Lyme Disease

Lyme disease is a Class C Disease and must be reported to the state within five business days.

Lyme disease is the most common tick-borne illness in the United States. More than 35,000 cases are reported annually in recent years. The disease is caused by a bacterial spirochete, *Borrelia burgdorferi*. In the northern and central U.S., the primary vector is *Ixodes scapularis*, the deer tick, while on the Pacific coast, the most common vector is *Ixodes pacificus*, the western black-legged tick. Other species of ixodid ticks have also been implicated in transmission.

Symptoms include fever, headache, fatigue, and an expanding skin rash called erythema migrans. Infections that are not treated can spread to joints, the heart, and the nervous system; however, most cases can be successfully treated with a few weeks of antibiotics.

The geographic distribution of Lyme disease is highly focused with most cases occurring in the northeastern and north-central states. The risk of infection in endemic areas is dramatically greater than the risk in non-endemic areas. In 2016, state rates varied widely from less than 0.01 cases per 100,000 population in 8 states to 86.4 cases per 100,000 population in Maine. The small number of cases reported from Louisiana suggests that Louisiana is not an area of intense transmission.

Persons exposed to wooded areas, overgrown brush, or residential areas adjacent to the like are at the highest risk in endemic areas. Although Louisiana is not considered an area of high risk, avoidance of tick-infested areas and use of personal protective measures are recommended for the prevention of Lyme disease and other tick-borne diseases. Most cases of Lyme disease result when the tick is attached for over 24 hours. Therefore, skin examination and prompt removal of ticks is another possible means of prevention.

The case definition of Lyme disease relies on isolation of *Borrelia burgdorferi* (rarely done), or on a combination of clinical and serologic tests. Serology is widely available, but must be interpreted with caution. An early IgM response develops and peaks at three to six weeks. Very rare cases (1% or 2%) have had IgM persisting for over two to three years. An IgG response starts after several weeks and may persist for years, even after successful treatment. A two-test approach, sensitive EIA or IFA followed by Western Blot confirmation, is the preferred approach. EIA, IFA alone, or ImmunoBlot alone (particularly IgM) do produce false positives. A combination of both is the best solution to reduce false positives. A positive IgM with negative EIA is more than likely a false positive result.

False Positive Results from Rheumatoid Arthritis, Systemic Lupus Erythematosus, and Treponemal Infections

False-positive results of serological tests for Lyme disease have been reported in cases of recent primary infection with varicella-zoster virus, Epstein-Barr virus, cytomegalovirus, and herpes simplex virus (HSV) type 2. **About 5% of a normal population has false positive IgM Western Blots.**

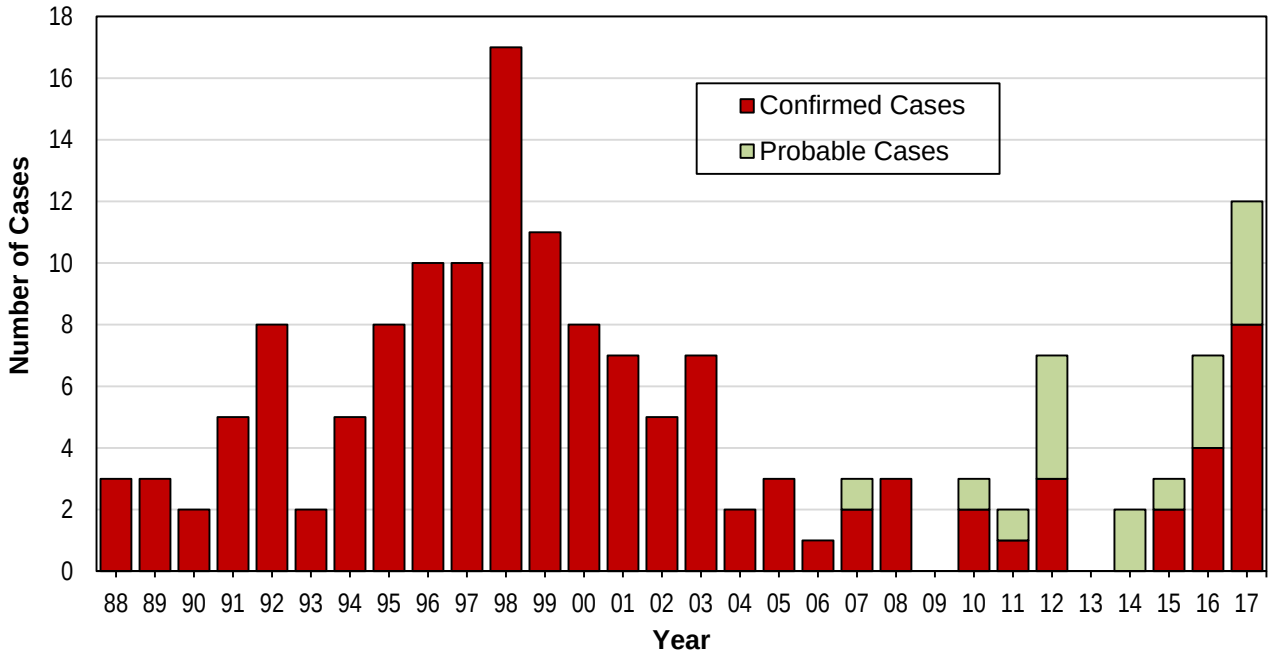
Over-diagnosis of Lyme Disease Is A Major Problem

In one study at a university-based referral clinic, only 339 (43%) of 788 patients were found to have - or have had - Lyme disease. False-positive test results are a major problem; they are more common than false-negative results in late disease. Excessive reliance on serologic tests, as well as failure to consider alternative diagnoses, contributes to over-diagnosis. A recent position paper by the American College of Physicians urges clinicians to determine the pretest probability of Lyme disease before ordering serologies; to perform Western blotting in the case of indeterminate serologic results; also to not regard a positive result as an indication for automatic antibiotic therapy if the pretest probability of disease is low. In fact, if the pretest probability of Lyme disease is low, a positive test result is more likely a false-positive than a true-positive.

Cases and Trends

During the period of 1988 to 2017, the number of cases per year reported in Louisiana increased to a high of 18 cases in 1998 (Figure 1). These numbers are extremely low in comparison to endemic areas of the United States.

Figure 1: Lyme disease cases - Louisiana, 1988-2017



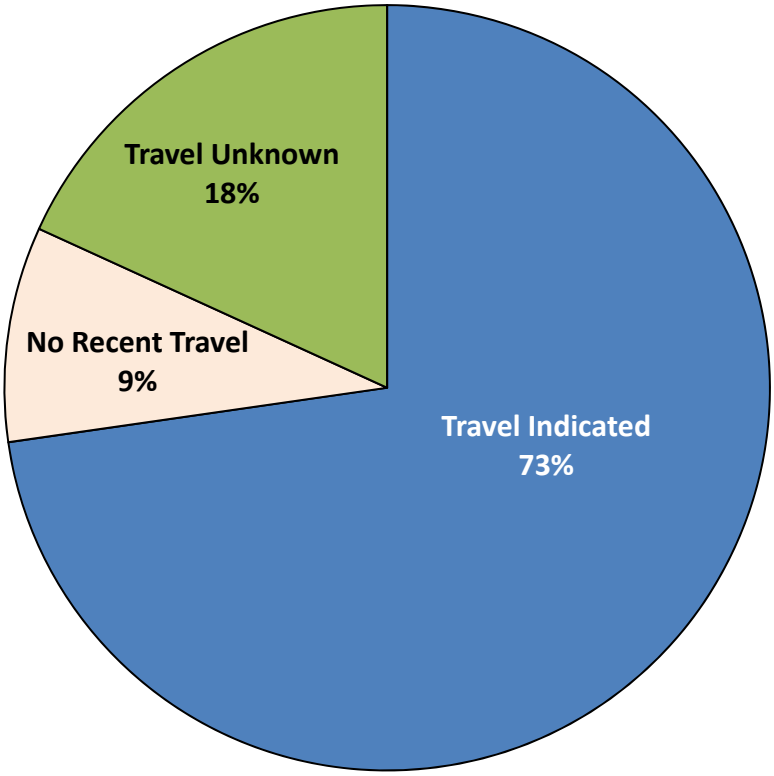
Infection Location

It is important to note that a majority of cases reported in Louisiana were individuals who had travelled out of state prior to developing symptoms, and they likely became infected outside of Louisiana. These travel-associated cases are still counted when their home residence is listed as Louisiana. Even though it is rare that cases report no travel out of the state, it is still important to keep track of how many Louisiana residents acquire the disease. This helps understand the burden

of the disease within the state and helps encourage healthcare providers to consider Lyme disease as a possible diagnosis and to ask about recent travel when seeing patients.

Since 2014, 73% of cases have reported recent travel outside of the state prior to developing symptoms; only 9% reported no recent travel; and information was not able to be obtained on the remaining 18% of cases (Figure 2).

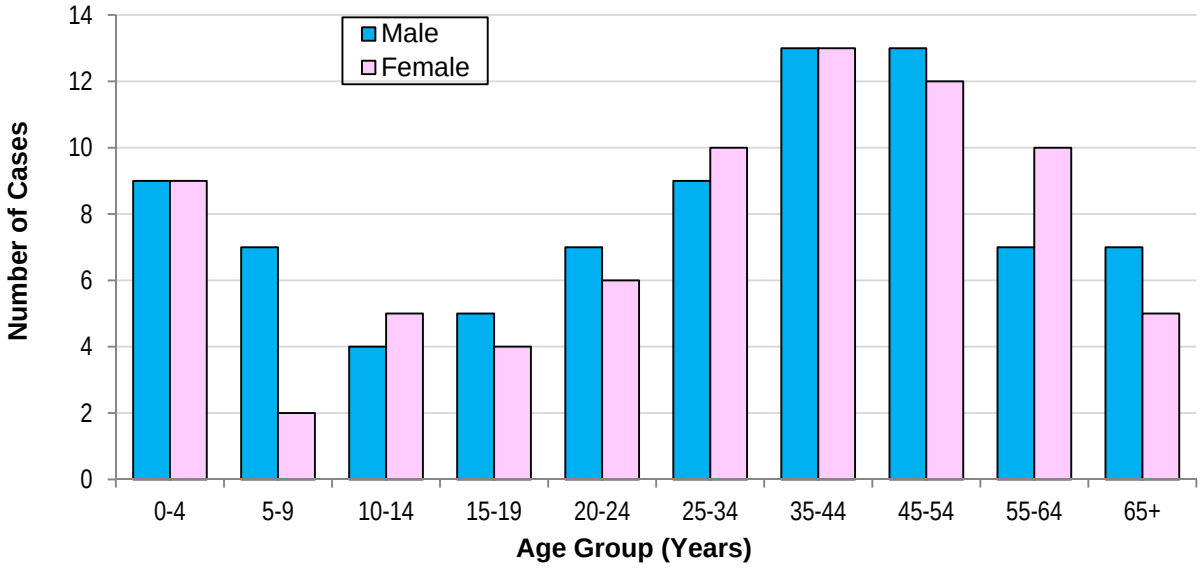
Figure 2: Lyme Disease Cases and Travel Exposure, Louisiana 2014-2017



Age, Sex and Race Distribution

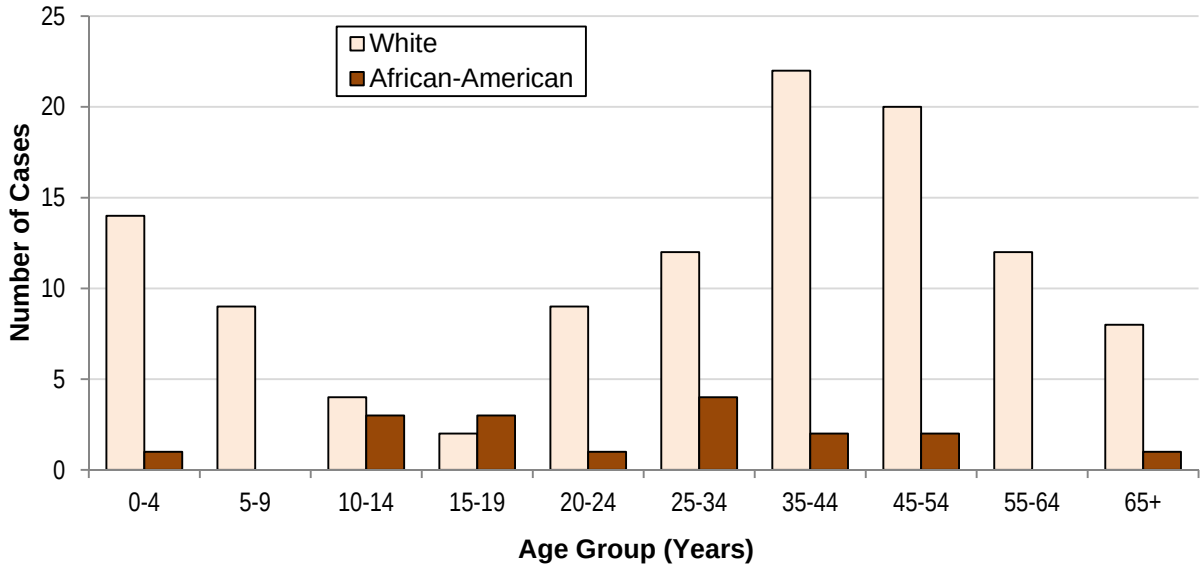
In Louisiana from 1988 to 2017, 48.4% of the cases were reported in females and 51.6% were reported in males (Figure 3). For both males and females, more cases occurred among people ages 25-years to 64-years old, most likely due to increased exposure to ticks in these age groups.

Figure 3: Lyme disease cases by gender and age - Louisiana, 1988-2017



From 1988 to 2017 in Louisiana, among cases where race was documented, more cases occurred among Whites (86.4%) than African-American (13.6%), (Figure 4).

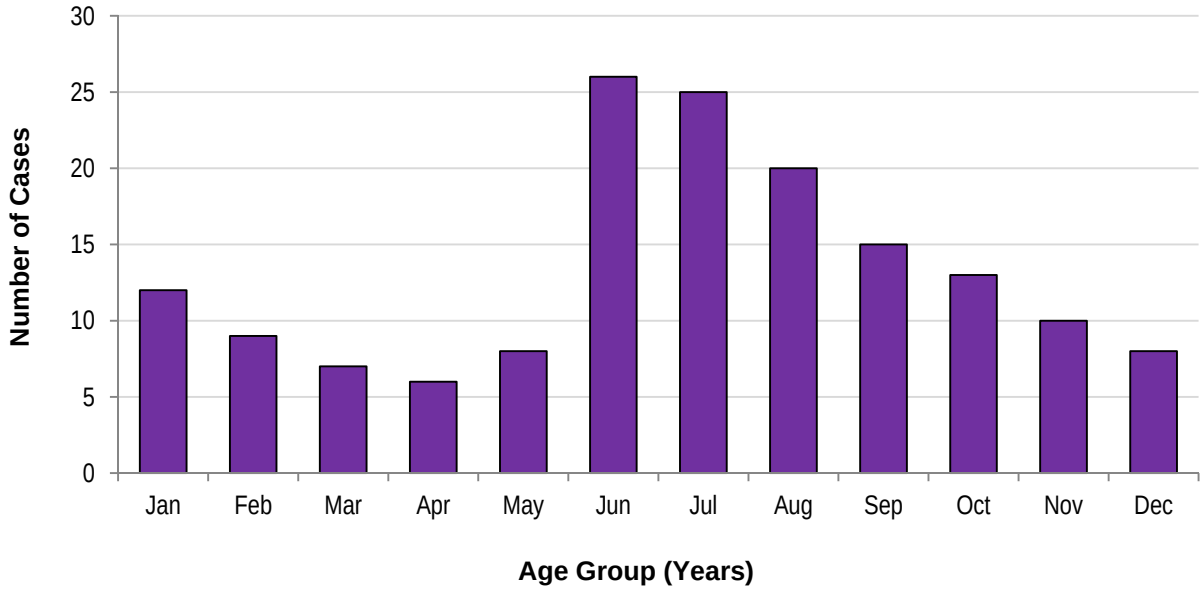
Figure 4: Lyme disease cases by race and age - Louisiana, 1988-2017



Seasonality

The seasonal distribution shows a peak in cases occurring in June; then case numbers slowly decrease into the winter months (Figure 5).

Figure 5: Lyme disease number of cases by month - Louisiana, 1988-2017



Geographical Distribution

The geographical distribution does not show large numbers of cases in the rural parishes (Table).

Table: Cases of Lyme disease by Parish - Louisiana, 1988-2017

Parish	Cases 1988-2017	Parish	Cases 1988-2017
ACADIA	1	MADISON	3
ALLEN	2	MOREHOUSE	1
ASCENSION	5	NATCHITOCHES	0
ASSUMPTION	1	ORLEANS	10
AVOYELLES	2	OUACHITA	7
BEAUREGARD	2	PLAQUEMINES	0
BIENVILLE	1	POINTE COUPEE	1
BOSSIER	3	RAPIDES	3
CADDO	15	RED RIVER	1
CALCASIEU	7	RICHLAND	1
CALDWELL	0	SABINE	1
CAMERON	0	ST. BERNARD	1
CATAHOULA	0	ST. CHARLES	2
CLAIBORNE	0	ST. HELENA	1
CONCORDIA	1	ST. JAMES	0
DE SOTO	1	ST. JOHN THE	2
E. BATON ROUGE	10	ST. LANDRY	2
EAST CARROLL	0	ST. MARTIN	3
EAST FELICIANA	0	ST. MARY	0
EVANGELINE	2	ST. TAMMANY	8
FRANKLIN	1	TANGIPAHOA	2
GRANT	1	TENSAS	0
IBERIA	1	TERREBONNE	4
IBERVILLE	3	UNION	1
JACKSON	0	VERMILION	3
JEFFERSON	11	VERNON	5
JEFFERSON DAVIS	1	WASHINGTON	8
LA SALLE	0	WEBSTER	4
LAFAYETTE	4	WEST BATON	0
LAFOURCHE	2	WEST CARROLL	1
LINCOLN	1	WEST FELICIANA	1
LIVINGSTON	4	WINN	1