

**Lyme Disease Contents**

- ▶ [Introduction](#)
- ▶ [The Bacterium](#)
- ▶ [Natural History](#)
- ▶ [Diagnosis](#)
- ▶ [Epidemiology](#)
- ▶ [Prevention and Control](#)
- ▶ [Vaccine](#)
- ▶ [Recommendations](#)
- ▶ [Questions and Answers](#)
- ▶ [Scientific Literature](#)
- ▶ [PBS Documentary](#)

## Epidemiology

**Definition:** Epidemiology is the study of the distribution and causes of disease in populations. Tracking the number of cases of disease by person, place, and time allows public health authorities to better identify who is at risk, trends of occurrence, and development of strategies for disease prevention and control.

**Surveillance of reported cases:** Lyme disease is a rapidly emerging vector-borne infectious disease in the United States. More than 128,000 cases have been reported to health authorities in the U.S. since 1982, when a systematic national surveillance was initiated. Lyme disease now accounts for more than 95% of all reported vector-borne illness in the U.S. The overall incidence rate of reported cases in the U.S. is about 5 per 100,000 population, but there is considerable underreporting. The disease occurs in distinct and geographically limited areas. The incidence in a few of the most highly endemic communities may reach 1 to 3% per year. Persons of all ages and both genders are equally susceptible, although the highest attack rates (see chart) are in children aged 0-14 years, and in persons 30 years of age and older. Although cases of Lyme disease have been reported from 48 states, significant risk of infection with the agent of Lyme disease, *Borrelia burgdorferi*, is found in only about 100 counties in 10 states located along the northeastern and mid-Atlantic seaboard and in the upper northcentral region, and in a few counties in northern California. Click on the table to the right to view data by year, state, and region for the ten year period 1989-1998.

Centers for Disease Control and Prevention (CDC)  
Lyme Disease Cases Reported to CDC by State Health Departments, 1989-1998\*

Year	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
Alabama	0	0	0	0	0	0	0	0	0	0
Alaska	0	0	0	0	0	0	0	0	0	0
Arizona	0	0	0	0	0	0	0	0	0	0
Arkansas	0	0	0	0	0	0	0	0	0	0
California	0	0	0	0	0	0	0	0	0	0
Colorado	0	0	0	0	0	0	0	0	0	0
Connecticut	0	0	0	0	0	0	0	0	0	0
Delaware	0	0	0	0	0	0	0	0	0	0
Florida	0	0	0	0	0	0	0	0	0	0
Georgia	0	0	0	0	0	0	0	0	0	0
Hawaii	0	0	0	0	0	0	0	0	0	0
Idaho	0	0	0	0	0	0	0	0	0	0
Illinois	0	0	0	0	0	0	0	0	0	0
Indiana	0	0	0	0	0	0	0	0	0	0
Iowa	0	0	0	0	0	0	0	0	0	0
Kansas	0	0	0	0	0	0	0	0	0	0
Kentucky	0	0	0	0	0	0	0	0	0	0
Louisiana	0	0	0	0	0	0	0	0	0	0
Maine	0	0	0	0	0	0	0	0	0	0
Maryland	0	0	0	0	0	0	0	0	0	0
Massachusetts	0	0	0	0	0	0	0	0	0	0
Michigan	0	0	0	0	0	0	0	0	0	0
Minnesota	0	0	0	0	0	0	0	0	0	0
Mississippi	0	0	0	0	0	0	0	0	0	0
Missouri	0	0	0	0	0	0	0	0	0	0
Montana	0	0	0	0	0	0	0	0	0	0
Nebraska	0	0	0	0	0	0	0	0	0	0
Nevada	0	0	0	0	0	0	0	0	0	0
New Hampshire	0	0	0	0	0	0	0	0	0	0
New Jersey	0	0	0	0	0	0	0	0	0	0
New Mexico	0	0	0	0	0	0	0	0	0	0
New York	0	0	0	0	0	0	0	0	0	0
North Carolina	0	0	0	0	0	0	0	0	0	0
North Dakota	0	0	0	0	0	0	0	0	0	0
Ohio	0	0	0	0	0	0	0	0	0	0
Oklahoma	0	0	0	0	0	0	0	0	0	0
Oregon	0	0	0	0	0	0	0	0	0	0
Pennsylvania	0	0	0	0	0	0	0	0	0	0
Rhode Island	0	0	0	0	0	0	0	0	0	0
South Carolina	0	0	0	0	0	0	0	0	0	0
South Dakota	0	0	0	0	0	0	0	0	0	0
Tennessee	0	0	0	0	0	0	0	0	0	0
Texas	0	0	0	0	0	0	0	0	0	0
Utah	0	0	0	0	0	0	0	0	0	0
Vermont	0	0	0	0	0	0	0	0	0	0
Virginia	0	0	0	0	0	0	0	0	0	0
Washington	0	0	0	0	0	0	0	0	0	0
West Virginia	0	0	0	0	0	0	0	0	0	0
Wisconsin	0	0	0	0	0	0	0	0	0	0
Wyoming	0	0	0	0	0	0	0	0	0	0
<b>Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

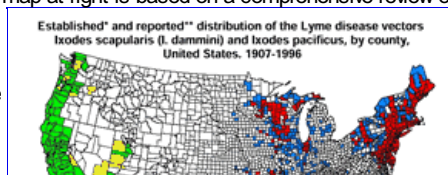
**United States map of reported cases:** Lyme disease cases have been reported by 48 states and the District of Columbia; there is, however, a distinctive geographic pattern in which cases remain concentrated in the northeastern, north-central, and Pacific coastal regions. The trend of increasing incidence in some established endemic areas continues, as well as geographic spread of *B. burgdorferi* to new areas. The distribution of the principal vectors of *B. burgdorferi* in the United States mirrors the areas of high reported incidence of



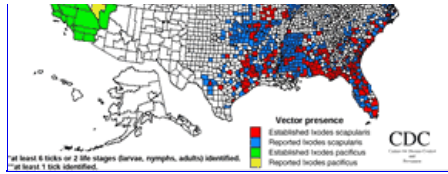
Lyme disease, and identifies areas of potential disease emergence. Click on the map at right for the epidemiological distribution of reported cases of Lyme disease in 1997, the latest year for which complete data are available.

**Lyme disease surveillance case definition:** State and local public health officials rely on health-care providers, laboratories, and other public health personnel to report the occurrence of notifiable diseases to state and local health departments. Without such data, trends cannot be accurately monitored, unusual occurrences of diseases might not be detected, and the effectiveness of intervention activities cannot be easily evaluated. In the United States, requirements for reporting diseases are mandated by state laws or regulations, and the list of reportable diseases in each state differs. CDC and the Council of State and Territorial Epidemiologists (CSTE) have established a policy (see [MMWR May 2, 1997;46:1-55](#)) that requires state health departments to report cases of selected diseases to CDC's National Notifiable Diseases Surveillance System (NNDSS). Based on a [surveillance case definition](#), Lyme disease is a reportable in all 50 states and the District of Columbia.

**Map of tick vectors:** The map at right is based on a comprehensive review of the literature in the United States from 1907 through 1996 of established and reported distribution of the Lyme disease vectors *Ixodes scapularis* and *Ixodes pacificus*. Data



compiled from the literature review are presented by county. "Established" means at least 6 ticks or 2 life stages (larvae, nymphs, adults) were identified in the county. "Reported" indicates at least 1 tick was identified in the county. Note that the principal vectors are *Ixodes scapularis* in the northeast and upper-midwest states and *Ixodes pacificus* along the West Coast of the United States. Although *I. scapularis* is widely distributed in the southern U.S., it is not an established vector of Lyme disease to humans in that area.



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[Also available in PDF format](#) (458 KB)


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[Return to top of page](#)

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