GIARDIASIS
SUMMARY REPORT

2017
NATIONAL NOTIFIABLE DISEASES
SURVEILLANCE SYSTEM, UNITED STATES

Centers for Disease
Control and Prevention
National Center for Emerging and
Zoonotic Infectious Diseases

CS303400

Suggested Citation

Centers for Disease Control and Prevention (CDC). Giardiasis Summary Report —National Notifiable Diseases Surveillance System, United States, 2017. Atlanta, Georgia: U.S. Department of Health and Human Services, CDC, 2019.

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Data are presented for cases of giardiasis reported to CDC through October 9, 2018.

Findings and conclusions from this report do not necessarily represent the official position of the Centers for Disease Control and Prevention.

Contents

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 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 territories, and Freely Associated States 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 2017 were analyzed using R version 3.5.1 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, 8*) 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 (*9*). 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 2017) and case status (confirmed or nonconfirmed). Average annual giardiasis rates were calculated by demographic variables (e.g., age and sex) and by month of symptom onset. Rates were not calculated for some variables (race and ethnicity) because 32.2% of race data and 37.4% of ethnicity data were missing. 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

The authors gratefully acknowledge Julia Painter and Jonathan Yoder for their assistance in summarizing the annual reporting of giardiasis by state through previous work on the Domestic Epidemiology Team, Waterborne Disease Prevention Branch, CDC. This report is based on contributions by state and local epidemiologists and microbiologists.

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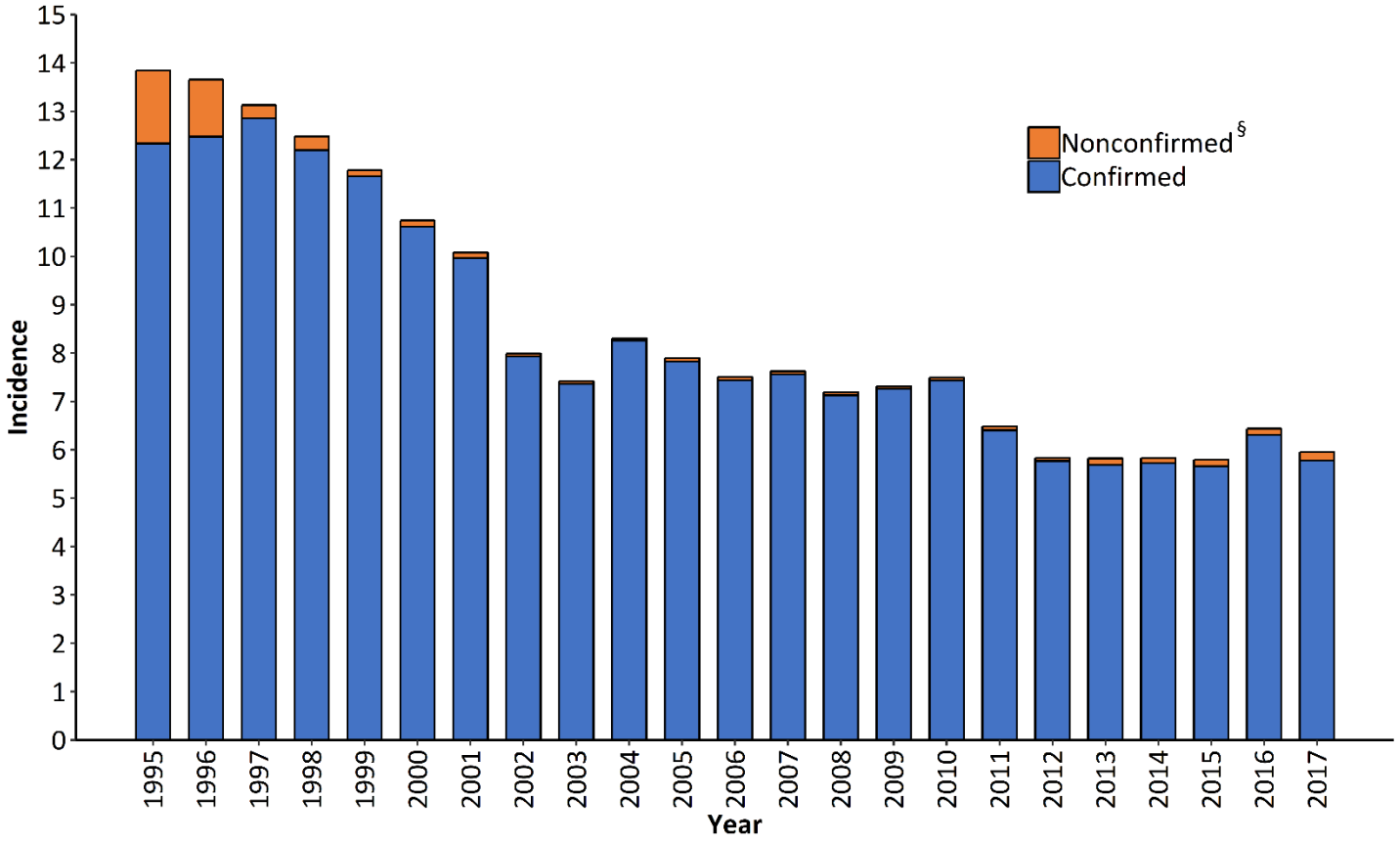
Tables and Figures

Figure 1. Incidence* of giardiasis cases, by year and case classification — National Notifiable Diseases Surveillance System, United States, 1995–2017 (n = 450,516)



* 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 2017, there were 15,214 reported giardiasis cases in the United States (97.1% confirmed and 2.9% nonconfirmed).

Table 1. Number, percentage[*], and incidence[§] of giardiasis cases, by region and jurisdiction — National Notifiable Diseases Surveillance System, United States, 2017 (n = 15,214)

Region/Jurisdiction	No.	%	Rate	No. of outbreak associated cases
Northeast	**3,832**	**25.2**	**6.9**	**44**
Connecticut	221	1.5	6.2	
Maine	129	0.8	9.7	
Massachusetts	551	3.6	8.0	3
New Hampshire	115	0.8	8.6	
New Jersey	377	2.5	4.2	
New York City[¶]	975	6.4	11.3	
New York State[¶]	866	5.7	7.7	29
Pennsylvania	553	3.6	4.3	12
Rhode Island	45	0.3	4.2	
Vermont	NR			
Midwest	**3,386**	**22.3**	**6.1**	**13**
Illinois	NR			
Indiana	192	1.3	2.9	5
Iowa	273	1.8	8.7	
Kansas	104	0.7	3.6	
Michigan	560	3.7	5.6	2
Minnesota	643	4.2	11.5	3
Missouri	242	1.6	4.0	
Nebraska	131	0.9	6.8	
North Dakota	36	0.2	4.8	1
Ohio	423	2.8	3.6	2
South Dakota	104	0.7	12.0	
Wisconsin	678	4.5	11.7	
South	**2,957**	**19.4**	**4.4**	**109**
Alabama	191	1.3	3.9	
Arkansas	151	1.0	5.0	
Delaware	29	0.2	3.0	
District of Columbia	56	0.4	8.1	
Florida	997	6.6	4.8	102
Georgia	603	4.0	5.8	
Kentucky	NR			
Louisiana	221	1.5	4.7	
Maryland	168	1.1	2.8	7
Mississippi	NR			
North Carolina	NR			
Oklahoma	NR			
South Carolina	156	1.0	3.1	
Tennessee	NR			
Texas	NR			
Virginia	284	1.9	3.4	
West Virginia	101	0.7	5.6	
Northwest	**1,434**	**9.4**	**9.2**	**23**
Alaska	90	0.6	12.2	2
Idaho	160	1.1	9.3	9
Montana	125	0.8	11.9	1

Oregon	346	2.3	8.4	11
Washington	669	4.4	9.0	
Wyoming	44	0.3	7.6	
Southwest	**3,605**	**23.7**	**5.8**	**1**
Arizona	145	1.0	2.1	
California	2,548	16.7	6.4	
Colorado	510	3.4	9.1	
Hawaii	53	0.3	3.7	
Nevada	46	0.3	1.5	
New Mexico	99	0.7	4.7	
Utah	204	1.3	6.6	1
Total	**15,214**	**100.0**	**6.0**	**190**

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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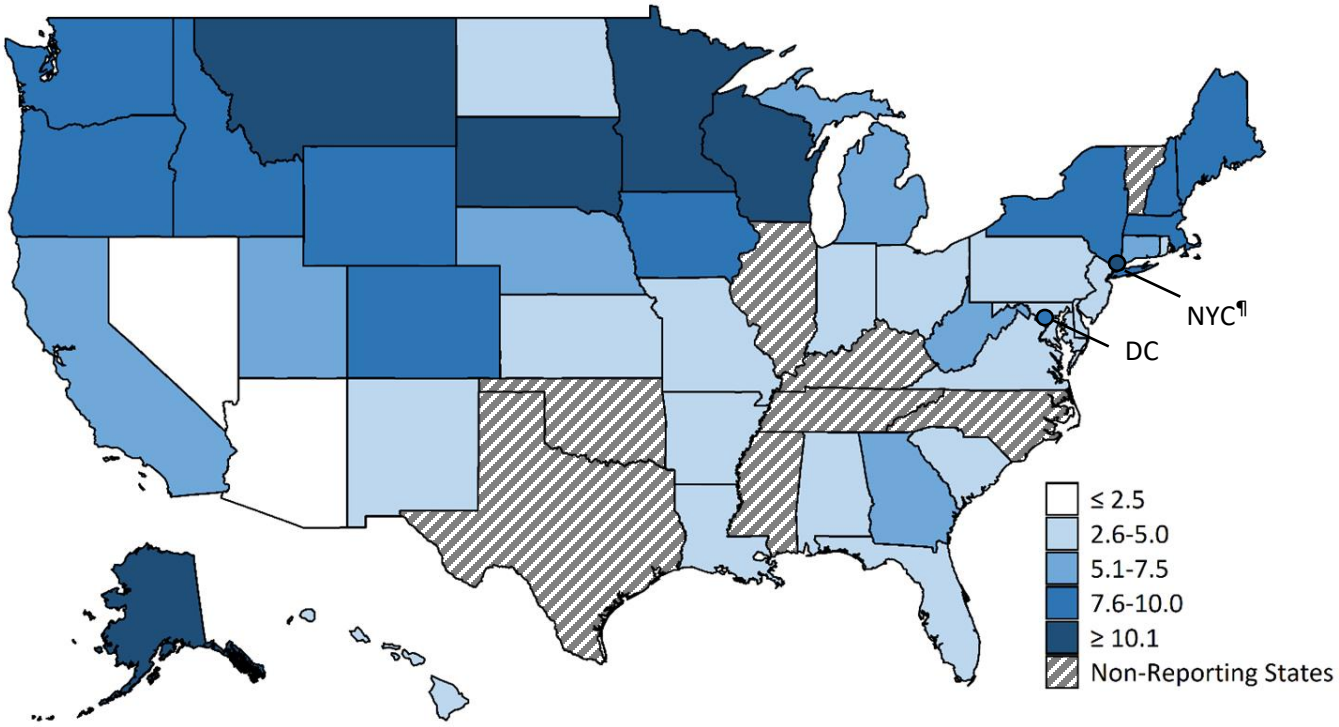
By jurisdiction, giardiasis incidence ranged from 1.5 per 100,000 population in Nevada to 12.2 per 100,000 population in Alaska. Previously, the highest rates were reported in Vermont (35.6 in 2011 and 29.2 in 2012), however Vermont did not report giardiasis cases in 2016 and 2017 (Supplemental Table 1). By region, incidence of reported giardiasis cases ranged from 4.4 cases per 100,000 population in the South to 9.2 in the Northwest. 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, 2017 (n=15,214[§])



[*] 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

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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, 2017 (n = 15,214)

Characteristic	No.	%
Sex		
Male	9,366	61.6
Female	5,801	38.1
Missing	47	0.3
Race		
American Indian/Alaska Native	76	0.5
Asian/Pacific Islander	427	2.8
Black	1,202	7.9
White	7,750	50.9
Other	864	5.7
Missing	4,895	32.2
Ethnicity		
Hispanic	1,064	7.0
Non-Hispanic	8,454	55.6
Missing	5,696	37.4
Total	**15,214**	**100.0**

* Percentages might not total 100% because of rounding

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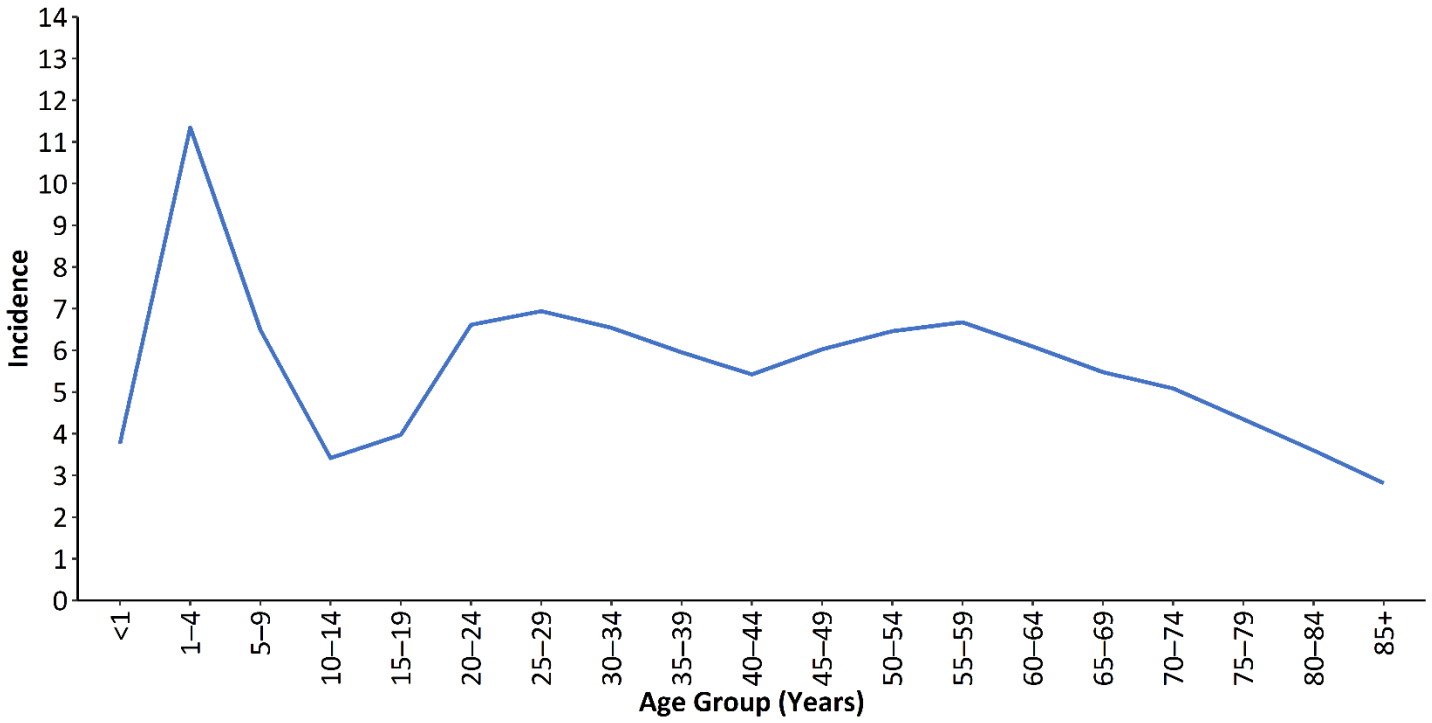
During 2017, a total of 9,366 patients were male (61.6%) and 5,801 (38.1%) were female; 47 (0.3%) were missing data on sex. The majority of cases for which data on race were available occurred among the classifications white (50.9%), black (7.9%), and Asian/Pacific Islander (2.8%). Data on race were not included for 32.2% of total annual case reports, and data on ethnicity were missing for 37.4% of case reports. The majority of patients were non-Hispanic (55.6%).

Figure 3. Incidence[*] of giardiasis cases, by age group — National Notifiable Diseases Surveillance System, United States, 2017 (n = 15,189[§])

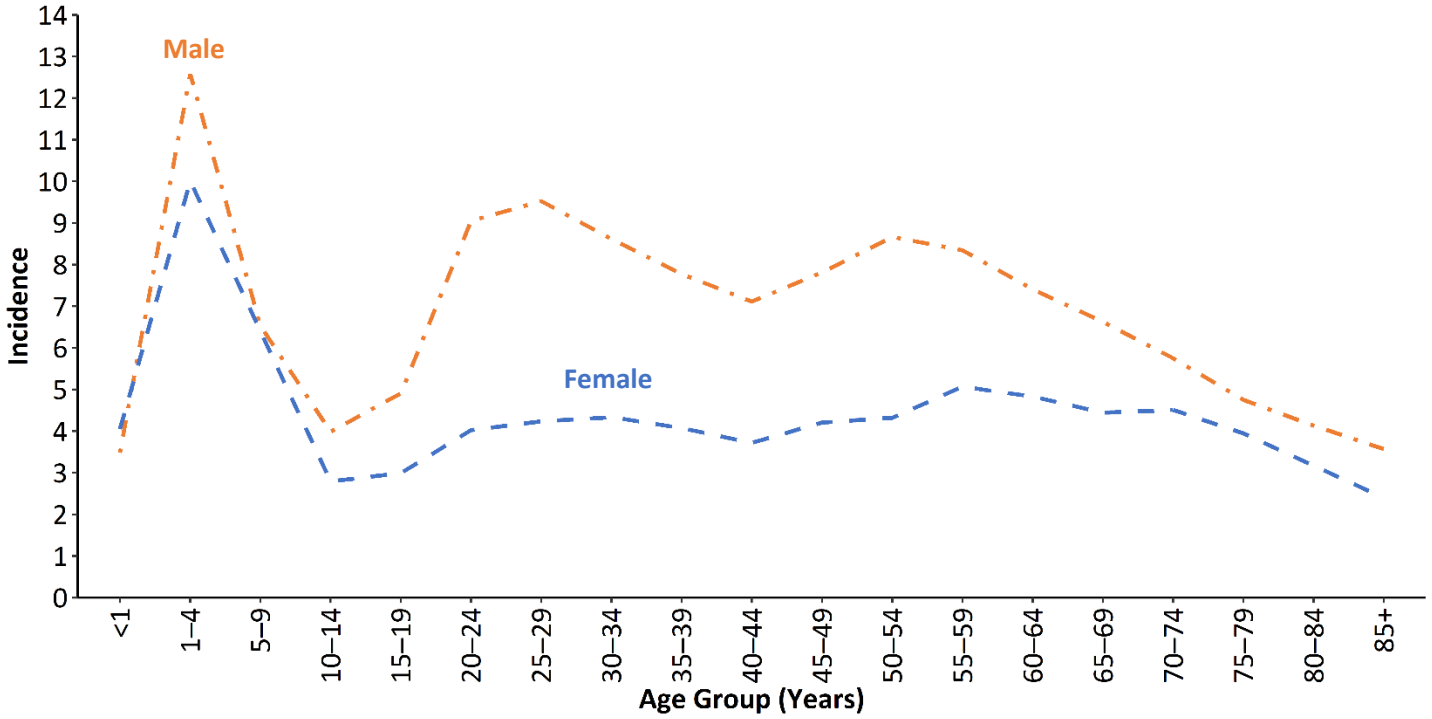


[*] Cases per 100,000 population

[§] Age data missing for 25 patients

In 2017, the incidence of reported giardiasis cases was highest among patients aged 1-4 years, 25-29 years, and 55-59 years (Incidence = 11.4, 6.9, and 6.7 cases per 100,000 population, respectively).

Figure 4. Incidence[*] of giardiasis cases, by sex and age group — National Notifiable Diseases Surveillance System, United States, 2017 (n = 15,143[§])

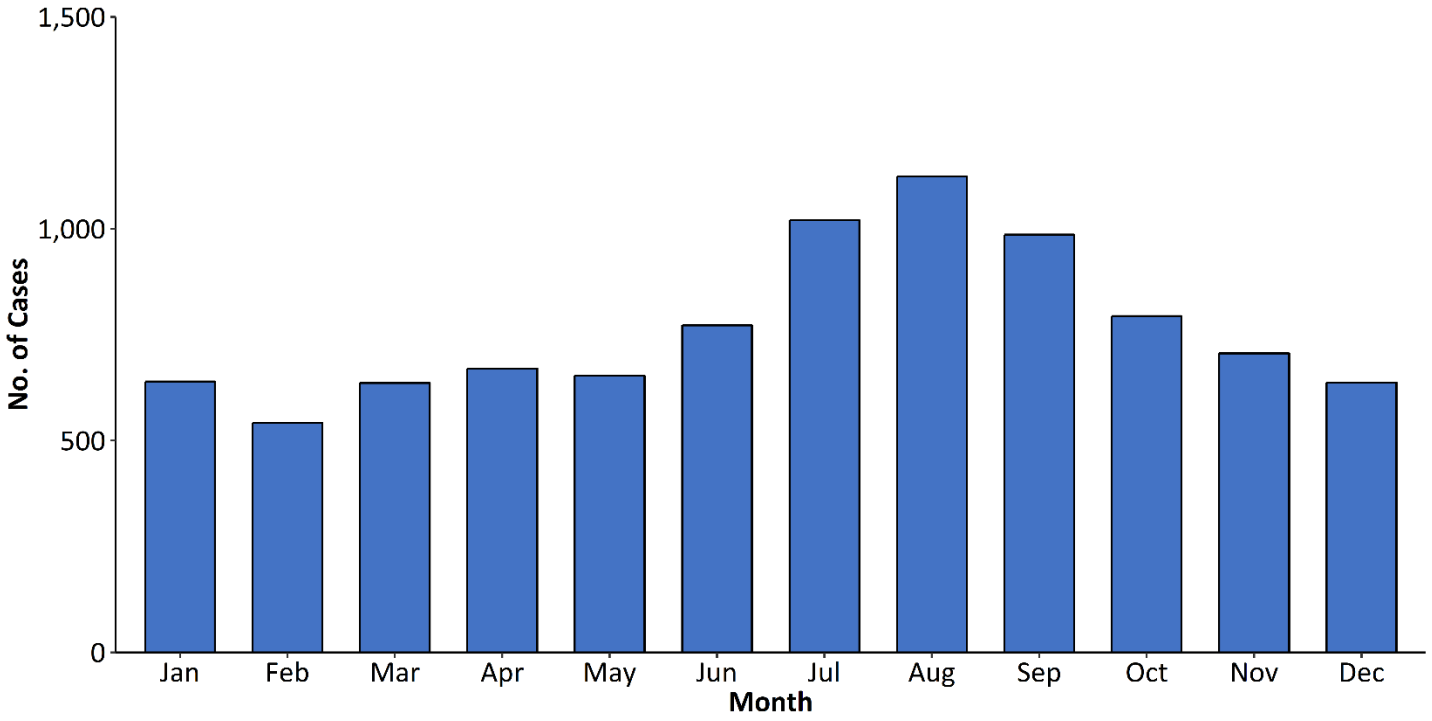


[*] Cases per 100,000 population

[§] Age or sex data missing for 71 patients

Rates were highest among males in almost every age group. The difference was most pronounced among males aged 25-29 years.

Figure 5. Number of giardiasis cases, by date of symptom onset — National Notifiable Diseases Surveillance System, United States, 2017 (n = 9,178*)



* Date of symptom onset data missing for 6,036 patients

In 2017, the majority of cases by symptom onset occurred between June and October, with a peak in August (n=1,123).

Supplemental Table

Table 1. Giardiasis reporting and non-reporting states (gray shading) — National Notifiable Diseases Surveillance System, United States, 1995–2017