

PATTERNS OF LYME DISEASE DIAGNOSIS AND TREATMENT BY FAMILY PHYSICIANS IN A SOUTHEASTERN STATE

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ABSTRACT: This study examined how often physicians in Georgia diagnose and treat Lyme disease as well as the criteria they use to reach a diagnosis of Lyme disease. A survey was sent to 1,331 family physicians in Georgia concerning how many cases of Lyme disease the physicians diagnosed, and the criteria used to make the diagnosis, during the preceding 12 months. Of 710 responses, 167 physicians treated 316 cases of Lyme disease without a firm diagnosis. In addition, 125 physicians diagnosed 262 cases of Lyme disease, 130 without serologic testing and 132 with serologic testing. Family Physicians in Georgia diagnose Lyme disease at a rate 40 times greater than the surveillance case rate reported in Georgia.

KEY WORDS: Lyme disease; Lyme disease/diagnosis; Lyme disease/epidemiology; Georgia.

INTRODUCTION

Surveillance for Lyme disease was initiated by the CDC in 1982, and Lyme disease was designated a reportable disease in 1991.¹ From that time until 1995, the surveillance case definition for Lyme disease was not uniform. Since 1995, states have been shifting toward inclusion of laboratory findings for surveillance case confirmation of Lyme disease.² Current CDC reporting guidelines define confirmed Lyme disease as "either: (a) physician-diagnosed erythema migrans ≥ 5 cm in diameter or (b) at least one disseminated manifestation (e.g., musculoskeletal, neurologic, or cardiac) plus laboratory confirmation of infection."^{3,4} In Georgia, confirmed surveillance case definition of Lyme disease requires laboratory confirmation for all cases.^{5,6}

Empiric treatment for Lyme disease, based on the finding of cry-

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thema migrans, is considered cost effective.⁷ Recommendations for clinical diagnosis and management of Lyme disease have included prevalence rates of the disease in the decision process.^{8,9} However, the determination of prevalence rate is dependent on many factors, including physician reporting compliance and laboratory surveillance. If physicians are treating the disease on clinical grounds, or without proper laboratory testing, the reported statewide prevalence rate could be falsely low. A falsely low prevalence rate could in turn affect management decisions (including testing and reporting) of patients with signs and symptoms of the disease. The consequences of both under- and over-diagnosis have been described.^{10,11,12}

At present, Lyme disease is thought to have a low prevalence in Georgia. From 1996 through 2000, there have only been 15 cases reported in the state. This is in sharp contrast to several northern states where the disease is felt to be endemic. In New York and Connecticut, for example, there were approximately 17,000 and 12,000 cases reported (respectively) for the same time period.¹ Both the causative organism of Lyme disease, *Borrelia burgdorferi*, as well as the common arthropod vector, *Ixodes scapularis*, have been isolated in Georgia and adjacent areas.^{13,14,15,16,17,18} With the vectors of the disease present, it is possible that Lyme disease is actually more prevalent than suspected. Because Lyme disease is easily treated in the early stages with generally good outcomes and prevention of late sequelae,^{19,20,21} it is important for physicians to have accurate information about the prevalence of the disease in order to make sound treatment decisions.

This study was undertaken to determine how often physicians in Georgia diagnose and treat Lyme disease, the criteria they use to reach a diagnosis, and to determine if this number differs substantially from the number of cases actually reported.

METHODS

A confidential survey was developed to determine the frequency and distribution of Lyme disease cases suspected, diagnosed, and treated by Family Physicians in Georgia during the twelve month period beginning December 1999. The survey also included questions about the criteria used to establish a diagnosis of Lyme disease. The survey did not inquire about the specific type of serologic testing utilized for diagnosis.

Prior to the administration of the final survey instrument to the target physicians, a preliminary survey instrument was administered to physicians within our department. The survey instrument was refined and

administered to a second group of 20 physicians from across Georgia. After a final revision, the survey was re-administered to another 20 physicians for validation.

The survey was mailed to 1,331 family physicians in Georgia in late November 2000. The mailing list was comprised of the active membership of the Georgia Academy of Family Physicians, as provided by the Academy. Non-respondents were mailed a second survey in mid-December. A third survey was mailed in early January 2001 to those who failed to respond to the first two mailings. Postage paid, return addressed envelopes were included with each mailing. As an incentive to return the questionnaires, the physicians were informed that returned questionnaires in each mailing would be entered into a raffle for professional practice materials including textbooks and a palm pilot. The questionnaires were numerically coded for confidentiality.

All data were entered into SPSS version 10.0 and analyzed. For results reported as percentages, ranges were calculated based on worst-case scenarios for the non-responding physician pool.

RESULTS

Surveys were returned from 734 of the 1331 surveyed physicians. Twenty-four surveys were returned as undeliverable or from physicians who were no longer practicing. Thus our response rate was determined to be 710 of 1307 practicing physicians, or 54.3%.

Of the 710 physicians who responded, 266 (37.5%) physicians suspected 927 cases of Lyme disease. Of these, 167 (62.8%) physicians treated 316 cases without a firm diagnosis during the 12-month period. Additionally, 125 physicians diagnosed a total of 262 cases of Lyme disease. Of these, 91 physicians confirmed 132 cases by an unspecified serologic test. This represented a total of 578 cases of Lyme disease treated during the 12-month period (Table 1). Table 2 lists the clinical findings for cases treated without laboratory confirmation. Some cases had more than one clinical finding.

Approximately 30% of the suspected cases of Lyme disease in the study were reported from 5 counties (Illustration 1). All of these counties are located outside of the coastal area and represent mixed urban, suburban, and rural population densities. From these counties, the basis given for diagnosis and the use of serologic testing paralleled the data reported from the state as a whole. Half of the cases that were associated with a visit to a known Lyme disease endemic area originated from these 5 counties.

TABLE 1

Basis for Treating 578 Cases of Lyme Disease

<i>Basis for Treatment</i>	<i>Treating Physicians</i>		<i>Cases</i>	
	<i>No.</i>	<i>%</i>	<i>No.</i>	<i>%</i>
No firm diagnosis	167	57.2	316	54.7
Diagnosis without serology	34	11.6	130	22.5
Positive Lyme serology	91	31.2	132	22.8
Total	292	100	578	100

From the four coastal counties in the state, surveys were returned from 28 physicians reporting 4 diagnosed cases of Lyme disease (one with a serologic test). Physicians ($n = 8$) from the seven inland counties adjacent to the coastal counties reported an additional 4 cases of Lyme disease (one with a serologic test).

DISCUSSION

Our data indicate that family physicians in Georgia diagnose and treat Lyme disease at a rate that markedly exceeds the reported prevalence

TABLE 2

Reported Clinical Findings of 446 Cases Treated for Lyme Disease Without Serologic Testing, Georgia, 2000*

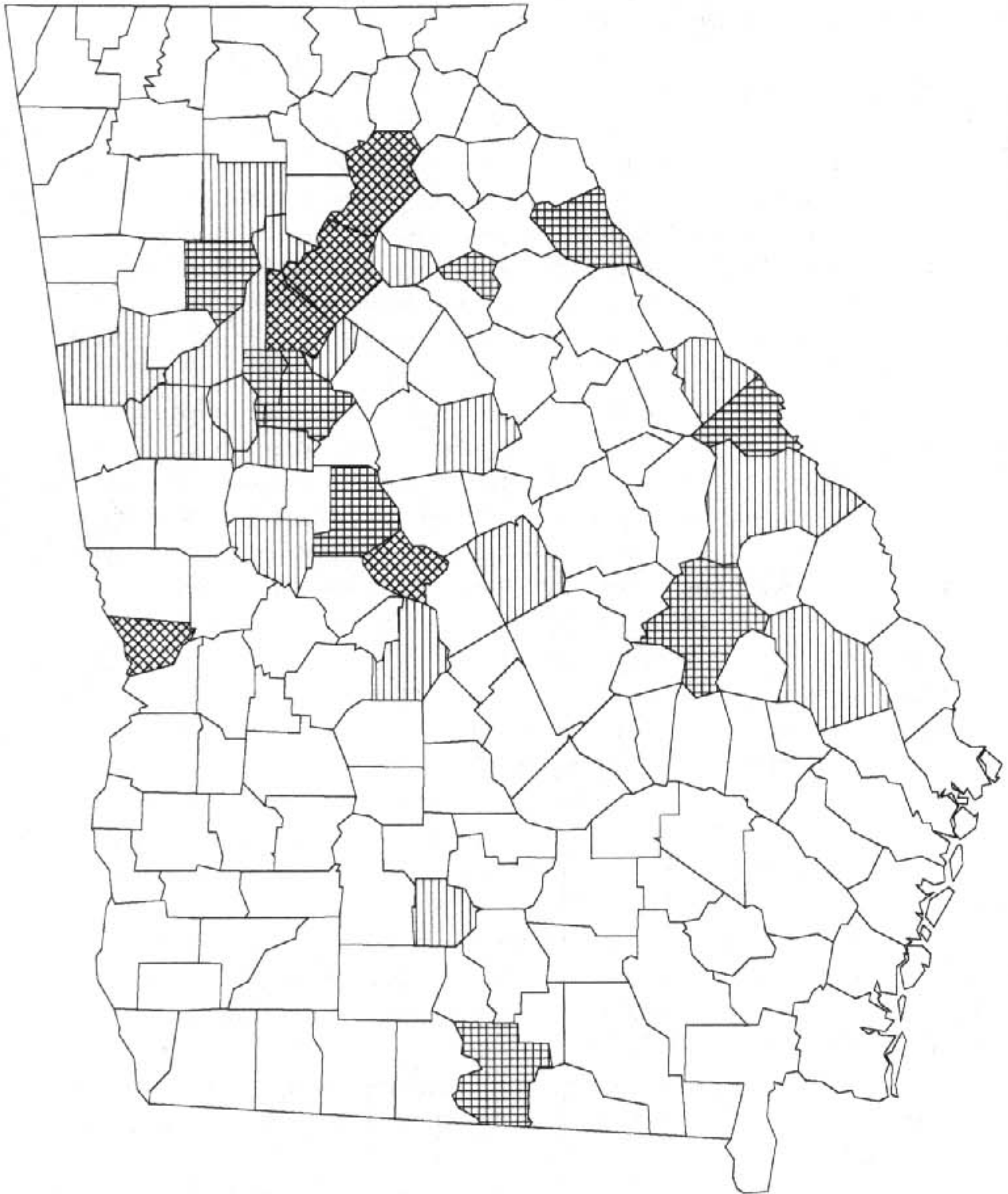
<i>Finding**</i>	<i>No.</i>
Erythema migrans with history of tick bite	216
Erythema migrans without history of tick bite	45
Musculoskeletal symptoms with history of tick bite	226
Musculoskeletal symptoms without history of tick bite	21
History of travel to Lyme endemic area	50
Neurologic symptom	14
Cardiac symptom	2
Other symptom	12

*Based on 12 months beginning December 1999.

**Some cases had more than one finding.

ILLUSTRATION 1

Geographic Distribution of 927 Suspected Cases of Lyme Disease in Georgia*



Suspected Cases 0 to 9 10 to 19
 20 to 29 30 to 87

*Counties with an unknown number of cases (those from which no surveys were returned) were included in the 0-9 group.

of the disease. In our study, 262 cases were reported to be diagnosed during a one-year period. Of these, 132 (50%) were confirmed by a serologic test. This is much less than that reported in New York and Connecticut but much more than the 6 cases of Lyme disease reported to the Georgia Division of Public Health during the same time period.²² In addition, 316 cases of Lyme disease were treated without a firm diagnosis.

This study has a number of limitations. The results are based on physician recollection for a 12-month period, which may be incorrect. There is likely to be bias in the return pool regarding willingness to report practice habits and disease prevalence. Non-respondents may have been less likely to report their treatment patterns, or possibly less likely to have treated Lyme disease. Our sample pool did not include all family physicians in Georgia (approximately 2,020), nor did we include the approximately 3,900 physicians in other specialties likely to be primary care providers for tick-borne illness.²³ This could lead to an under-estimation of the Lyme disease rate.

Almost half of the treated cases were based on the presence of an erythema migrans rash, which is considered pathognomonic of the infection.^{21,24,25} Physicians often treat Lyme disease and forgo laboratory testing when erythema migrans is present.^{26,27,28} However, misdiagnosis of the rash does occur.^{20,29,30} One study found that of 11 patients referred from a non-endemic area with suspected erythema migrans, all were misdiagnosed.³¹ It is also likely that many of the cases of erythema migrans reported by physicians in our study were actually southern tick-associated rash illness (STARI). Erythema migrans-like rash is the hallmark of this tick-borne illness, but unlike Lyme disease, it is carried by a tick commonly found in Georgia (*Amblyopia americanum*- the Lone Star tick).^{5,6,32,33,34,35} The finding that most of the reported cases were not from coastal areas of the state, where the risk for Lyme disease transmission is thought to be greatest, supports STARI as the physical finding rather than erythema migrans.

A number of the cases treated were based on the presence of musculoskeletal symptoms alone without serologic testing. The likelihood of Lyme disease in this clinical setting is very low; therefore, these cases were probably not Lyme disease.^{7,8,10,36}

This study did not query physicians regarding the serologic testing method employed. The CDC recommends the two step method with ELISA followed by Western Blot. Commercially available one step methods are known to have high false positive rates.^{8,9,21,32} It is likely that some of patients with confirmatory serology actually had false positive one-step tests.

In conclusion, what is clear from our study is that the rate for Lyme disease diagnosed both clinically and by a serologic test by family physicians is much higher than the reported prevalence of the disease. Because the Georgia reporting requirements were more stringent than the CDC guidelines, the reported rate of Lyme disease in Georgia during this study period was most likely inaccurately low. Georgia Department of Human Resources and the CDC are currently sponsoring a tick-borne pathogen identification program for Georgia physicians. The authors recommend increased efforts to educate physicians about Lyme disease and other tick-borne illness, and continued development of strategies to more accurately determine the true prevalence of Lyme and Lyme-like diseases in Georgia.

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