

Princeton Health Department

Phone: 609.497.7608
Fax: 609.924.7627

One Monument Drive
Princeton, NJ 08540

Jeffrey Grosser
Health Officer

Quantitative Analysis of Data for reported Cases of Lyme disease

Introduction: CDC reports that the highest incidence of Lyme disease is in the Northeastern States of United States.¹ In the strategic planning for 2015 to 2020, Princeton Health Department (PHD) recognizes that Lyme disease is a public health challenge in Princeton.² The health department has posted information on Lyme disease on its website. When untreated Lyme disease becomes chronic, and causes systemic symptoms which leads to poor health, and directly affects one's productivity and socio-economic condition. Chronic Lyme disease indirectly impacts the socioeconomic condition of the community.

Goal: To demonstrate that Princeton Health Department is capable of conducting and disseminating assessments focused on population health status and public health issues facing the community.

Objective:

- 1) To analyze public health data on reported Lyme disease in Princeton.
- 2) To identify the impact that Lyme disease has on Princeton residents compared to the Mercer County and to the entire State of New Jersey.

Source of Data: Data on reported Lyme disease in Princeton was obtained from Communicable disease Reporting and Surveillance System (CDRSS). Data on reported Lyme disease in Mercer County and State of New Jersey was obtained from the New Jersey Reportable communicable disease report. These local and state data were compared with national Lyme disease data reported by the Centers for Disease Control and Prevention (CDC). CDC reported data for Mercer County in 2008 was 234 which differed from the 358 reported by NJ reportable communicable disease report. Estimated population used in the calculations was obtained from Census report in 2000 and 2010 for Princeton, Mercer County and the State of New Jersey.

Method: The rate of reported Lyme disease per 1,000 population in a given year was calculated by dividing the number of reported cases in a year with the respective population in the same year. A scatter-graph was plotted using Microsoft Excel to show the trend in rate of reported Lyme disease in Princeton as shown in Figure 3.

The rate of Lyme disease reported in Princeton in a given year was then compared with the rate in Mercer County and the State of New Jersey for the same year by merging the 3 scatter plots on the same chart using Microsoft Excel as shown in Figure 4. **Findings:** Table 1 gives the number of reported Lyme disease, calculated rate of reported Lyme disease per 1000 people and the 2000 and 2010 Census estimated number of people residing in Princeton, Mercer County and State of New Jersey. In Table 1, we observe that there is an increase in the rate of reported Lyme disease per 1, 000 population with each year in Princeton. The rate of Lyme was 1.62 per 1,000 population in 2005 and it increased to 3.6 by 2013. The rate then decreased to 2.2 per 1,000 population in 2014. The rate per 1,000 population in Mercer County and New Jersey has decreased from .61 and .39 in 2005 to .39 to .37 in 2014.

Table 1: Gives the number of reported cases and calculated rate of reported Lyme disease per 1000 population in Princeton, Mercer County and State of New Jersey ³⁻⁶

Date	Princeton Data ^a			Mercer County Data ^b			New Jersey State Data ^b		
Date	# of Reported Lyme Disease Cases	Rate per 1,000 Population	Population Size	# of Reported Lyme Disease Cases	Population Size	Rate per 1000 Population	# of Reported Lyme Disease Cases	Population Size	Rate per 1000 Population
Year 2005: 1/2/05 to 12/31/05	49	1.62	14,203 (Borough)+ 16,027(Township) =30,230	225	367,508	0.612	3363	8,414,297	0.399
Year 2006: 1/1/06 to 12/30/06	23	0.76	30,230	150		0.408	2432		0.289
Year 2007: 12/31/06 to 12/29/07	31	1	30,230	206		0.56	3134		0.372
Year 2008: 12/30/07 to 1/3/09	62	2	30,230	358 (234 reported by CDC)		0.974	6063		0.721
Year 2009: 1/4/09 to 1/2/10	73	2.4	30,230	253		0.688	4973		0.591
Year 2010: 1/3/10 to 1/1/11	43	1.5	12,307(Borough)+ 16,265(Township) =28,572	158	366,513	0.431	3712	8,791,894	0.422
Year 2011: 1/2/11 to 12/31/11	89	3.1	28,572	217		0.592	4262		0.485
Year 2012: 1/1/12 to 12/29/12	76	2.7	28,572	142		0.387	3576		0.407
Year 2013: 12/30/12 to 12/28/13	102	3.6	28,572	141		0.384	3766		0.428
Year 2014:	63	2.2	28,572	143		0.39	3286		0.374

^a Communicable Disease Reporting and Surveillance system (CDRSS)⁵ and Census⁴ and ^b New Jersey Reportable Communicable Disease Report⁶ and Census⁴

Figure 1 shows the scatter graph plotted for the rate of Lyme disease in Princeton per 1000 people. It displays the rising rate of reported Lyme disease in Princeton Figure 1. The rate in 2005 was 1.62 which increased 100% in 2013. The rate in 2014 dropped to 2.2 per 1000 population.

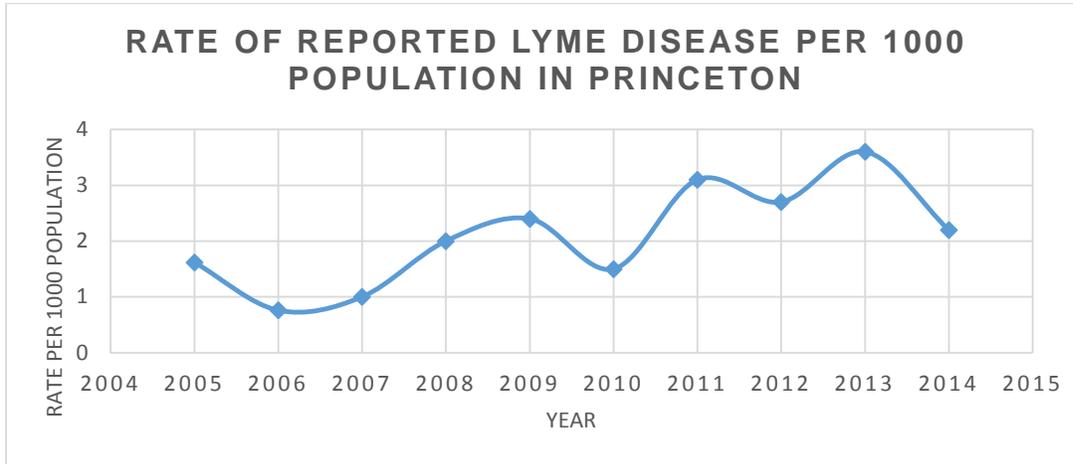


Figure 1. Rate of Reported Lyme disease per 1000 population in Princeton

Figure 2 displays the number of scatter graph plotted for the rates on reported Lyme disease in Princeton, Mercer County and New Jersey, Figure 2. It shows that the rate of Lyme disease per 1,000 population in Princeton is much higher than Mercer County and State of New Jersey. It also illustrates an increasing trend of Lyme disease in Princeton, whereas the trend in Mercer County and State of New Jersey is decreasing from 2008 onwards. The rate in Mercer County (.39 per 1000 population) and State of New Jersey (.37 per 1000 population) is almost similar. In 2014, a spike is observed in the trend for Mercer County and State of New Jersey but then we do not have data for Princeton to compare.

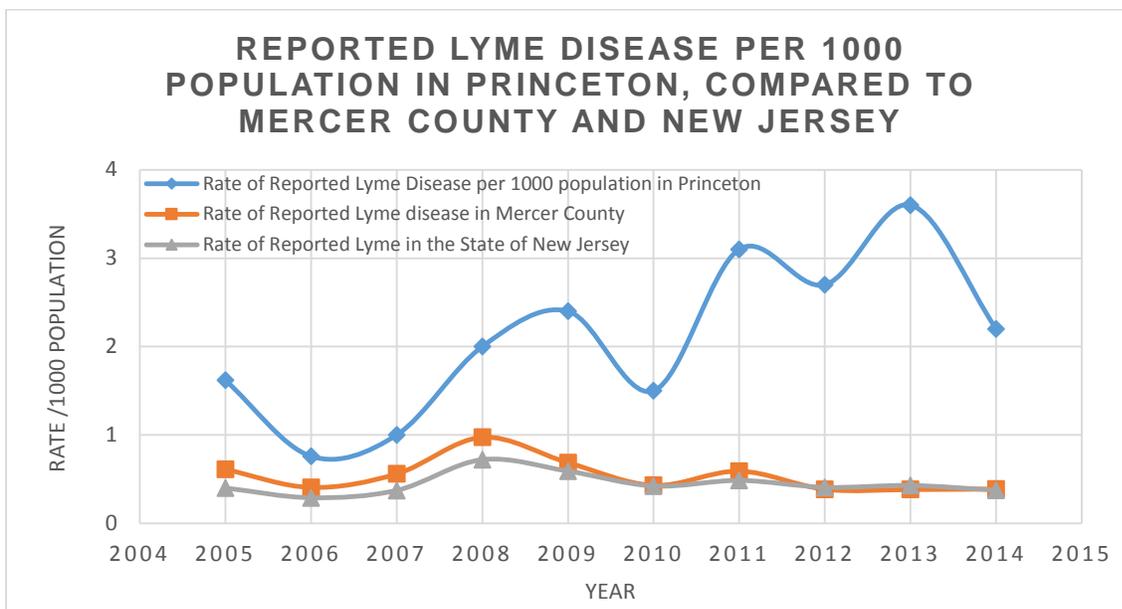


Figure 2. Rate of Reported Lyme disease per 1000 population in Princeton, Mercer County and the State of New Jersey.

Conclusions: The incidence of Lyme disease is increasing in Princeton whereas in Mercer County and the State of New Jersey the rates are almost similar and show a decreasing trend. The rate of reported Lyme disease per 1000 population is much higher in Princeton than its County and State. More research in the form of survey needs to be done in order to understand the habits of Princeton residents and to assess their knowledge on Lyme. The survey will help in assessing and implementing cost effective and efficient programs and protocols aimed at reducing the prevalence and incidence.

References:

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