

Cryptosporidiosis NNDSS Summary Report for 2018

Background

Surveillance Overview: National Cryptosporidiosis Case Surveillance

Cryptosporidiosis is a gastrointestinal illness caused by protozoa of the genus *Cryptosporidium*, the leading cause of U.S. waterborne disease outbreaks (1) and the third leading cause of U.S. zoonotic enteric illness (2). An estimated 748,000 cryptosporidiosis cases occur annually; this means <2% of cases are nationally notified (3). *Cryptosporidium* infection can be symptomatic or asymptomatic. Immunocompetent patients can experience frequent, non-bloody, watery diarrhea typically lasting up to 2–3 weeks (4). Additional symptoms can include vomiting, nausea, abdominal pain, fever, anorexia, fatigue, and weight loss. Immunocompromised patients can experience profuse watery diarrhea lasting weeks to months or even life-threatening malnutrition and wasting.

Cryptosporidiosis is a [nationally notifiable disease](#); the first full year of reporting was 1995. National data are collected through passive surveillance. Healthcare providers and laboratories that diagnose cryptosporidiosis are mandated to report cases to the local or state health department. The 50 states, territorial, District of Columbia (DC), and New York City health departments, in turn, voluntarily notify CDC of cases via the [National Notifiable Diseases Surveillance System \(NNDSS\)](#). Some states conduct enhanced molecular surveillance of cryptosporidiosis through participation in [CryptoNet](#); CryptoNet data are not presented here.

State, DC, US territory, and Freely Associated State public health agencies voluntarily notify CDC of cryptosporidiosis outbreaks via the [National Outbreak Reporting System \(NORS\)](#). NORS data are not presented here; however, [summaries of data on waterborne disease outbreaks](#) are reported elsewhere.

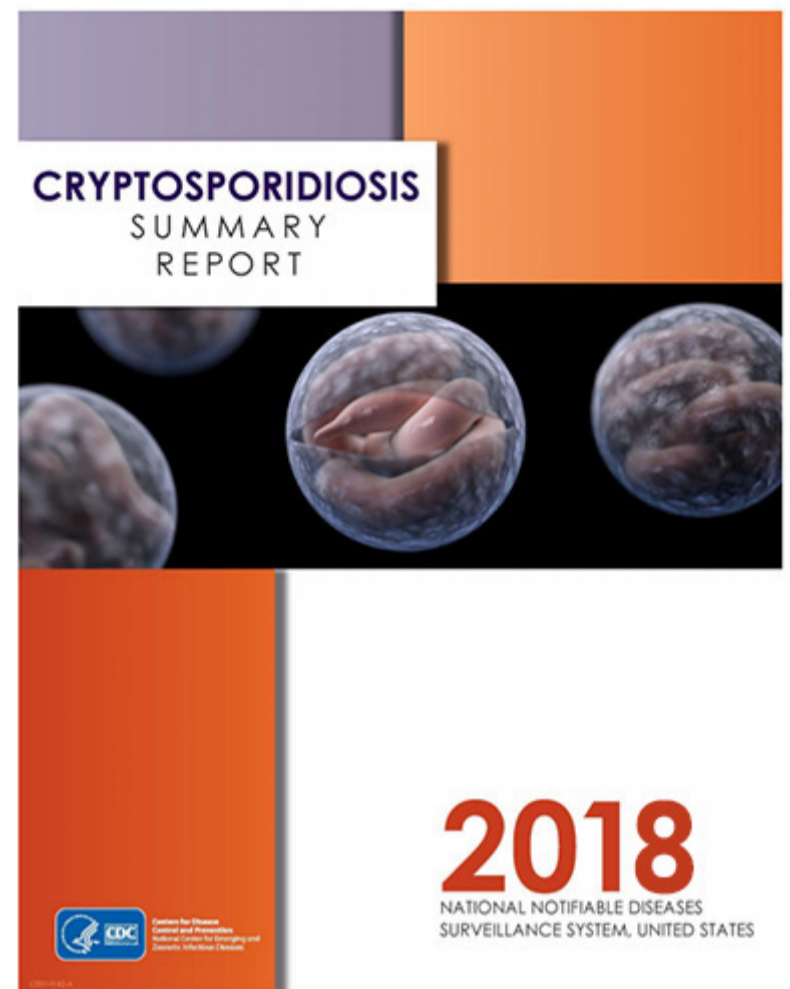
Methods

Case Definition

The [definition](#) of a confirmed case of cryptosporidiosis has changed over time; the [first national case definition](#) was published in 1995, and the [current case definition](#) was published in 2012. The pre-2011 case definitions classified a case with any laboratory evidence of *Cryptosporidium* infection as a confirmed case.

The 2012 confirmed case definition requires evidence of *Cryptosporidium* organisms or DNA in stool, intestinal fluid, tissue samples, biopsy specimens, or other biological sample by certain laboratory methods with a high positive predictive value (e.g., direct fluorescent antibody [DFA] test, polymerase chain reaction [PCR], enzyme immunoassay [EIA], or light microscopy of stained specimen).

A probable case of cryptosporidiosis is defined as 1) having supportive laboratory test results for *Cryptosporidium* spp. infection using a screening test method, such as immunochromatographic card or rapid card test, or a laboratory test of unknown method or 2) meeting clinical criteria (i.e., diarrhea and one or more of the following: diarrhea duration of ≥ 72 hours, abdominal cramping, vomiting, or anorexia) and being epidemiologically linked to a confirmed case.



nausea, abdominal cramping, vomiting, or diarrhea) and being epidemiologically linked to a confirmed case.

A suspect case is defined as having a diarrheal illness and being epidemiologically linked to a probable case. Cases not classified as confirmed, probable, or suspect are classified as unknown.

Analysis

National cryptosporidiosis surveillance data for 2018 were analyzed using R version 3.5.1. Data cleaning processes included case deduplication and the verification of case status (e.g., confirmed, nonconfirmed). Numbers, percentages, and incidence (cases per 100,000 population) of cryptosporidiosis were calculated in aggregate for the United States and separately for each reporting jurisdiction. Rates were calculated by dividing the number of cryptosporidiosis cases by mid-year census estimates (5, 6) and multiplying by 100,000. In addition to analyzing data nationally and by reporting jurisdiction, data were analyzed by region (Northeast, Midwest, South, and West regions), as defined by the U.S. Census Bureau (7). To account for differences in the seasonal use of recreational water, the West region was further subdivided into Northwest and Southwest.

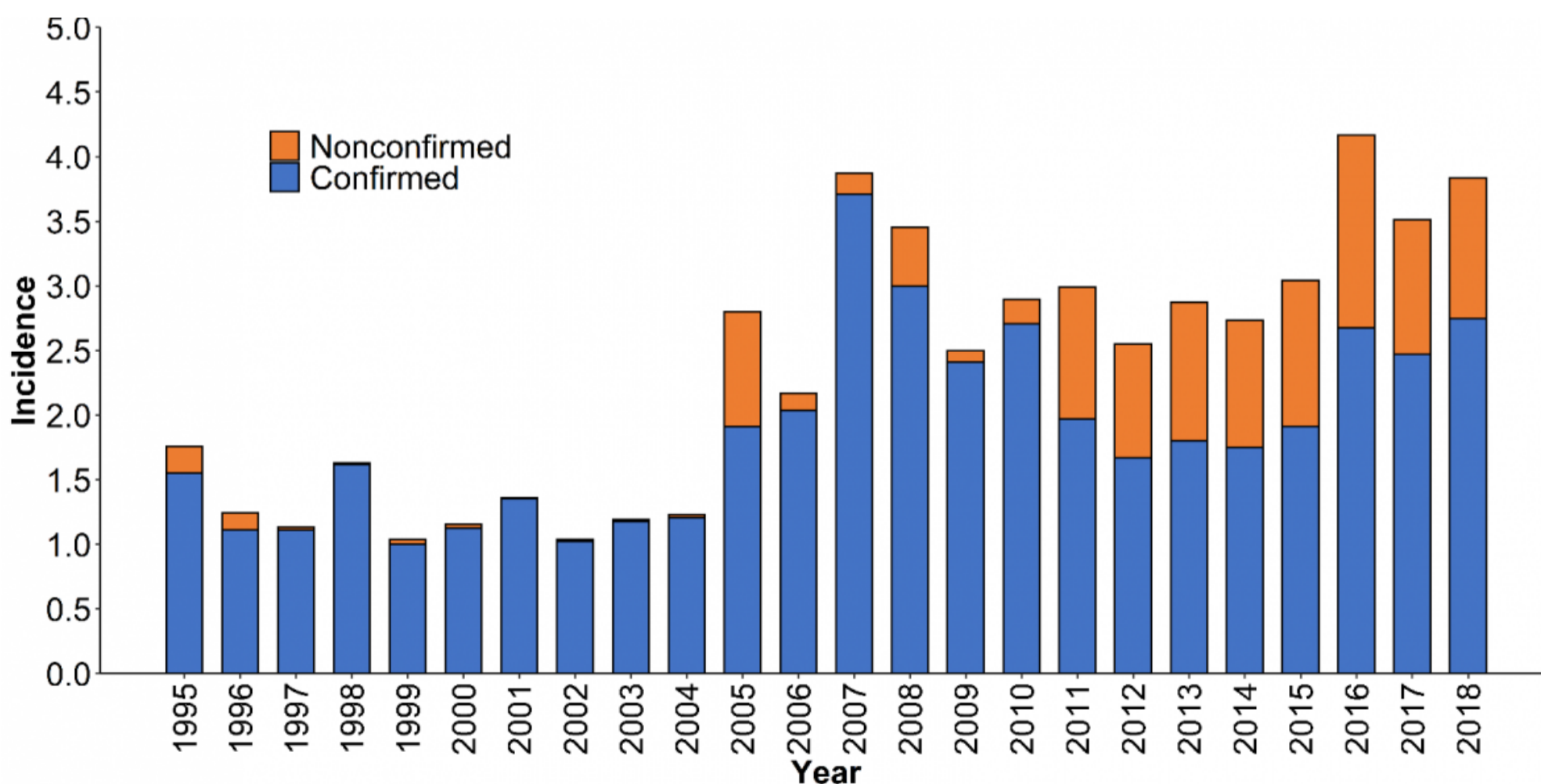
To examine reporting over time, cryptosporidiosis rates were calculated by year (1995–2018) and case status (confirmed or nonconfirmed). Average annual cryptosporidiosis rates were calculated by demographic variables (e.g., age and sex). Rates were not calculated for race or ethnicity, because 14.6% of race data and 25.5% of ethnicity data were missing, nor were rates calculated by month of symptom onset. One case reported by Puerto Rico for 2016 was excluded from analysis, because detailed demographic census data are not available to calculate rates by age and sex.

Acknowledgements

The authors thank the Surveillance and Data Branch, Division of Health Informatics and Surveillance, Center for Surveillance, Epidemiology, and Laboratory Services; Office of Public Health Scientific Services, Centers for Disease Control and Prevention, U.S. Department of Health and Human Services, Atlanta, GA for preparing and aggregating state-based NNDSS data for dissemination.

Tables and Figures

Figure 1. Incidence* of cryptosporidiosis cases, by year and case classification — National Notifiable Diseases Surveillance System, United States, 1995–2018 (n=167,642)



* Cases per 100,000 population per year

§ Probable, suspect, or unknown cases

¶ First full year of national reporting

After 2004, the overall annual incidence rate of cryptosporidiosis has remained greater than 2.0 per 100,000 population. It is unclear if this reflects a true increase or one or more of the following: U.S. Food and Drug Administration's 2005 approval of nitazoxanide to treat cryptosporidiosis in immunocompetent patients ages >12 years and substantial outbreaks (each resulting in >2,000 cases) that occurred in 2005 (NYS), 2007 (UT), 2008 (TX), and 2016 (OH). After 2015, testing for *Cryptosporidium* increased due to increasing use of diagnostic multiplex PCR panels for gastrointestinal illness. Additionally, the incidence of cryptosporidiosis outbreaks substantially increased in 2016. The consistently increased rate of nonconfirmed cases after 2010 likely reflects changes in the national case definition.

Table 1. Number, percentage^{*}, and incidence[§] of cryptosporidiosis cases, by region and jurisdiction — National Notifiable Diseases Surveillance System, United States, 2018 (n=12,540)

Region/Jurisdiction	No.	%	Incidence	No. of outbreak-associated cases
Northeast	1,819	14.5	3.2	86
Connecticut	81	0.6	2.3	
Maine	60	0.5	4.5	
Massachusetts	242	1.9	3.5	6
New Hampshire	87	0.7	6.4	7
New Jersey	164	1.3	1.8	
New York City [¶]	248	2.0	3.0	1
New York State [¶]	323	2.6	2.9	8
Pennsylvania	457	3.6	3.6	11
Rhode Island	90	0.7	8.5	53
Vermont	67	0.5	10.7	
Midwest	4,654	37.1	6.8	81
Illinois	425	3.4	3.3	14
Indiana	324	2.6	4.8	1
Iowa	663	5.3	21.0	
Kansas	95	0.8	3.3	
Michigan	378	3.0	3.8	3
Minnesota	530	4.2	9.4	39

Missouri	351	2.8	5.7	
Nebraska	170	1.4	8.8	
North Dakota	39	0.3	5.1	
Ohio	640	5.1	5.5	24
South Dakota	177	1.4	20.1	
Wisconsin	862	6.9	14.8	
South	3,920	31.3	3.1	148
Alabama	152	1.2	3.1	5
Arkansas	82	0.7	2.7	
Delaware	31	0.2	3.2	
District of Columbia	36	0.3	5.1	
Florida	586	4.7	2.8	91
Georgia	350	2.8	3.3	
Kentucky	178	1.4	4.0	1
Louisiana	157	1.3	3.4	
Maryland	85	0.7	1.4	
Mississippi	98	0.8	3.3	
North Carolina	263	2.1	2.5	2
Oklahoma	164	1.3	4.2	
South Carolina	121	1.0	2.4	
Tennessee	251	2.0	3.7	4
Texas	983	7.8	3.4	44
Virginia	312	2.5	3.7	1
West Virginia	71	0.6	3.9	
Northwest	739	5.9	4.7	12
Alaska	17	0.1	2.3	
Idaho	129	1.0	7.4	10
Montana	81	0.6	7.6	
Oregon	297	2.4	7.1	

Washington	198	1.6	2.6	2
Wyoming	17	0.1	2.9	
Southwest	1,408	11.2	2.3	41
Arizona	203	1.6	2.8	18
California	663	5.3	1.7	
Colorado	215	1.7	3.8	1
Hawaii	7	0.1	0.5	
Nevada	38	0.3	1.3	
New Mexico	89	0.7	4.2	11
Utah	193	1.5	6.1	11
Total	12,540	100	3.8	368

[Download Data](#)  [XLS - 17 KB]

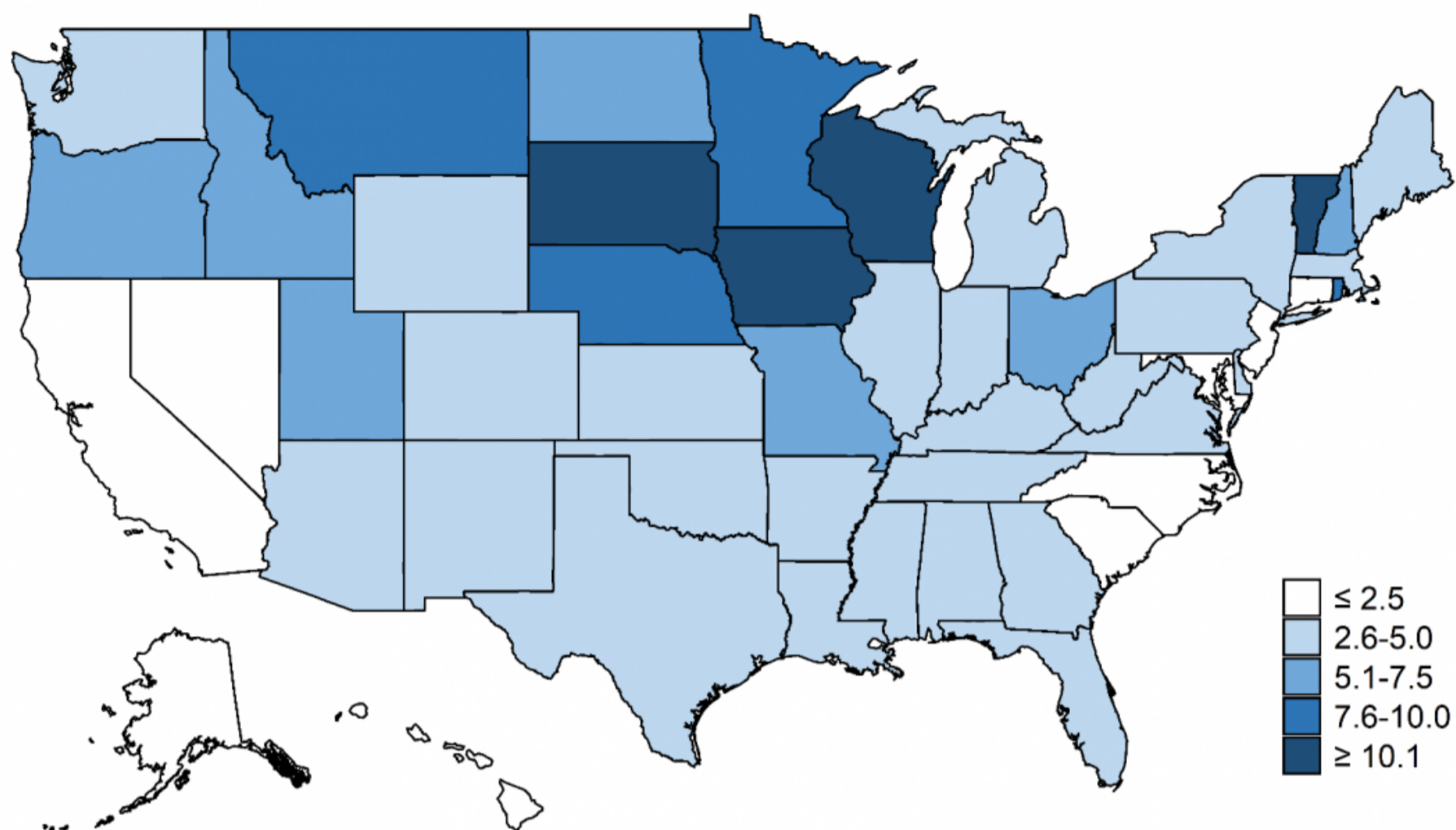
* Percentages might not total 100% because of rounding

§ Cases per 100,000 population

¶ New York State and New York City data are mutually exclusive

By jurisdiction, incidence ranged from 21.0 per 100,000 population in Iowa to 0.5 per 100,000 population in Hawaii. As a region, the Midwest has the greatest overall incidence of 6.8 per 100,000 population. This coincides with this region having some of the highest incidence by jurisdiction. Differences in incidence might reflect differences in risk factors or mode of transmission of *Cryptosporidium*; the magnitude of outbreaks; or the capacity or requirements to detect, investigate, and report cases.

Figure 2. Incidence* of cryptosporidiosis cases, by jurisdiction — National Notifiable Diseases Surveillance System, United States, 2018 (n=12,540)



[Download Data](#) [XLS - 11 KB]

* Cases per 100,000 population

§ New York State and New York City data are mutually exclusive

Cryptosporidiosis is geographically widespread across the United States. Although incidence appears to be consistently higher in the northern Midwest states, differences in incidence might reflect differences in risk factors or modes of transmission of *Cryptosporidium*; the magnitude of outbreaks; or the capacity or requirements to detect, investigate, and report cases.

Table 2. Number and percentage* of cryptosporidiosis cases, by selected patient demographic characteristics — National Notifiable Diseases Surveillance System, United States, 2018 (n=12,540)

Characteristic	No.	%
Sex		
Male	6,042	48.2
Female	6,479	51.7
Missing	19	0.2
Race		
American Indian/Alaska Native	68	0.5
Asian/Pacific Islander	192	1.5
Black	941	7.5

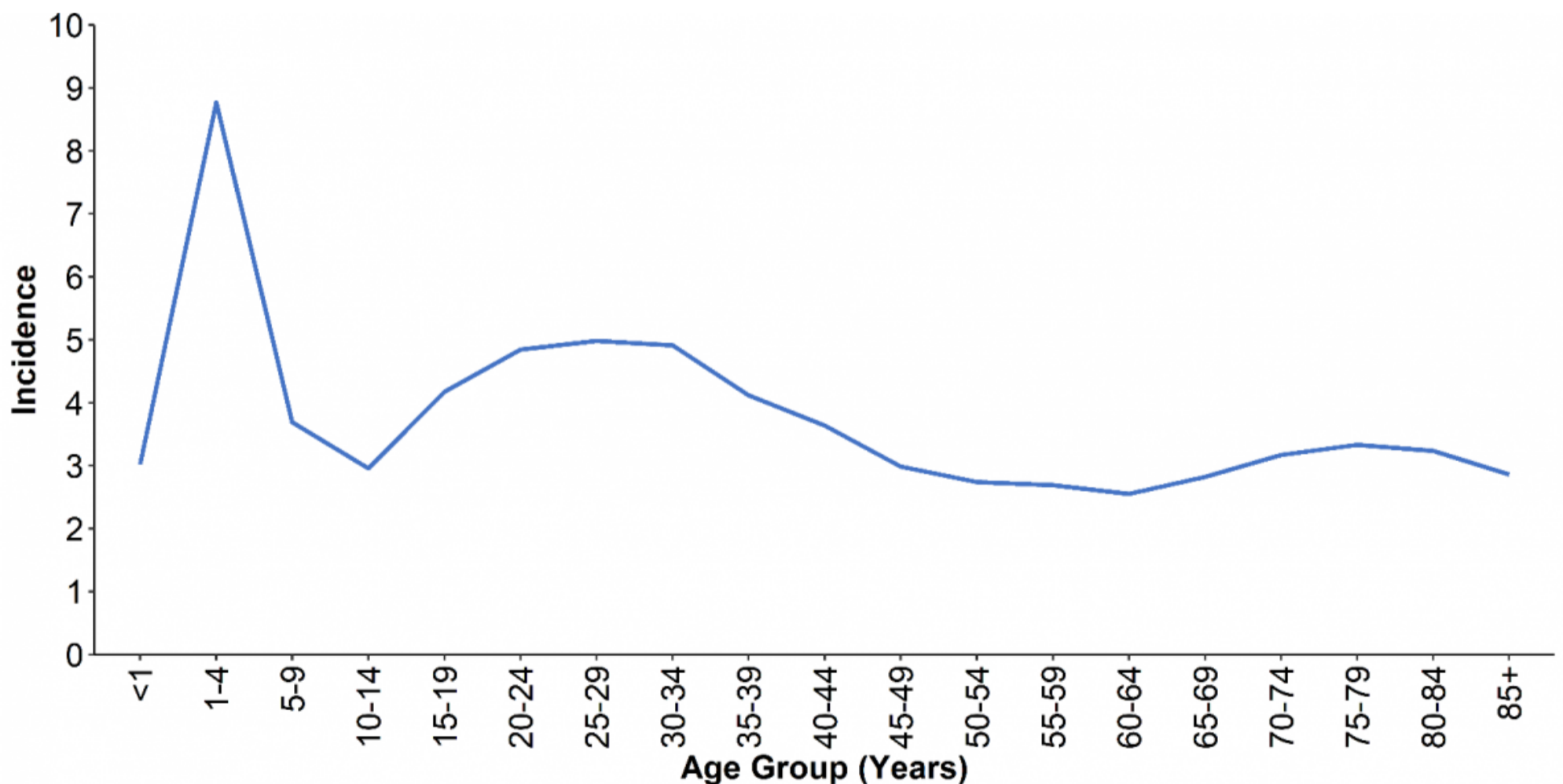
White	8,841	70.5
Other	665	5.3
Missing	1,833	14.6
Ethnicity		
Hispanic	1,149	9.2
Non-Hispanic	8,190	65.3
Missing	3,201	25.5
Total	12,540	100.0

[Download Data](#)  [XLS - 15 KB]

* Percentages might not total 100% because of rounding

More than half of patients (6,479 [51.7%]) were female. Of the 10,707 patients for whom race was reported, 82.6% were white. Of the 9,339 patients for whom ethnicity was reported, 12.3% were Hispanic.

Figure 3. Incidence* of cryptosporidiosis cases, by age group — National Notifiable Diseases Surveillance System, United States, 2018 (n=12,534 §)

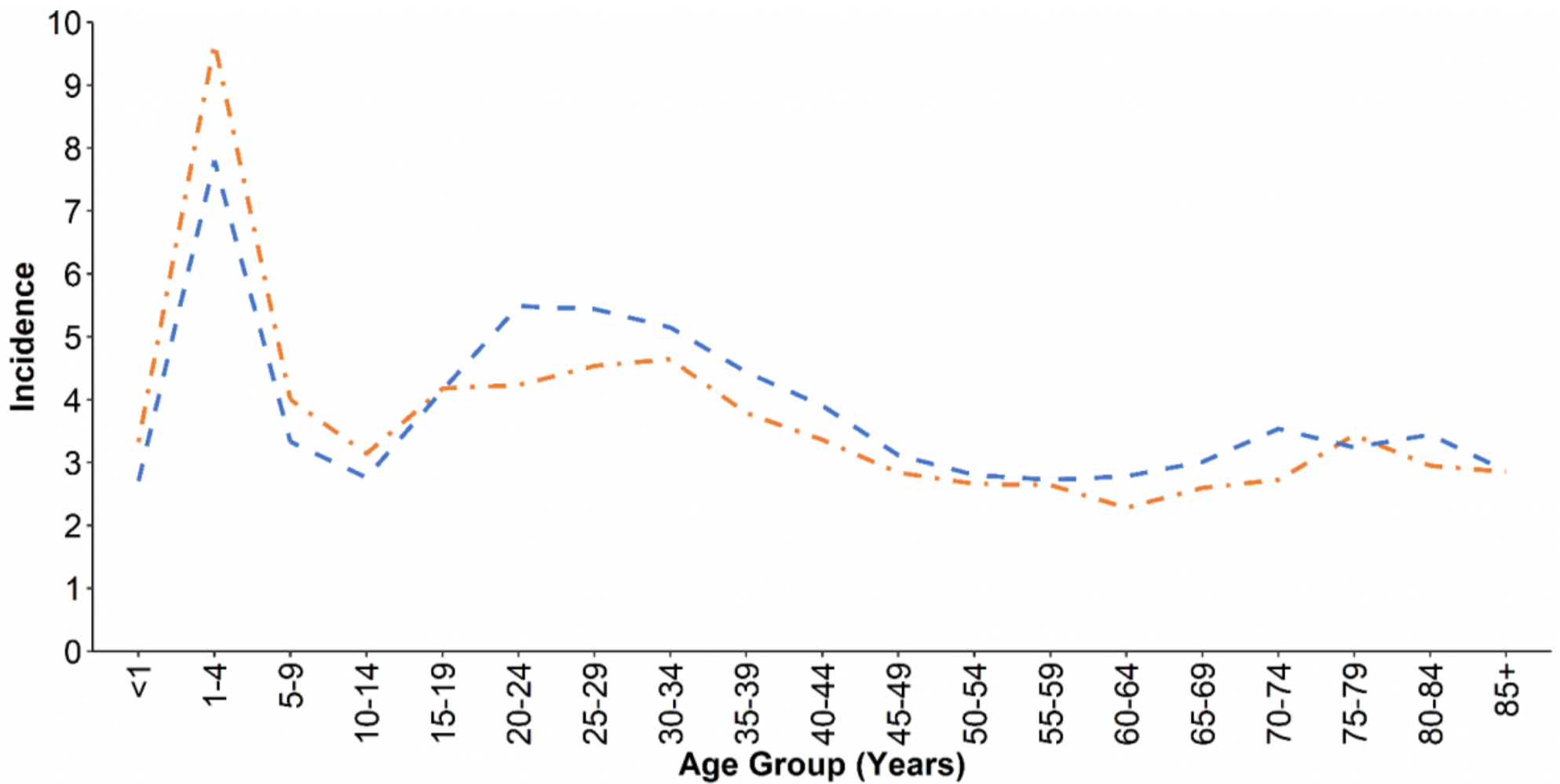


[Download Data](#)  [XLS - 11 KB]

* Cases per 100,000 population
§ Age data missing for 6 patients

The incidence of cryptosporidiosis cases was highest among patients ages 1–4 years (8.8 cases per 100,000 population), 25–29 years (5.0), 30–34 years (4.9), and 20–24 years (4.8). This might reflect young children becoming infected and ill and their caregivers subsequently becoming infected after changing diapers of young children or helping them with toileting.

Figure 4. Incidence* of cryptosporidiosis cases, by sex and age group — National Notifiable Diseases Surveillance System, United States, 2018 (n=12,515 §)



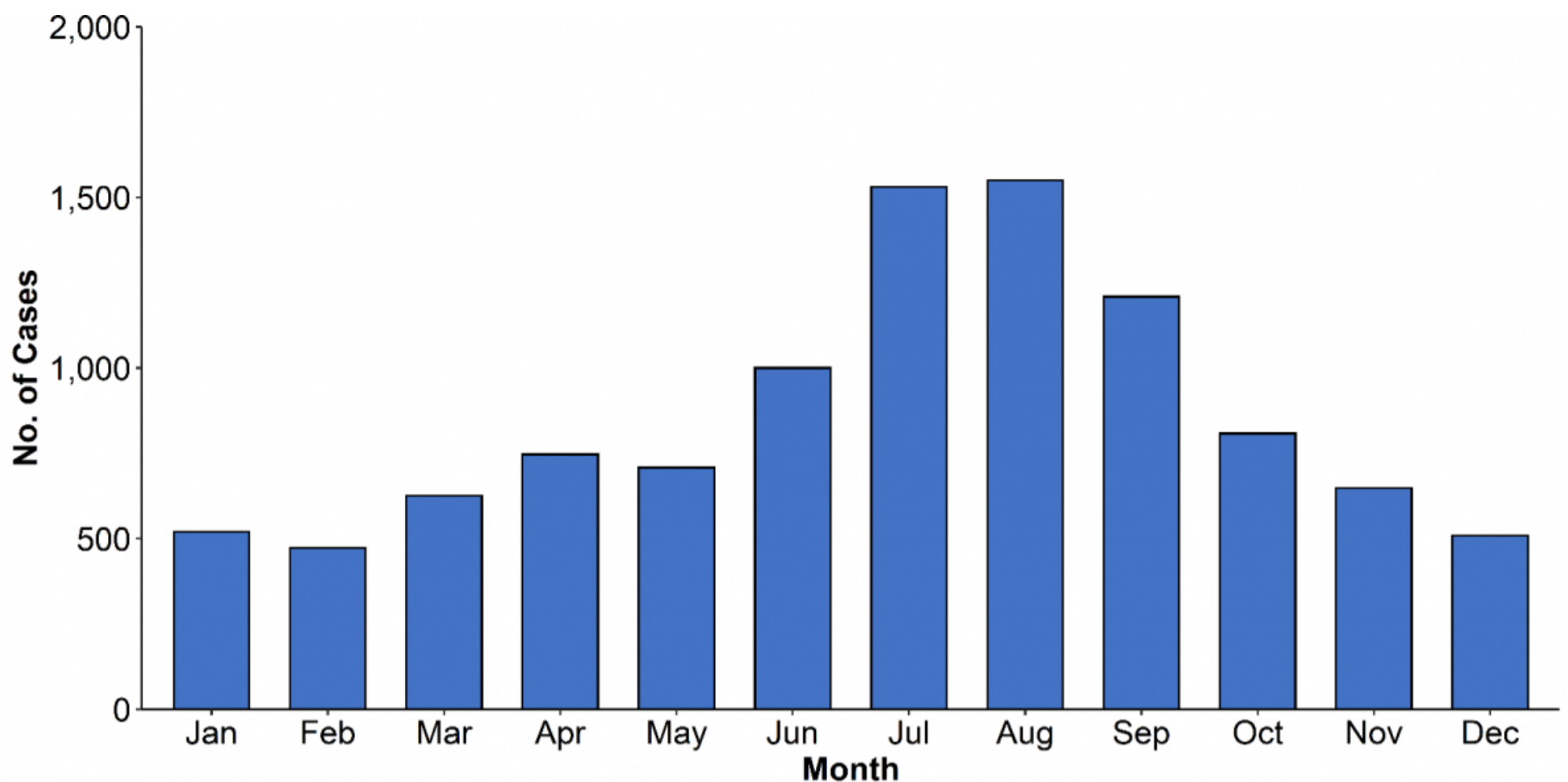
[Download Data](#) [XLS - 12 KB]

* Cases per 100,000 population

§ Age or sex data missing for 25 patients

Among both males and females, the highest incidence of cryptosporidiosis was among those ages 1–4 years (9.7 and 7.8 cases per 100,000 population for males and females, respectively). Rates for females were higher than for males for all age groups >19 years, except the 75–79 age group. Differences in age-specific incidence might be due to age-specific differences in risk factors or modes of transmission of *Cryptosporidium*. For example, compared with males, females might be more likely to change diapers of young children or help them with toileting, and thus, more likely to be exposed to *Cryptosporidium*. Additionally, compared with males, females might be more likely to seek healthcare, and thus, more likely to have illness diagnosed and reported as cryptosporidiosis.

Figure 5. Number of cryptosporidiosis cases, by month of symptom onset — National Notifiable Diseases Surveillance System, United States, 2018 (n=10,328 *)



[Download Data](#) [XLS - 11 KB]

* Month of symptom onset data missing for 2,212 patients

The number of cryptosporidiosis cases was greatest in August (n=1,550) and lowest in February (n=473). The number of cases by month of symptom onset reflect seasonal differences in exposure, such as summertime swimming.

References

1. Hlavsa MC, Cikesh BL, Roberts VA, et al. Outbreaks associated with treated recreational water — United States, 2000–2014. *MMWR Morb Mortal Wkly Rep* 2018;67:547–551. DOI: <http://dx.doi.org/10.15585/mmwr.mm6719a3> .
2. Hale RH, Scallan E, Cronquist AB, et al., Estimates of enteric illness attributable to contact with animals and their environments in the United States, *Clinical Infect Dis* 2012;54:472–9. DOI: <https://doi.org/10.1093/cid/cis051> .
3. Scallan E, Hoekstra RM, Angulo FJ, et al. Foodborne illness acquired in the United States—major pathogens. *Emerg Infect Dis* 2011;17:7–15. DOI: [3201/eid1701.P111101](https://doi.org/10.3201/eid1701.P111101) .
4. Hunter PR, Hughes S, Woodhouse S, et al. Sporadic cryptosporidiosis case-control study with genotyping. *Emerg Infect Dis* 2004;10:1241–9. DOI: [3201/eid1007.030582](https://doi.org/10.3201/eid1007.030582).
5. US Census Bureau. Annual Estimates of the Resident Population for Incorporated Places of 50,000 or More, Ranked by July 1, 2018 Population: April 1, 2010 to July 1, 2018. Washington, DC: US Census Bureau; Release Date: May 2019. Available at <https://www.census.gov/content/census/en/data/tables/time-series/demo/popest/2010s-total-cities-and-towns.html> .
6. United States Department of Health and Human Services (US DHHS), Centers for Disease Control and Prevention (CDC), National Center for Health Statistics (NCHS), Bridged-Race Population Estimates, United States July 1st resident population by state, county, age, sex, bridged-race, and Hispanic origin. Compiled from 1990–1999 bridged-race intercensal population estimates (released by NCHS on 7/26/2004); revised bridged-race 2000–2009 intercensal population estimates (released by NCHS on 10/26/2012); and bridged-race Vintage 2018 (2010–2018) postcensal population estimates (released by NCHS on 6/25/2019). Available on CDC WONDER Online Database. Accessed at <https://wonder.cdc.gov/Bridged-Race-v2018.HTML> on Oct 16, 2019.
7. US Census Bureau. Census regions and divisions of the United States. Washington, DC: US Department of Commerce Economics and Statistics Administration, US Census Bureau. Available at https://www2.census.gov/geo/pdfs/maps-data/maps/reference/us_regdiv.pdf [PDF - 2 pages] .

Recommended Citation:

Recommended Citation:

Centers for Disease Control and Prevention (CDC). Cryptosporidiosis Summary Report — National Notifiable Diseases Surveillance System, United States, 2018. Atlanta, Georgia: U.S. Department of Health and Human Services, CDC, 2019.

Page last reviewed: May 25, 2021