Giardiasis NNDSS Summary Report for 2019

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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 1.1 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 2019 were analyzed using R version 4.0.3. 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*) and multiplying by 100,000. U.S. Census Bureau data were obtained using their Application Programming Interface and the R censusapi package (*7*–*8*). 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 (2010 to 2019) 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., 26.1%, 39.6%, and 40.1% 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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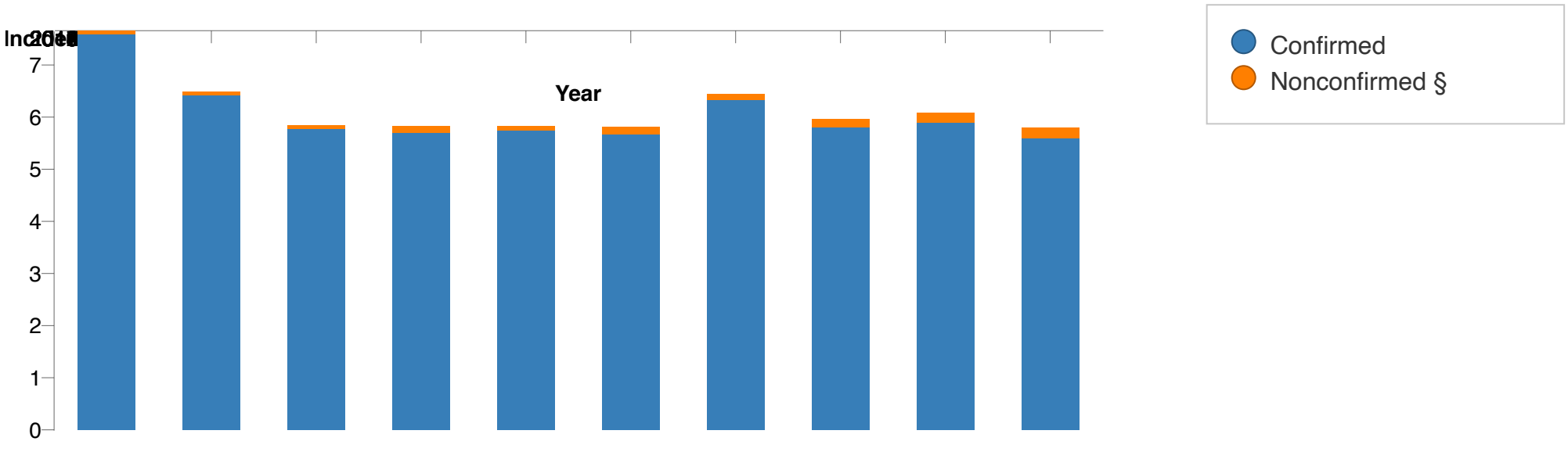
Tables and Figures

Figure 1. Incidence* of reported giardiasis cases, by year and case classification — National Notifiable Diseases Surveillance System, United States, 2010–2019 (N = 158,344)



Download Data [XLS – 921 B]

* 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 2019, there were 14,887 reported giardiasis cases in the United States (96.6% confirmed and 3.4% nonconfirmed).

Table 1. Number, percentage*, and incidence§ of reported giardiasis cases, by region and jurisdiction — National Notifiable Diseases Surveillance System, United States, 2019 (N = 14,887)

Region/Jurisdiction	No.	%	Incidence	No. of outbreak-associated cases
Northeast	**4,229**	**28.4**	**7.6**	**109**
Connecticut	188	1.3	5.3	N/A
Maine	142	1.0	10.6	N/A
Massachusetts	532	3.6	7.7	N/A
New Hampshire	97	0.7	7.1	N/A
New Jersey	436	2.9	4.9	N/A
New York State[¶]	1,018	6.8	9.2	11
New York City[¶]	1,202	8.1	14.4	92
Pennsylvania	536	3.6	4.2	6
Rhode Island	79	0.5	7.5	N/A
Vermont	NR	NR	NR	N/A
Midwest	**3,118**	**20.9**	**5.6**	**10**
Illinois	NR	NR	NR	N/A
Indiana	198	1.3	2.9	N/A
Iowa	269	1.8	8.5	N/A
Kansas	134	0.9	4.6	N/A
Michigan	423	2.8	4.2	N/A
Minnesota	574	3.9	10.2	10
Missouri	223	1.5	3.6	N/A
Nebraska	94	0.6	4.9	N/A
North Dakota	49	0.3	6.4	N/A
Ohio	424	2.8	3.6	N/A
South Dakota	92	0.6	10.4	N/A
Wisconsin	638	4.3	11.0	N/A
South	**2,958**	**19.9**	**4.4**	**93**
Alabama	160	1.1	3.3	N/A
Arkansas	132	0.9	4.4	N/A

Delaware	35	0.2	3.6	1
District of Columbia	75	0.5	10.6	N/A
Florida	1,088	7.3	5.1	89
Georgia	480	3.2	4.5	N/A
Kentucky	NR	NR	NR	N/A
Louisiana	256	1.7	5.5	N/A
Maryland	174	1.2	2.9	N/A
Mississippi	NR	NR	NR	N/A
North Carolina	NR	NR	NR	N/A
Oklahoma	NR	NR	NR	N/A
South Carolina	156	1.0	3.0	N/A
Tennessee	NR	NR	NR	N/A
Texas	NR	NR	NR	N/A
Virginia	300	2.0	3.5	1
West Virginia	102	0.7	5.7	2
Northwest	**933**	**6.3**	**5.8**	**24**
Alaska	76	0.5	10.4	N/A
Idaho	177	1.2	9.9	22
Montana	79	0.5	7.4	N/A
Oregon	284	1.9	6.7	1
Washington	288	1.9	3.8	1
Wyoming	29	0.2	5.0	N/A
Southwest	**3,649**	**24.5**	**5.9**	**5**
Arizona	143	1.0	2.0	N/A
California	2,603	17.5	6.6	N/A
Colorado	492	3.3	8.5	N/A
Hawaii	44	0.3	3.1	3
Nevada	85	0.6	2.8	N/A
New Mexico	88	0.6	4.2	N/A

Utah	194	1.3	6.1	2
Total	**14,887**	**100**	**5.8**	**241**

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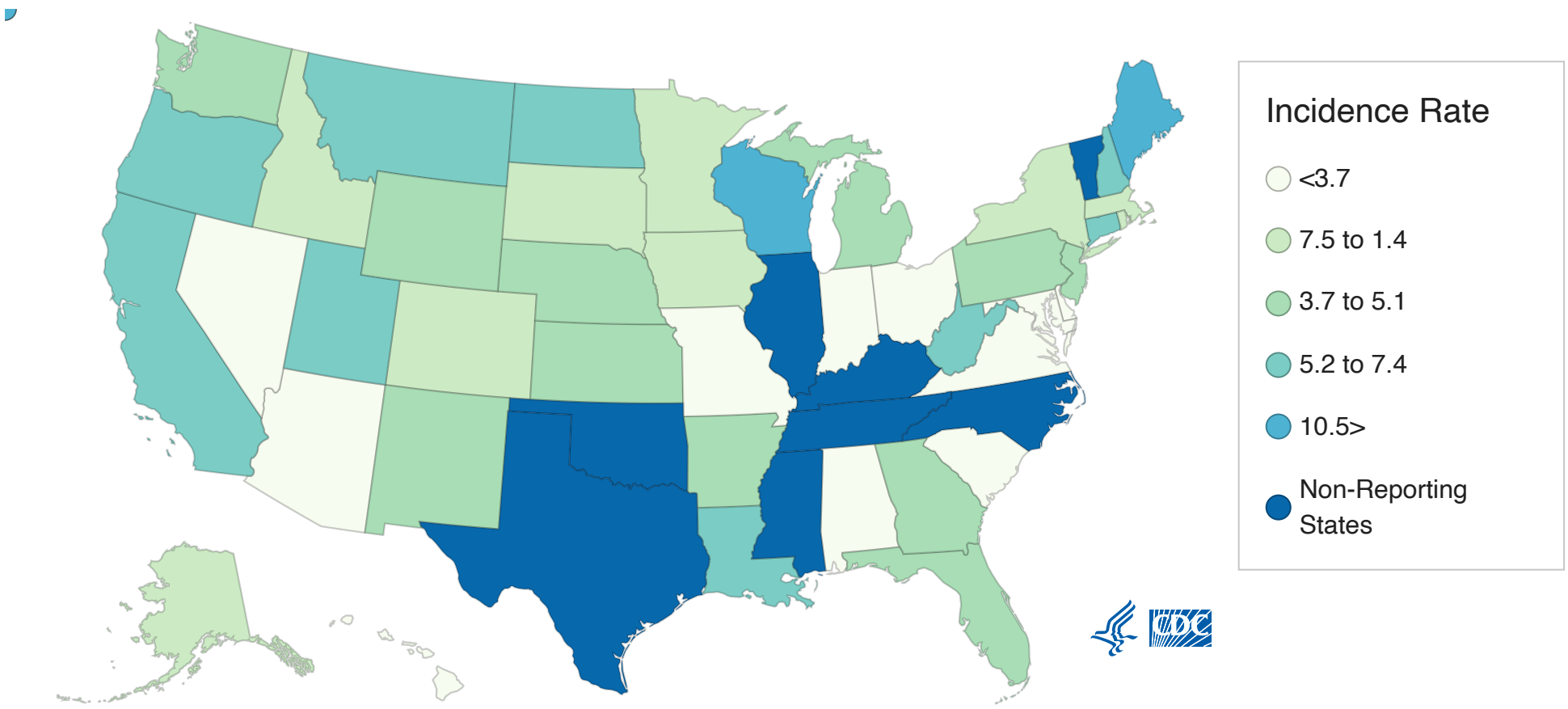
Abbreviation NR = Not Reportable

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

By jurisdiction, giardiasis incidence ranged from 2.0 per 100,000 population in Arizona to 14.4 per 100,000 population in New York City. By region, incidence of reported giardiasis cases ranged from 4.4 cases per 100,000 population in the South to 7.6 cases per 100,000 population 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 reported giardiasis cases, by reporting jurisdiction§ — National Notifiable Diseases Surveillance System, United States, 2019 (N=14,887)



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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 reported giardiasis cases, by selected patient demographic characteristics — National Notifiable Diseases Surveillance System, United States, 2019 (N = 14,887)

Characteristic	No.	%
Sex		
Male	9,314	62.6
Female	5,513	37.0
Unknown	60	0.4
Race		
American Indian or Alaska Native	78	0.5
Asian or Pacific Islander	470	3.2
Black	1,004	6.7
White	7,552	50.7
Other	1,894	12.7
Unknown	3,889	26.1
Ethnicity		
Hispanic or Latino	1,322	8.9
Not Hispanic or Latino	7,673	51.5
Unknown	5,892	39.6
Total	**14,887**	**100.0**

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* Percentages might not total 100% because of rounding

During 2019, a total of 9,314 patients were male (62.6%) and 5,513 (37.0%) were female; 60 (0.4%) were missing data on sex. The majority of cases for whom data on race were available occurred among the classifications white (68.7%), black (9.1%), and Asian/Pacific Islander (4.3%). Data on race were not included for 26.1% of total annual case reports, and data on ethnicity were missing for 39.6% of case reports. The majority of patients for whom data on ethnicity were available were non-Hispanic (85.3%).

Figure 3. Incidence[*] of reported giardiasis cases, by age group — National Notifiable Diseases Surveillance System, United States, 2019 (N = 14,845[§])

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* Cases per 100,000 population
§ Age data missing for 42 patients

In 2019, the incidence of reported giardiasis cases was highest among patients aged under 5 years, 55-59 years, and 50-54 years (incidence = 6.1, 5.4, and 5.3 cases per 100,000 population, respectively).

Figure 4. Incidence* of reported giardiasis cases, by sex and age group — National Notifiable Diseases Surveillance System, United States, 2019 (N = 14,787§)

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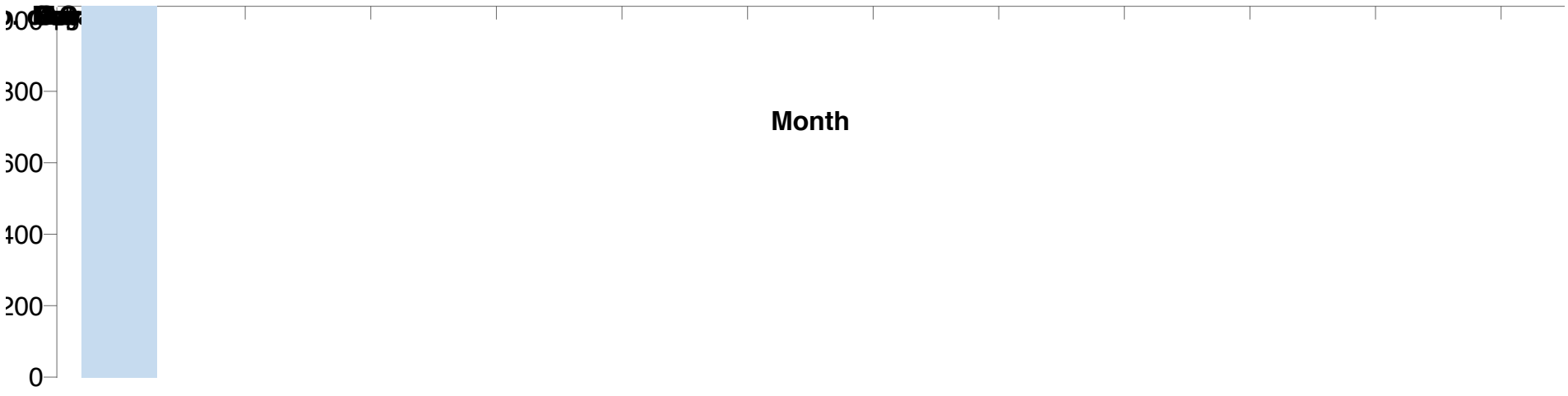
* Cases per 100,000 population

[§] Age or sex data missing for 100 patients

The highest incidence of giardiasis was among males ages 55–59 years (7.3 cases per 100,000 population) and females under 5 years (5.3 cases per 100,000 population). Rates were highest among males in every age group. The difference was most pronounced between sexes aged 25-29 years, with males presenting with 4.2 additional cases of giardiasis per 100,000 population compared to females.

Figure 5. Number of reported giardiasis cases, by date of symptom onset — National Notifiable Diseases Surveillance System, United States, 2019 (N = 8,910[§])



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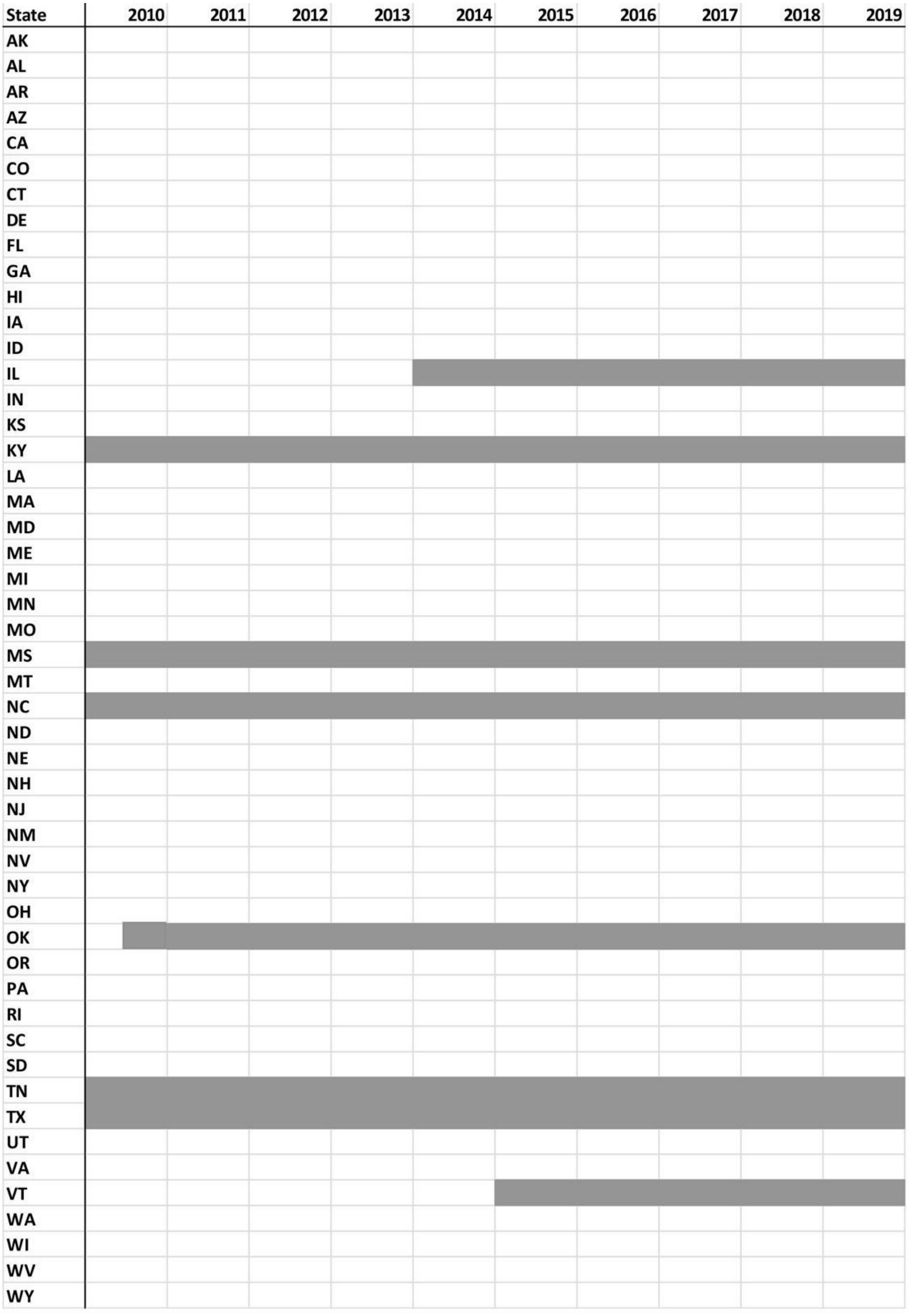
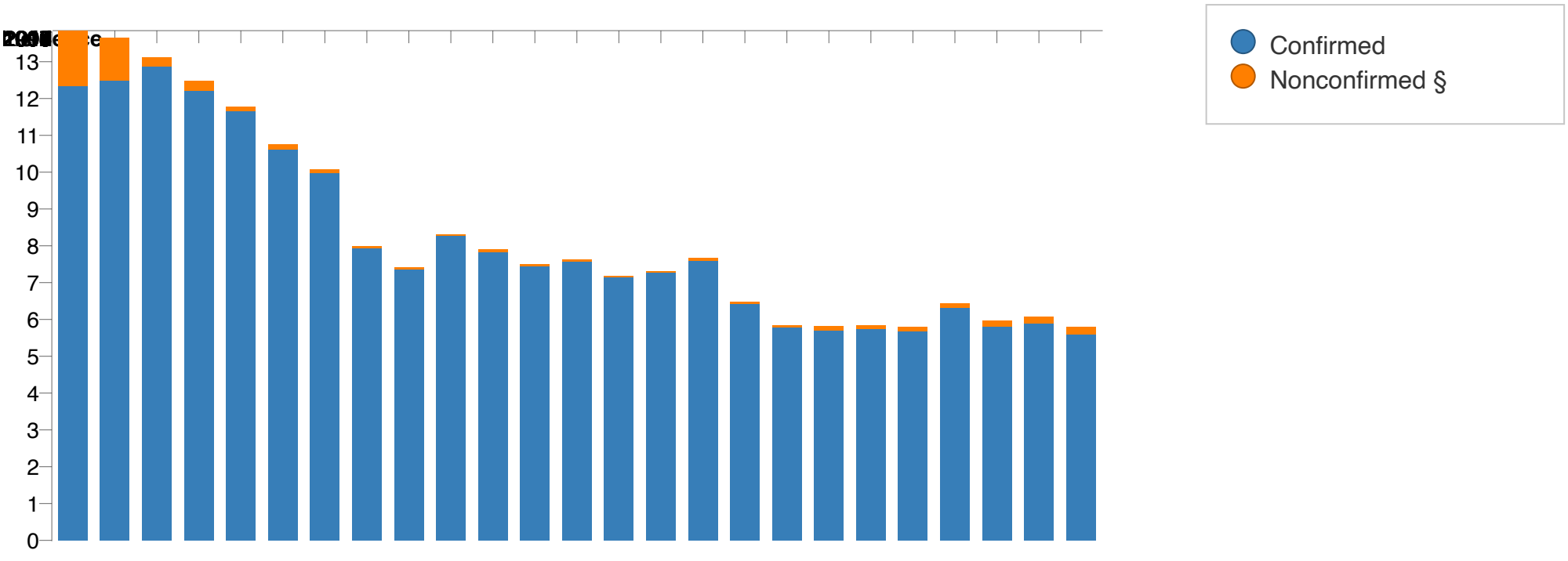
[§] Date of symptom onset data missing for 5,977 patients

In 2019, the majority of cases by symptom onset occurred between June and October, with a peak in July (n=1,038).

Supplemental Table 1. Giardiasis reporting and non-reporting states (gray shading) — National Notifiable Diseases Surveillance System, United States, 2010–2019



Supplemental Figure 1. Incidence* of reported giardiasis cases, by year and case classification — National Notifiable Diseases Surveillance System, United States, 1995¶ – 2019 (N = 480,921)



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* Cases per 100,000 population per year

§ Probable, suspect, or unknown cases

¶ First full year of national reporting

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