Giardiasis NNDSS Summary Report for 2018

Background

Surveillance Overview: National Giardiasis Case Surveillance

Giardiasis is an illness caused by the protozoan parasite *Giardia duodenalis* (formerly called *G. lamblia* or *G. intestinalis*), which causes gastrointestinal symptoms such as diarrhea, abdominal cramps, bloating, weight loss, or malabsorption (1, 2). Each year in the United States, it is estimated that *Giardia* causes more than 1.2 million illnesses (3).

Giardiasis is a nationally notifiable disease; the first full year of reporting was 1993. National data are collected through passive surveillance. Healthcare providers and laboratories that diagnose confirmed giardiasis cases report to the local or state health departments. State and territorial health departments, the District of Columbia (DC), and the New York City health departments, in turn, voluntarily notify CDC of cases via the National Notifiable Disease Surveillance System (NNDSS). The number of health departments submitting can vary from year to year depending on which states have designated giardiasis as reportable in their jurisdictions.

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

Methods

Case Definition

The definition of a confirmed case of giardiasis has changed over time; the first national case definition was published in 1997 (4), and a revised case definition was published in 2011 (5). The current (2011) case definition differs from the 1997 definition in clarifying that clinical symptoms are necessary for categorizing giardiasis cases as confirmed.

A confirmed case of giardiasis is defined as a case that meets the clinical description and the criteria for laboratory confirmation. Laboratory-confirmed giardiasis is defined as the detection of *Giardia* organisms, antigen, or DNA in stool, intestinal fluid, tissue samples, biopsy specimens, or other biological samples (5). Nonconfirmed cases of giardiasis include probable, suspected, and unknown cases. A probable case of giardiasis meets the clinical description and is epidemiologically linked to a confirmed case. A national case definition for suspected cases of giardiasis does not exist; the definition varies by state. Cases not classified as confirmed, probable, or suspect are classified as unknown.

Analysis

National giardiasis surveillance data for 2018 were analyzed using R version 3.6.1 and SAS 9.4. 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 giardiasis were calculated in aggregate for the United States and separately for each reporting jurisdiction. Rates were calculated by dividing the number of giardiasis cases by each year's mid-year census estimates (6, 7) and multiplying by 100,000. Region and total population estimates included only jurisdictions that reported (Supplemental Table 1). 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 (8). 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, giardiasis rates were calculated by year (1995 to 2018) and case status (confirmed or nonconfirmed). Average annual giardiasis rates were calculated by demographic variables (e.g., age and sex) and jurisdiction. Rates were not calculated for race, ethnicity, or month of onset due to large proportion of missing data for these variables (i.e., 27.9%, 42.2%, and 60.3%, respectively). Cases reported by territories were excluded from the analysis, because detailed demographic census data are not available to calculate rates by age and sex.

Acknowledgements

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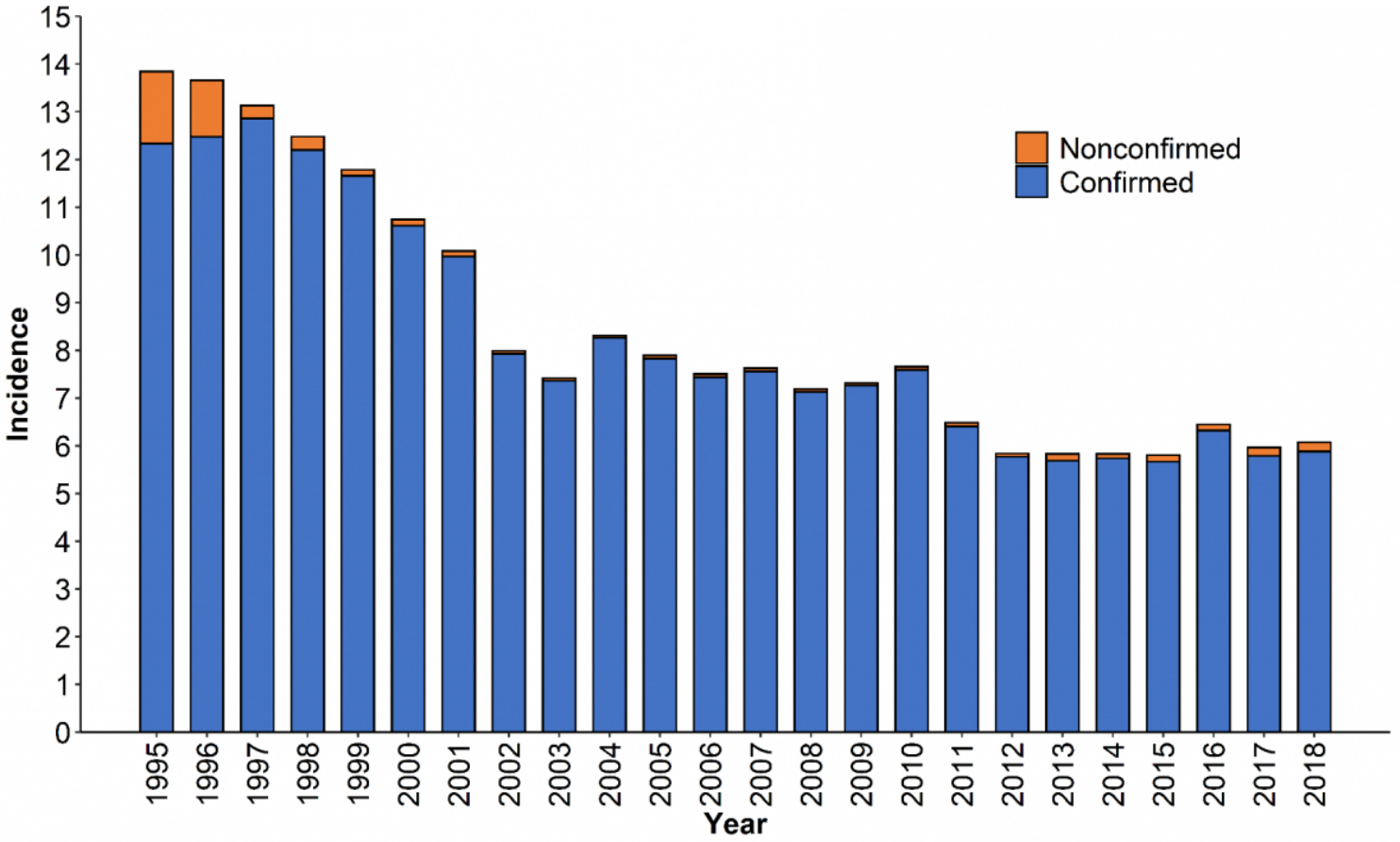
Tables and Figures

Figure 1. Incidence * of giardiasis cases, by year and case classification — National Notifiable Diseases Surveillance System, United States, 1995–2018 (n = 466,034)



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* Cases per 100,000 population per year
§ Probable, suspect, and unknown cases

Since 2011, the incidence of reported, confirmed giardiasis cases has remained < 7.0 cases per 100,000 population. In 2018, there were 15,579 reported giardiasis cases in the United States (96.8% confirmed and 3.2% nonconfirmed).

Table 1. Number, percentage *, and incidence § of giardiasis cases, by region and jurisdiction — National Notifiable Diseases Surveillance System, United States, 2018 (n = 15,579)

Region/Jurisdiction	No.	%	Incidence	No. of outbreak associated cases
Northeast	**4,164**	**26.7**	**7.5**	**46**
Connecticut	197	1.3	5.5	

Maine	163	1.0	12.2	
Massachusetts	560	3.6	8.1	1
New Hampshire	124	0.8	9.1	
New Jersey	353	2.3	4.0	
New York City ¶	1,114	7.2	13.3	
New York State ¶	935	6.0	8.4	19
Pennsylvania	662	4.2	5.2	25
Rhode Island	56	0.4	5.3	1
Vermont	NR			
Midwest	**3,323**	**21.3**	**6.0**	**33**
Illinois	NR			
Indiana	239	1.5	3.6	
Iowa	260	1.7	8.2	
Kansas	128	0.8	4.4	
Michigan	459	2.9	4.6	4
Minnesota	508	3.3	9.1	22
Missouri	255	1.6	4.2	
Nebraska	126	0.8	6.5	
North Dakota	49	0.3	6.4	2
Ohio	509	3.3	4.4	5
South Dakota	114	0.7	12.9	
Wisconsin	676	4.3	11.6	
South	**3,266**	**21.0**	**4.8**	**116**

Alabama	218	1.4	4.5	
Arkansas	140	0.9	4.6	
Delaware	24	0.2	2.5	
District of Columbia	92	0.6	13.1	
Florida	1105	7.1	5.2	115
Georgia	651	4.2	6.2	
Kentucky	NR			
Louisiana	222	1.4	4.8	
Maryland	165	1.1	2.7	
Mississippi	NR			
North Carolina	NR			
Oklahoma	NR			
South Carolina	210	1.3	4.1	1
Tennessee	NR			
Texas	NR			
Virginia	334	2.1	3.9	
West Virginia	105	0.7	5.8	
Northwest	**1,107**	**7.1**	**7.0**	**8**
Alaska	71	0.5	9.6	
Idaho	138	0.9	7.9	7
Montana	89	0.6	8.4	
Oregon	323	2.1	7.7	
Washington	438	2.8	5.8	1

Wyoming	48	0.3	8.3	
Southwest	**3,719**	**23.9**	**6.0**	**20**
Arizona	149	1.0	2.1	
California	2,607	16.7	6.6	
Colorado	530	3.4	9.3	4
Hawaii	43	0.3	3.0	1
Nevada	80	0.5	2.6	
New Mexico	77	0.5	3.7	
Utah	233	1.5	7.4	15
Total	**15,579**	**100**	**6.1**	**223**

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Abbreviation NR = Not Reportable

* Percentages might not total 100% because of rounding
§ Cases per 100,000 population
¶ New York State and New York City data are mutually exclusive

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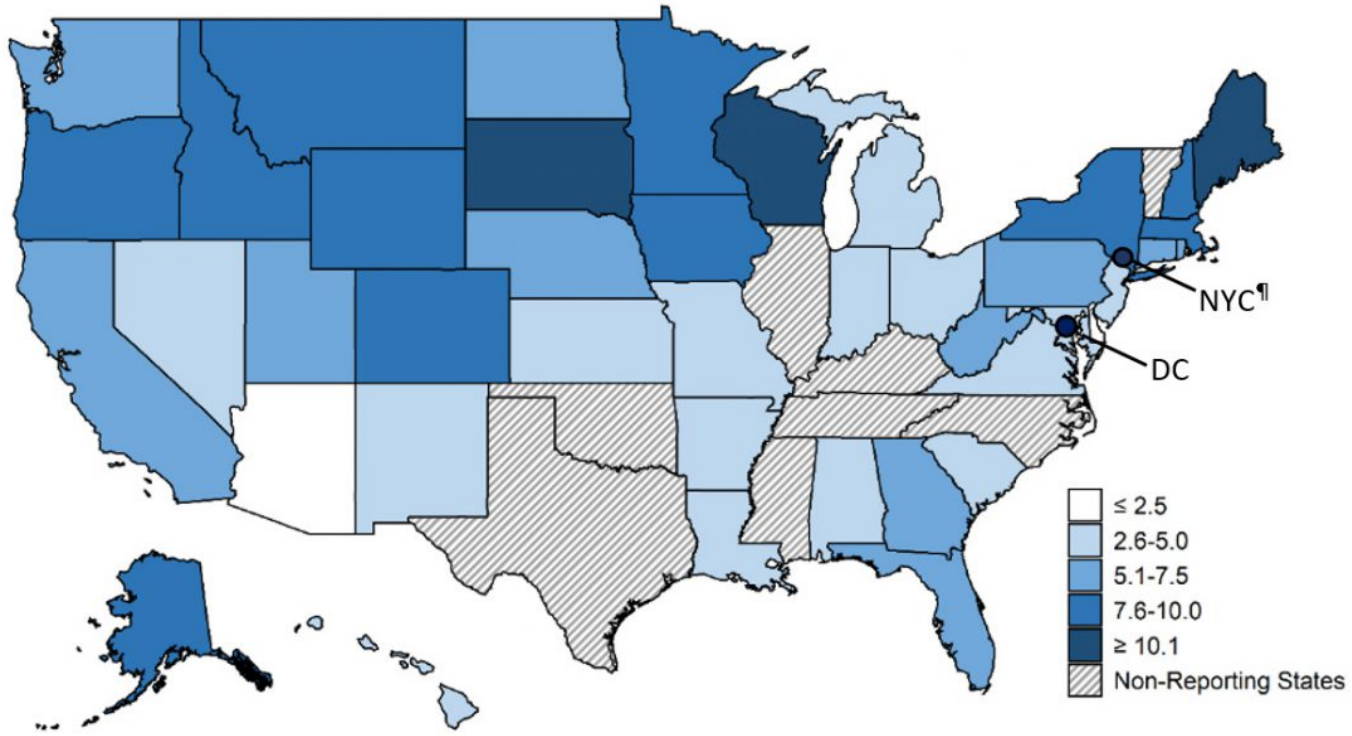
By jurisdiction, giardiasis incidence ranged from 2.1 per 100,000 population in Arizona to 13.3 per 100,000 population in New York City. By region, incidence of reported giardiasis cases ranged from 4.8 cases per 100,000 population in the South to 7.5 in the Northeast. Differences in incidence might reflect differences in risk factors or mode of transmission of Giardia; the magnitude of outbreaks; or the capacity or requirements to detect, investigate, and report cases.

Figure 2. Incidence * of giardiasis cases, by reporting jurisdiction — National Notifiable Diseases Surveillance System, United States, 2018 (n=15,579 §)



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* Cases per 100,000 population
§ Non-reporting states included Illinois, Kentucky, Mississippi, North Carolina, Oklahoma, Tennessee, Texas, and Vermont
¶ New York State and New York City data are mutually exclusive

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

Table 2. Number and percentage * of giardiasis cases, by selected patient demographic characteristics — National Notifiable Diseases Surveillance System, United States, 2018 (n = 15,579)

Characteristic	No.	%
Sex		

Male	9,561	61.4
Female	5,966	38.3
Missing	52	0.3
Race		
American Indian/Alaska Native	94	0.6
Asian/Pacific Islander	374	2.4
Black	980	6.3
White	7,871	50.5
Other	1,917	12.3
Missing	4,343	27.9
Ethnicity		
Hispanic	1,270	8.2
Non-Hispanic	7,731	49.6
Missing	6,578	42.2
Total	**15,579**	**100.0**

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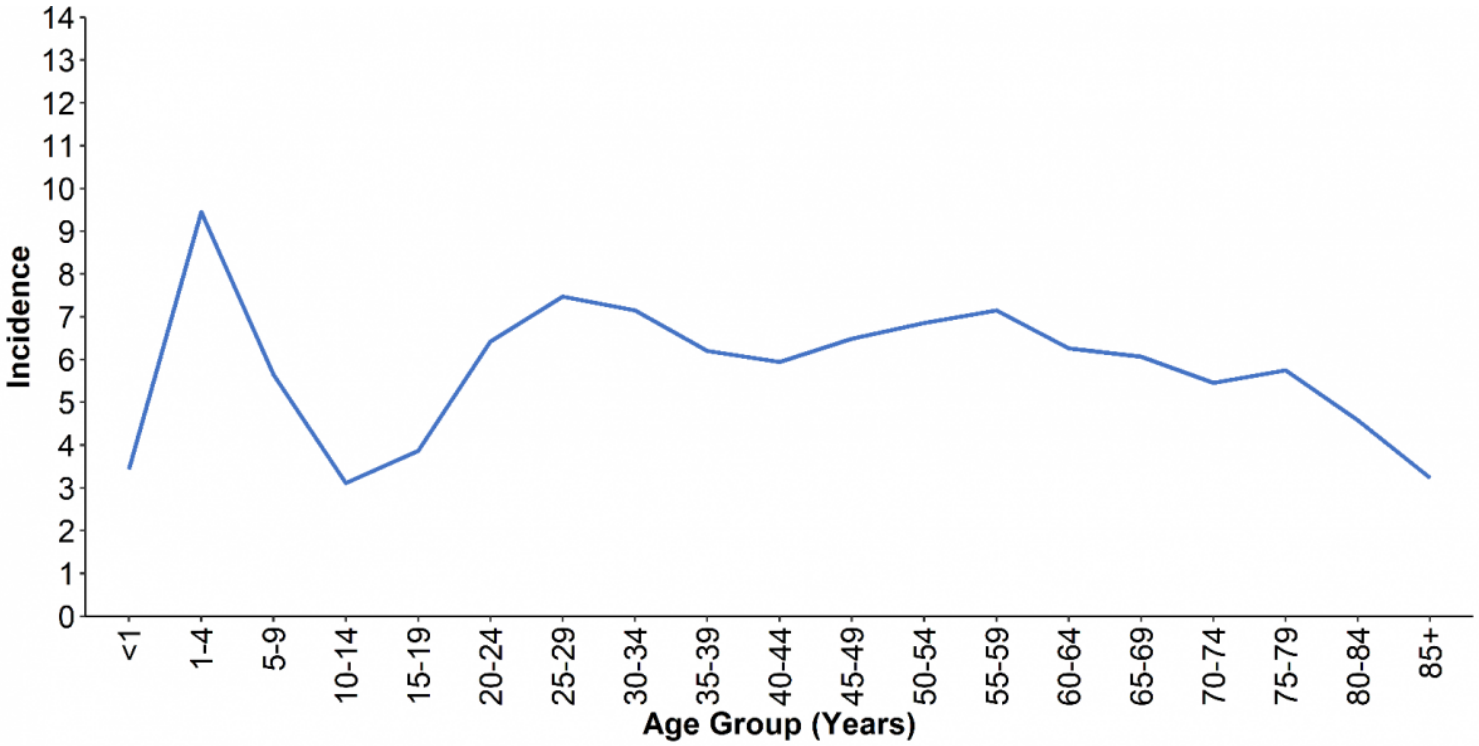
* Percentages might not total 100% because of rounding

During 2018, a total of 9,561 patients were male (61.4%) and 5,966 (38.3%) were female; 52 (0.3%) were missing data on sex. The majority of cases for whom data on race were available occurred among the classifications white (70.1%), black (8.7%), and Asian/Pacific Islander (3.3%). Data on race were not included for 27.9% of total annual case reports, and data on ethnicity were missing for 42.2% of case reports. The majority of patients for whom data on ethnicity were available were non-Hispanic (85.9%).

Figure 3. Incidence * of giardiasis cases, by age group — National Notifiable Diseases Surveillance System, United States, 2018 (n = 15,569 §)



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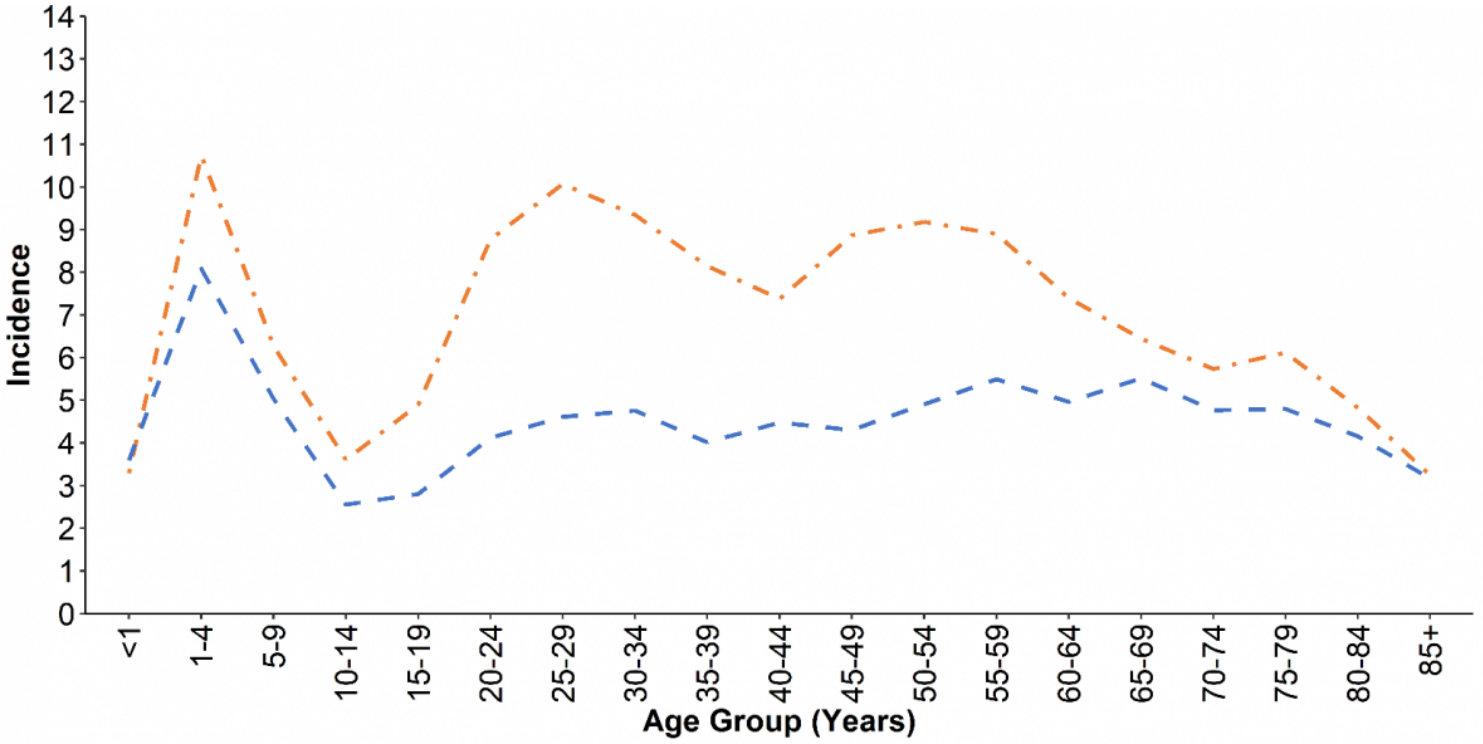
* Cases per 100,000 population
§ Age data missing for 10 patients

In 2018, the incidence of reported giardiasis cases was highest among patients aged 1-4 years, 25-29 years, and 55-59 years (incidence = 9.5, 7.5, and 7.2 cases per 100,000 population, respectively).

Figure 4. Incidence * of giardiasis cases, by sex and age group — National Notifiable Diseases Surveillance System, United States, 2018 (n = 15,518 §)



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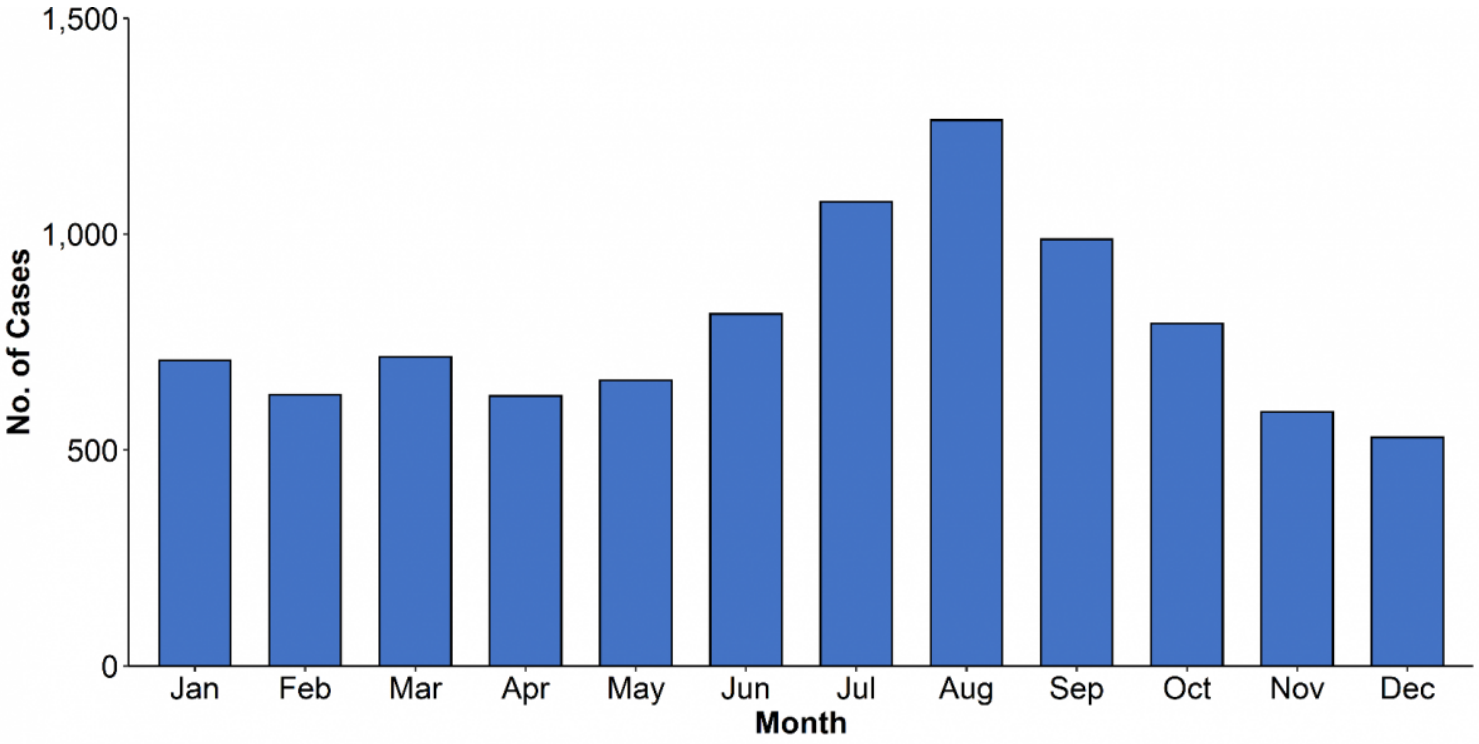
* Cases per 100,000 population
§ Age or sex data missing for 61 patients

Among both males and females, the highest incidence of giardiasis was among those ages 1–4 years (10.7 and 8.1 cases per 100,000 population, respectively). Rates were highest among males in every age group aside from the <1 year age group. The difference was most pronounced between sexes aged 25-29 years, with males presenting with 5.5 additional cases of giardiasis per 100,000 population compared to females.

Figure 5. Number of giardiasis cases, by date of symptom onset — National Notifiable Diseases Surveillance System, United States, 2018 (n = 9,389 *)



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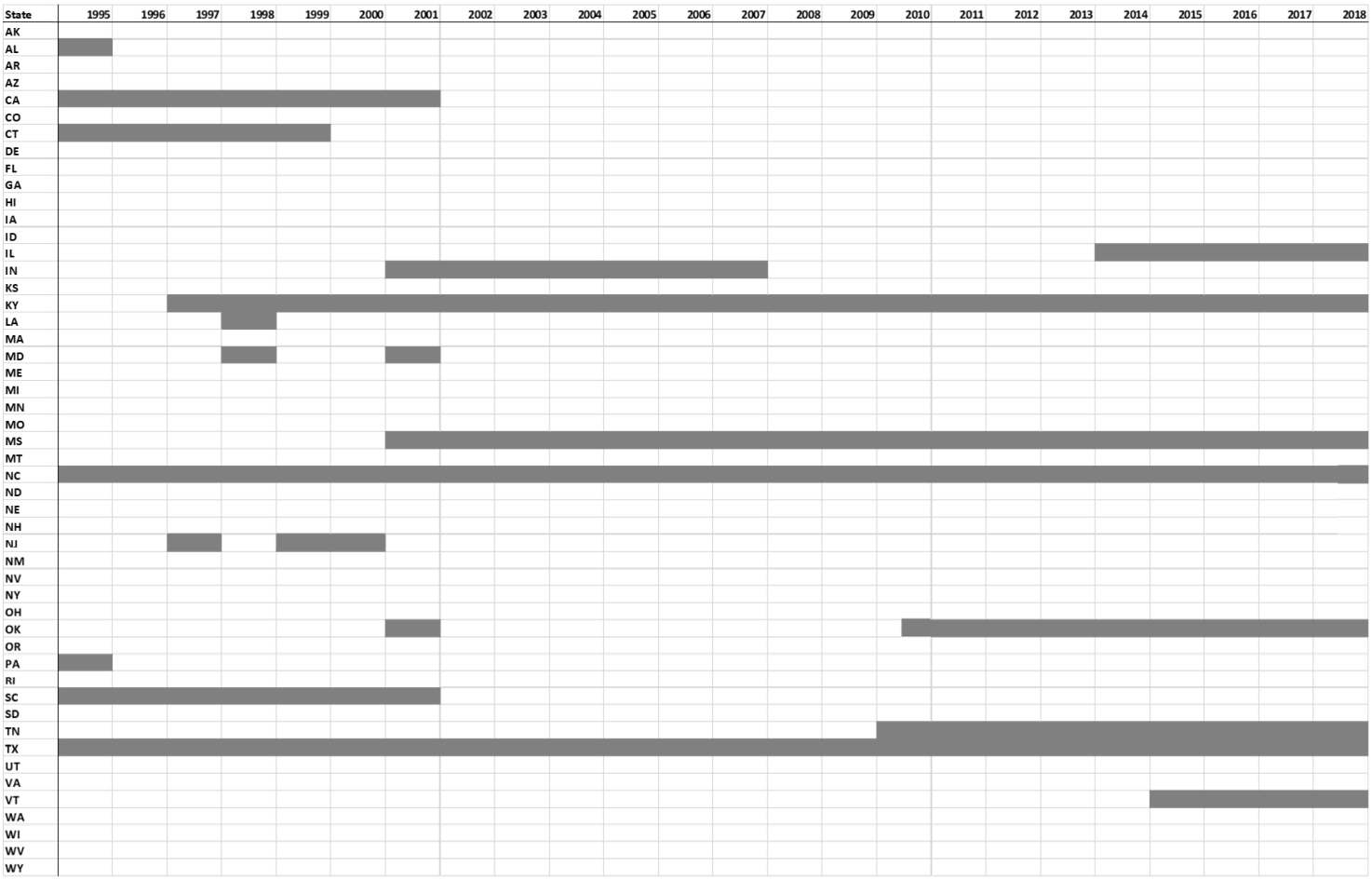
* Date of symptom onset data missing for 6,190 patients

In 2018, the majority of cases by symptom onset occurred between June and October, with a peak in August (n=1,264).

Supplemental Table

Table S1. Giardiasis reporting and non-reporting states (gray shading) — National Notifiable Diseases Surveillance System, United States, 1995–2018



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