

GIARDIASIS

SUMMARY REPORT



2014

NATIONAL NOTIFIABLE DISEASES
SURVEILLANCE SYSTEM, UNITED STATES



Centers for Disease
Control and Prevention
National Center for Emerging and
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Report Compiled By

Michelle E. Gleason, MPH; Ariana Perez, MPH; Gabriella Veytsel, MPH; Sarah A. Collier, MPH; Zachary A. Marsh, MPH; Michele C. Hlavsa, RN, MPH; Jennifer R. Cope, MD, MPH; Kathleen E. Fullerton, MPH; Kathy Benedict, DVM, PhD

Centers for Disease Control and Prevention

National Center for Emerging and Zoonotic Infections
Division of Foodborne, Waterborne, and Environmental Diseases
Waterborne Disease Prevention Branch
1600 Clifton Road, Atlanta, GA 30329
E-mail: healthywater@cdc.gov

Data are presented for cases of giardiasis for the year 2014 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.

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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 \(NNSS\)](#). 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 2014 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) 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 2014) 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., 39.1%, 44.9%, and 46.9%, 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

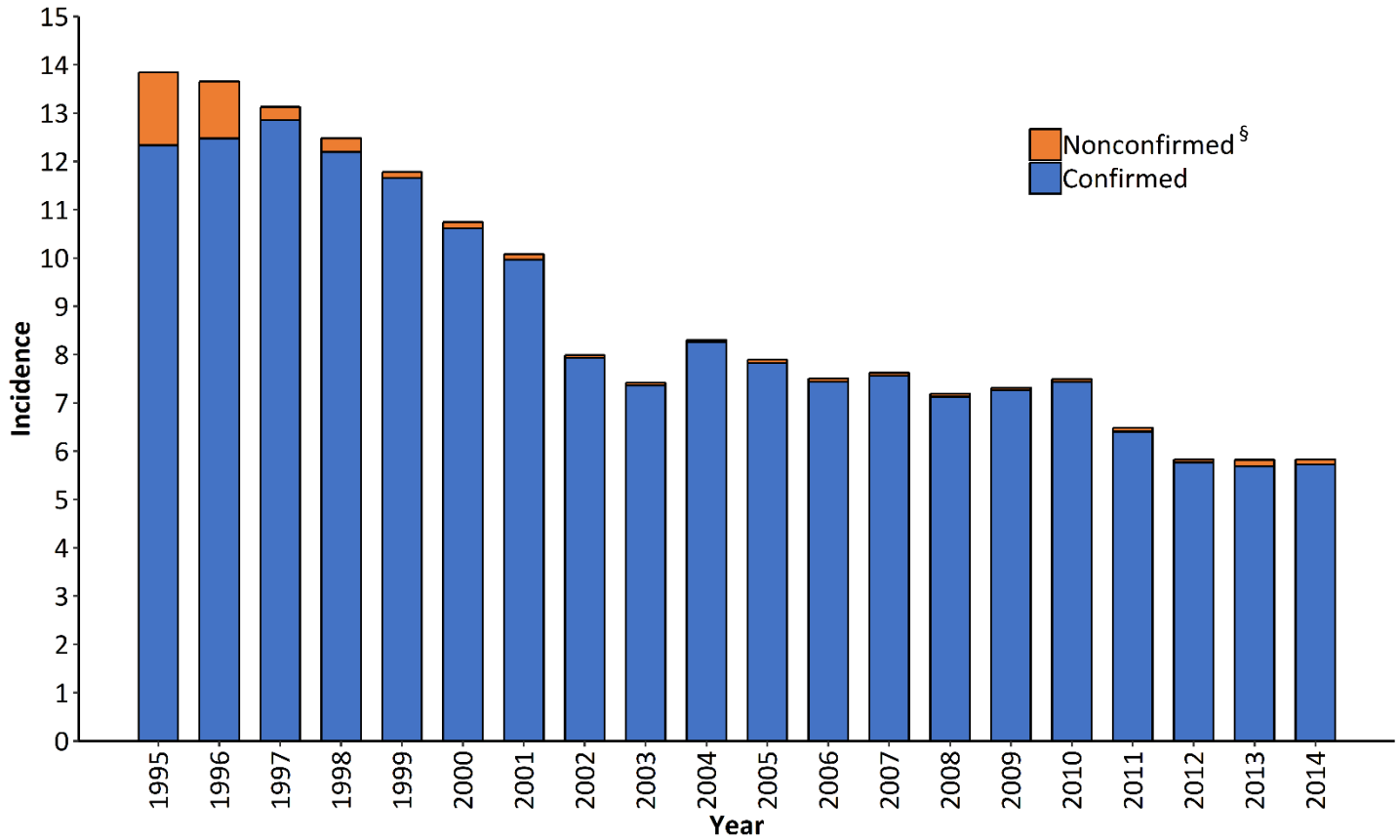
The authors gratefully acknowledge Julia Painter and Jonathan Yoder for their assistance in summarizing the annual reporting of giardiasis by state through previous work on the Domestic Epidemiology Team, Waterborne Disease Prevention Branch, CDC. This report is based on contributions by state and local 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, 1995–2014 (n = 404,337) - Download raw data



* 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 2014, there were 14,624 reported giardiasis cases in the United States (98.3% confirmed and 1.7% nonconfirmed).

Table 1. Number, percentage*, and incidence[§] of giardiasis cases, by region and jurisdiction — National Notifiable Diseases Surveillance System, United States, 2014 (n = 14,624)

Region/Jurisdiction	No.	%	Incidence	No. of outbreak associated cases
Northeast	4,292	29.3	7.6	63
Connecticut	219	1.5	6.1	
Maine	154	1.1	11.6	
Massachusetts	709	4.8	10.5	1
New Hampshire	97	0.7	7.3	
New Jersey	384	2.6	4.3	
New York City [¶]	874	6.0	10.3	
New York State [¶]	951	6.5	8.5	37
Pennsylvania	722	4.9	5.6	25
Rhode Island	45	0.3	4.3	
Vermont	137	0.9	21.9	
Midwest	3,119	21.3	5.7	28
Illinois	NR			
Indiana	194	1.3	2.9	2
Iowa	205	1.4	6.6	
Kansas	104	0.7	3.6	
Michigan	506	3.5	5.1	
Minnesota	690	4.7	12.7	9
Missouri	228	1.6	3.8	
Nebraska	131	0.9	7.0	
North Dakota	39	0.3	5.3	
Ohio	385	2.6	3.3	2
South Dakota	132	0.9	15.5	
Wisconsin	505	3.5	8.8	15
South	3,238	22.1	5.0	113
Alabama	182	1.2	3.8	
Arkansas	113	0.8	3.8	
Delaware	24	0.2	2.6	
District of Columbia	78	0.5	11.8	
Florida	1,165	8.0	5.9	107
Georgia	656	4.5	6.5	
Kentucky	NR			
Louisiana	280	1.9	6.0	1
Maryland	268	1.8	4.5	
Mississippi	NR			
North Carolina	NR			
Oklahoma	NR			
South Carolina	150	1.0	3.1	
Tennessee	NR			
Texas	NR			
Virginia	256	1.8	3.1	
West Virginia	66	0.5	3.6	5
Northwest	1,225	8.4	8.2	12
Alaska	89	0.6	12.1	
Idaho	154	1.1	9.4	12
Montana	90	0.6	8.8	

Oregon	351	2.4	8.9	
Washington	515	3.5	7.3	
Wyoming	26	0.2	4.5	
Southwest	2,750	18.8	4.6	8
Arizona	119	0.8	1.8	
California	1,852	12.7	4.8	
Colorado	332	2.3	6.2	4
Hawaii	43	0.3	3	
Nevada	65	0.4	2.3	
New Mexico	114	0.8	5.5	
Utah	225	1.5	7.7	4
Total	14,624	100	5.8	224

Abbreviation NR = Not Reportable

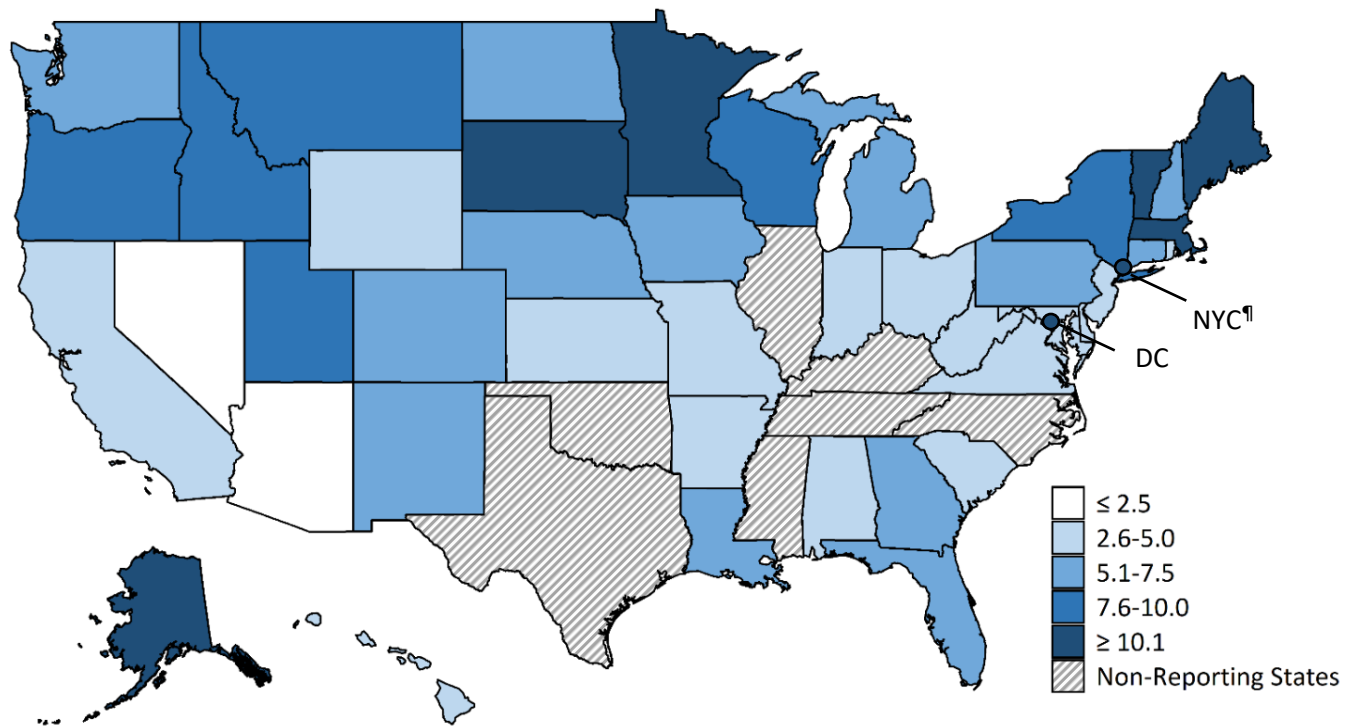
* Percentages might not total 100% because of rounding

§ Cases per 100,000 population

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

By jurisdiction, giardiasis incidence ranged from 1.8 per 100,000 population in Arizona to 21.9 per 100,000 population in Vermont. By region, incidence of reported giardiasis cases ranged from 4.6 cases per 100,000 population in the Southwest to 8.2 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, 2014 (n=14,624[§]) - Download raw data



* Cases per 100,000 population

[§] Non-reporting states included Illinois, Kentucky, Mississippi, North Carolina, Oklahoma, Tennessee, and Texas

[¶] 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.

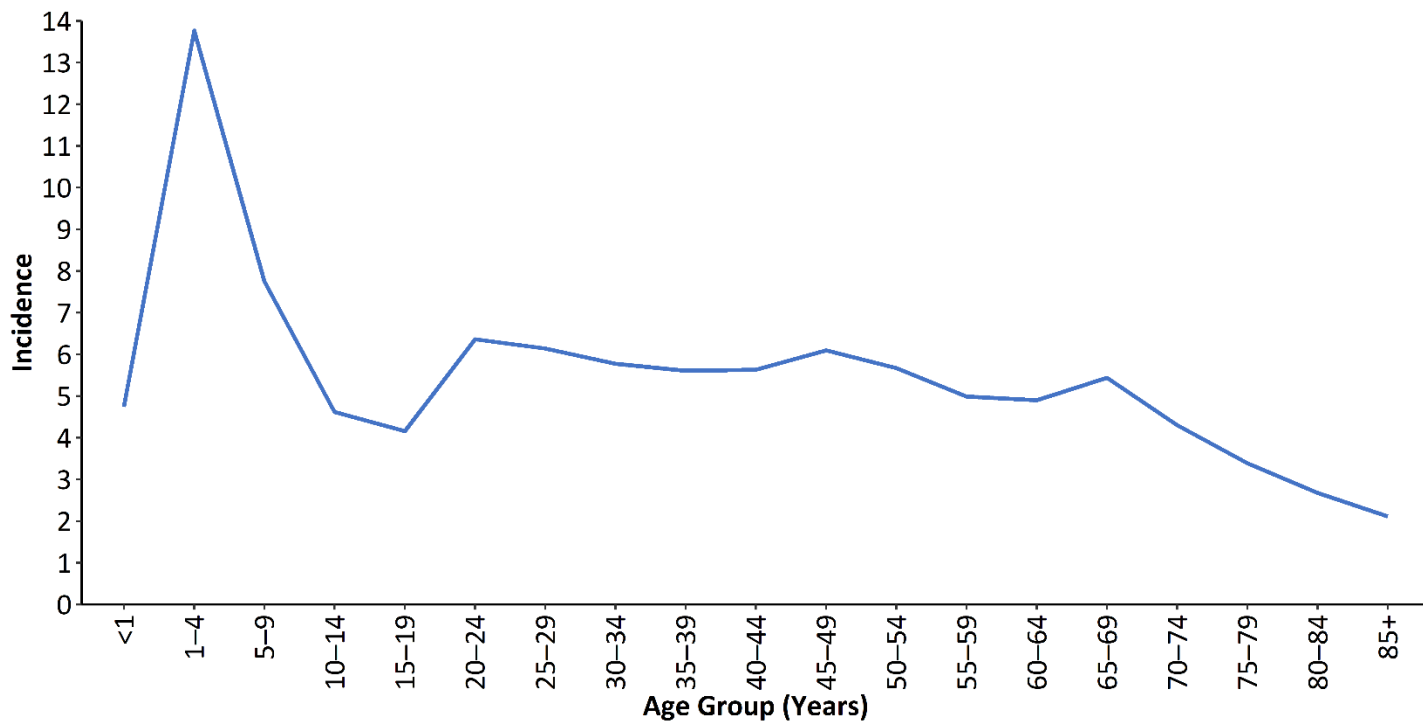
Table 2. Number and percentage* of giardiasis cases, by selected patient demographic characteristics — National Notifiable Diseases Surveillance System, United States, 2014 (n = 14,624)

Characteristic	No.	%
Sex		
Male	8,688	59.4
Female	5,746	39.3
Missing	190	1.3
Race		
American Indian/Alaska Native	80	0.5
Asian/Pacific Islander	673	4.6
Black	1,172	8.0
White	6,745	46.1
Other	655	4.5
Missing	5,299	36.2
Ethnicity		
Hispanic	1,153	7.9
Non-Hispanic	7,387	50.5
Missing	6,084	41.6
Total	14,624	100.0

* Percentages might not total 100% because of rounding

During 2014, a total of 8,688 patients were male (59.4%) and 5,746 (39.3%) were female; 190 (1.3%) were missing data on sex. The majority of cases for whom data on race were available occurred among the classifications white (72.3%), black (12.6%), and Asian/Pacific Islander (7.2%). Data on race were not included for 36.2% of total annual case reports, and data on ethnicity were missing for 41.6% of case reports. The majority of patients for whom data on ethnicity were available were non-Hispanic (86.5%).

Figure 3. Incidence* of giardiasis cases, by age group — National Notifiable Diseases Surveillance System, United States, 2014 (n = 14,549[§]) - Download raw data

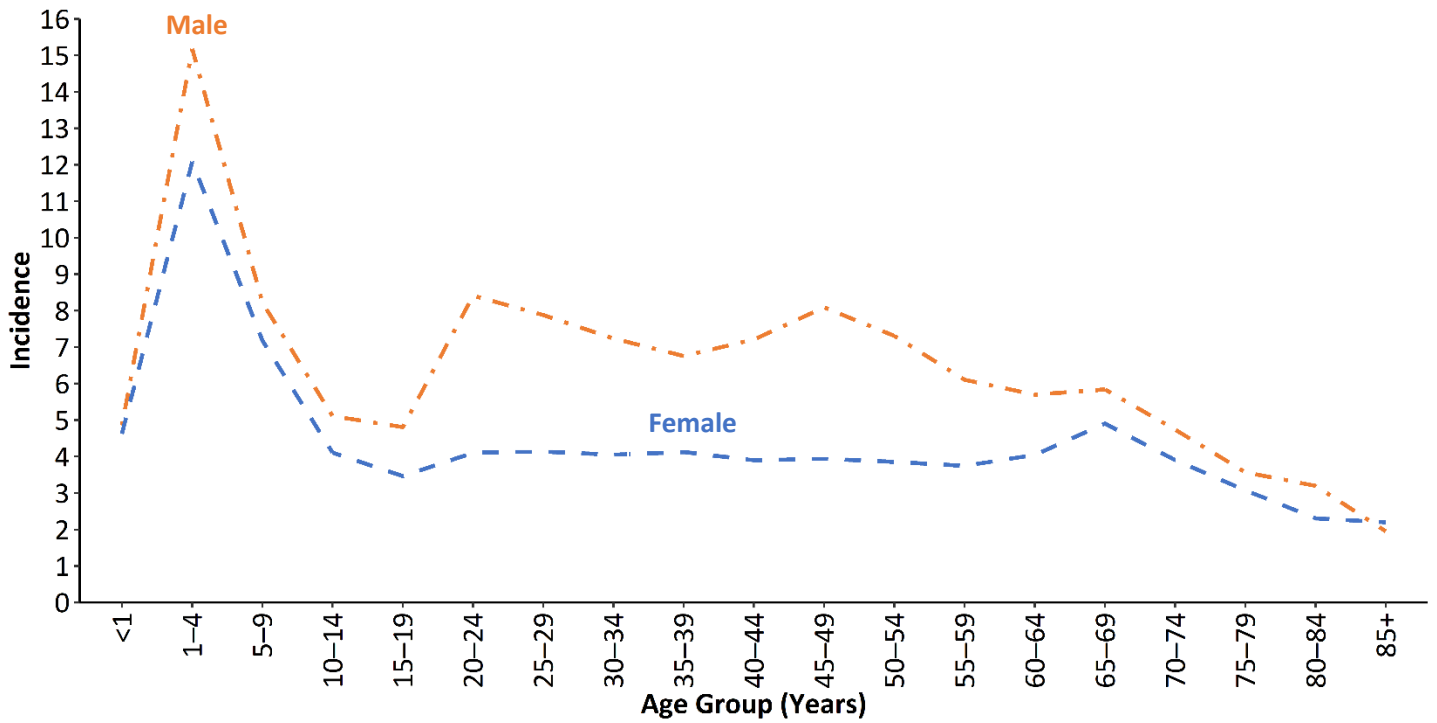


* Cases per 100,000 population

[§] Age data missing for 75 patients

In 2014, the incidence of reported giardiasis cases was highest among patients aged 1-4 years, 5-9 years, and 20-24 years (Incidence = 13.8, 7.8, and 6.4 cases per 100,000 population, respectively).

Figure 4. Incidence* of giardiasis cases, by sex and age group — National Notifiable Diseases Surveillance System, United States, 2014 (n = 14,361[§]) - Download raw data

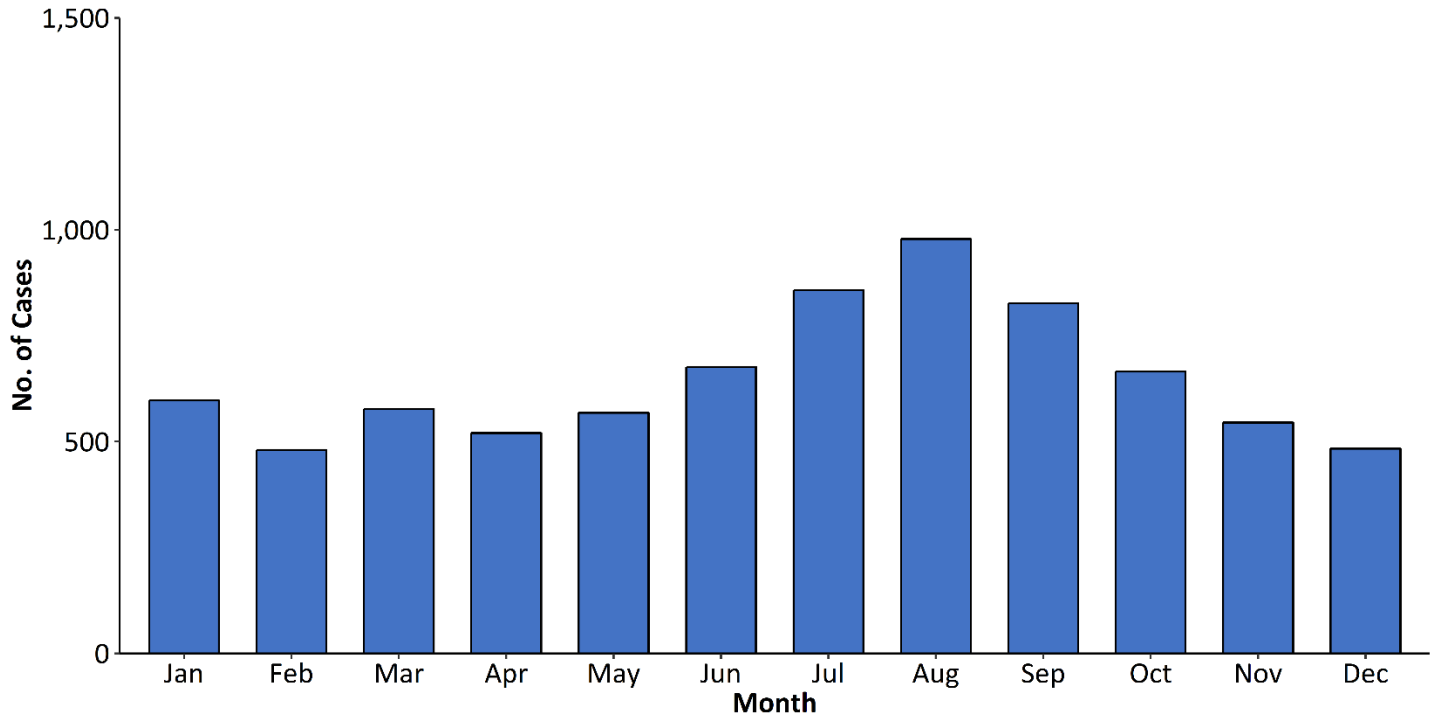


* Cases per 100,000 population

[§] Age or sex data missing for 263 patients

Rates were highest among males in almost every age group. The difference was most pronounced between sexes aged 20-24 years.

Figure 5. Number of giardiasis cases, by date of symptom onset — National Notifiable Diseases Surveillance System, United States, 2014 (n = 7,772*) - Download raw data



* Date of symptom onset data missing for 6,852 patients

In 2014, the majority of cases by symptom onset occurred between June and October, with a peak in August (n=978).

Supplemental Table

Table S1. Giardiasis reporting and non-reporting states (gray shading) — National Notifiable Diseases Surveillance System, United States, 1995–2014

State	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	
AK																					
AL																					
AR																					
AZ																					
CA																					
CO																					
CT																					
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