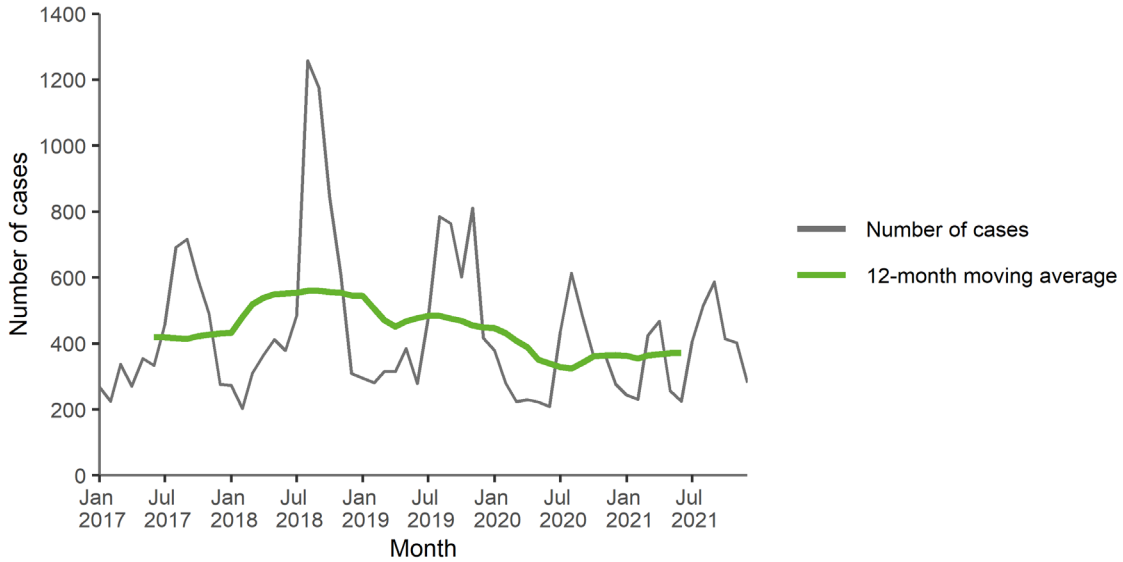
Figure 1. Confirmed cryptosporidiosis cases per 100 000 population by country, EU/EEA, 2021



Source: Country reports.

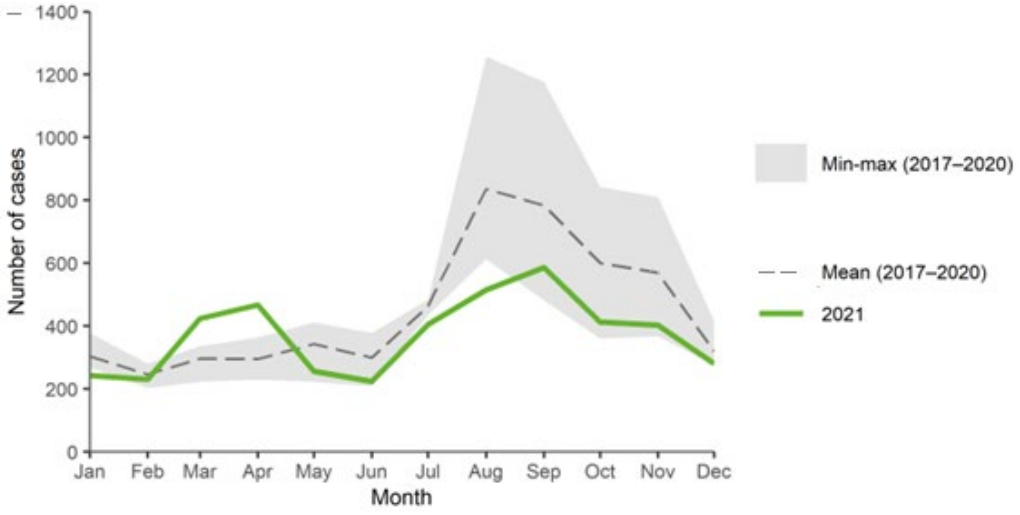
In 2021, cryptosporidiosis case reports showed a bimodal seasonal pattern with a smaller spring peak and a larger late summer/autumn peak (Figures 2 and 3). This pattern was not seen in 2020 but was previously common for cryptosporidiosis (e.g. in 2019 and earlier). Ireland reported many of the cases in the spring peak (226 cases in March and 294 cases in April, corresponding to 62% of all cases in Ireland in 2021 and 58% of all EU/EEA cases in these two months).

Figure 2. Number of confirmed cryptosporidiosis cases by month, EU/EEA, 2017–2021



Source: Country reports from Belgium, Cyprus, Czechia, Estonia, Finland, Germany, Hungary, Iceland, Ireland, Latvia, Luxembourg, Malta, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain and Sweden.

Figure 3. Number of confirmed cryptosporidiosis cases by month, EU/EEA, 2021 and 2017–2020



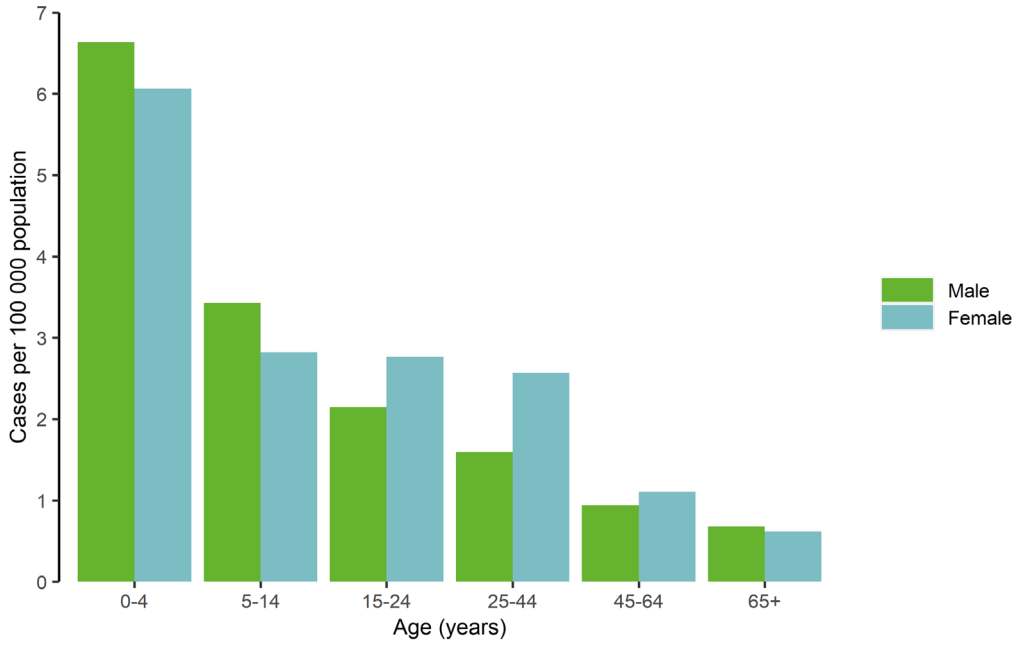
Source: Country reports from Belgium, Cyprus, Czechia, Estonia, Finland, Germany, Hungary, Iceland, Ireland, Latvia, Luxembourg, Malta, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain and Sweden.

Age and gender

Age and gender data were available for 99% of confirmed cryptosporidiosis cases. The highest notification rate was observed in the age group 0–4 years (6.4 cases per 100 000 population), with 6.6 confirmed cases per 100 000 boys and 6.1 confirmed cases per 100 000 girls (Figure 4). The highest notification rate in this age group was reported by Ireland (109.2 cases per 100 000 population), followed by Luxembourg (24.1 cases per 100 000 population) and Belgium (17.0 cases per 100 000 population). Of the 21 countries for which rates could be calculated, 13 countries reported <1 case per 100 000 population in this age group.

The overall male-to-female ratio was 0.9:1 and varied by age group. There were more male cases among those in the age groups 0–4 years (male-to-female ratio 1.2:1) and 5–14 years (male-to-female ratio 1.3:1). There were more female cases among those in the age groups 15–24 years (male-to-female ratio 0.8:1) and 24–44 years (male-to-female ratio 0.7:1).

Figure 4. Confirmed cryptosporidiosis cases per 100 000 population, by age and gender, EU/EEA, 2021



Source: Country reports.

Outbreaks and other threats

In the summer of 2021, there was a transition from the Epidemic Intelligence Information System for Food and Waterborne Diseases (EPIS-FWD) to the new EpiPulse system for the reporting of outbreaks or unusual events of food- or waterborne diseases. No national or multicounty cryptosporidiosis outbreaks were reported through EpiPulse in 2021.

For 2021, Ireland reported an increase in cases in March and April that mainly affected children. This increase was reflected in the overall EU/EEA peak in cases in spring 2021, as well as in Ireland's notification rate. When the rise in cases was observed, national public health authorities issued a warning to the public, with advice on washing hands before eating or preparing food, as well as after using the toilet or being outside on a farm or touching pets, livestock or other animals [4].

Discussion

In 2020 and 2021, the EU/EEA notification rate and number of *Cryptosporidium* infections was noticeably reduced compared with the previous three years. Prior to the COVID-19 pandemic (2014–2019), notification rates for the EU/EEA ranged between 3.0 cases and 4.7 cases per 100 000 population. This decreased considerably to 1.7 cases in 2020 and then 1.8 cases in 2021. The drop in reported cases is most likely due to a combination of factors relating to the COVID-19 pandemic. For example, redistribution of resources may have affected both surveillance and diagnostics and a real reduction in cases may have occurred due to stricter hygiene measures (e.g. increased hand washing) as well as less travel and less restaurant and farm visits, among other things. Another factor that had an impact on the number of reported cases was that the UK stopped reporting data in 2020 due to its withdrawal from the EU on 1 February 2020. Prior to this (2017–2019), the UK reported approximately 44% of all cases in the EU/EEA, on average.

In 2021, Germany and Ireland reported most of the cases in the EU/EEA, but the highest notification rates were seen in Ireland and Luxembourg. These latter two were the only countries with a notification rate higher than 10 cases per 100 000 population.

Every year EU/EEA countries report *Cryptosporidium* outbreaks and clusters of both locally acquired and travel-related cases. *Cryptosporidium* is one of the most commonly reported etiological agents of waterborne outbreaks caused by parasitic protozoa [5,6]. In Europe, the infection is mainly acquired through recreational waters (e.g. swimming pools, public paddling pools, water parks or open water, as well as at mass sporting events involving water or mud) and contact with farm animals [5,7]. Outbreaks associated with food are also reported [8,9], and outbreaks related to drinks such as juice have been described [10,11].

In 2021, information about *Cryptosporidium* species was available for 21% (914/4 476) of cryptosporidiosis cases reported in the EU/EEA. *Cryptosporidium parvum* was the most commonly reported (98%) species, followed by *Cryptosporidium hominis* (2%). Other species known to cause disease in humans include *Cryptosporidium meleagridis*, *Cryptosporidium cuniculus*, *Cryptosporidium ubiquitum*, *Cryptosporidium canis*, *Cryptosporidium felis*, *Cryptosporidium viatorum*, *Cryptosporidium ditrichi, Cryptosporidium erinacei, Cryptosporidium suis* and *Cryptosporidium mortiferum* (previously known as *Cryptosporidium* chipmunk genotype I) [12]. *Cryptosporidium mortiferum* has been reported as an emerging species in Sweden [13]. In addition to species differentiation, *Cryptosporidium* can further be typed with higher resolution into different subtypes. Several countries in the EU/EEA apply *Cryptosporidium* species identification and subtyping routinely in surveillance and outbreak investigations [14].

Public health implications

Despite a relatively low EU/EEA notification rate, it is important to monitor and control cryptosporidiosis in the region and to better understand the epidemiology in terms of species, subtype distribution and trends. This requires increased laboratory testing for parasites, species identification and subtyping, as well as more complete reporting. As outbreak control is dependent on understanding the dynamics of infection, this information is often crucial for outbreak investigations and source tracing. Cryptosporidiosis is considered underdiagnosed and, thus far, no effective treatments or vaccines have been developed.

The public should also be made aware of how to minimise the risk of getting cryptosporidiosis, including practicing proper hand hygiene and proper handling of raw or minimally processed fruits and vegetables, such as washing, peeling and cooking, if necessary. Public health authorities should raise awareness of these prevention strategies, especially among families with small children who may visit petting zoos or farms, as well as people in close contact with farm animals (e.g. farm workers and veterinary specialists). Awareness should also be raised about the possibility of getting cryptosporidiosis from swallowing contaminated water in swimming pools or other recreational water sites, or while participating in mass sporting events involving water or mud.

References

1. European Centre for Disease Prevention and Control (ECDC). Introduction to the Annual Epidemiological Report. Stockholm: ECDC; 2021. Available at: http://ecdc.europa.eu/annual-epidemiological-reports/methods
2. European Centre for Disease Prevention and Control (ECDC). Surveillance systems overview. Stockholm: ECDC. Available at: https://www.ecdc.europa.eu/en/publications-data/surveillance-systems-overview-2021
3. European Centre for Disease Prevention and Control (ECDC). Surveillance Atlas of Infectious Diseases. Stockholm: ECDC; 2021. Available at: https://atlas.ecdc.europa.eu/public/index.aspx?Dataset=27&HealthTopic=7
4. News Desk. Spike in cryptosporidium parasitic infections prompts warning in Ireland. April 25 2021. Food Safety News; 2021. Available at: https://www.foodsafetynews.com/2021/04/spike-in-cryptosporidium-parasitic-infections-prompts-warning-in-ireland
5. Chalmers RM. Waterborne outbreaks of cryptosporidiosis. Ann Ist Super Sanita. 2012;48(4):429-46.
6. Alireza Zahedi, Una Ryan. Cryptosporidium – An update with an emphasis on foodborne and waterborne transmission. Research in Veterinary Science. 2020; 132:500-512.
7. Alsmark C, Nolskog P, Angervall AL, Toepfer M, Winiecka-Krusnell J, Bouwmeester J, et al. Two outbreaks of cryptosporidiosis associated with cattle spring pasture events. Veterinary parasitology, regional studies and reports. 2018 Dec;14:71-4.
8. Lucy J. Robertson, Rachel M. Chalmers. Foodborne cryptosporidiosis: is there really more in Nordic countries? Trends in Parasitology. 2013; 29:3-9.
9. SM Cacciò, RM Chalmers. Human cryptosporidiosis in Europe. Clinical Microbiology and Infection. 2016; 22:471-480.
10. Robertson LJ, Temesgen TT, Tysnes KR, Eikas JE. An apple a day: an outbreak of cryptosporidiosis in Norway associated with self-pressed apple juice. Epidemiology and infection. 2019 Jan;147:e139.
11. Joe Whitworth. Unpasteurized spinach drink tied to increase of cryptosporidium cases. Food Safety News; 2019. Available at: https://www.foodsafetynews.com/2019/12/unpasteurized-spinach-drink-tied-to-increase-of-cryptosporidium-cases/
12. Ryan U, Zahedi A, Feng Y, Xiao L. An Update on Zoonotic Cryptosporidium Species and Genotypes in Humans. Animals. 2021; 11(11):3307.
13. Bujila I, Troell K, Fischerström K, Nordahl M, Killander G, Hansen A, et al. Cryptosporidium chipmunk genotype I – An emerging cause of human cryptosporidiosis in Sweden. Infection, Genetics and Evolution. 2021;92:104895.
14. Chalmers RM, Perez-Cordon G, Caccio SM, Klotz C, Robertson LJ. Cryptosporidium genotyping in Europe: The current status and processes for a harmonised multi-locus genotyping scheme. Experimental parasitology. 2018 Aug;191:25-30.