

LYME DISEASE AND OTHER TICK-BORNE DISEASES
DUTCHESS COUNTY COMMUNITY SURVEY 2009

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EXECUTIVE SUMMARY

Purpose of the Community Survey

Lyme disease and other tick-borne diseases have been an important health issue in Dutchess County since 1986. The Dutchess County Department of Health (DCDOH) has been working to prevent and control Lyme disease through a variety of interventions including surveillance activities and educational programs.

Awareness campaigns and educational programs have been effective in preventing exposure to ticks by encouraging modification of personal behavior. Throughout the years, these programs have been evaluated by conducting community surveys to measure people's knowledge, attitudes, and behaviors regarding tick-borne diseases. The DCDOH has been able to develop and modify interventions based on the survey results.

Following the format of previous Dutchess County community surveys conducted in 2001, 2002, and 2003, a new community survey was conducted in the fall of 2009. Based on environmental characteristics and population density, the county was divided into two regions: Region 1 – comprising the south western corner of the county extending north to Hyde Park, and Region 2 - encompassing the rest of county. The DCDOH developed the survey and a professional survey company was contracted to achieve a sample size of 310 surveys per region (total 620) by randomly calling residents in the two regions. The survey took approximately 25 minutes to conduct. Statistical analysis was performed using Stata/IC version 10.0.

Key Findings

General Awareness and Concerns

- Three quarters of respondents (74%) felt they knew “a lot or some” about Lyme disease. The proportion of respondents who felt they were knowledgeable was significantly higher in Region 2 (79% versus 69% in Region 1).
- The majority of respondents (87%) felt that Lyme disease is a problem in Dutchess County.
- Only 40% were aware that ticks can cause diseases other than Lyme.
- Close to three quarters of respondents (72%) were concerned that they or their family members might contract Lyme disease. The concern was significantly higher in Region 1 (77% versus 67% in Region 2) and Region 2 had no opinion (neither agreed nor disagreed) significantly more frequently than Region 1 (17% versus 8%).

Knowledge of Risks of Exposure

- Overall, respondents had a good understanding of the risks of exposure. However, knowledge was somewhat lacking in the following areas:
 - Greater than a quarter of respondents either believed that they can get Lyme disease in ways other than a tick bite (11%) or didn't know if that was possible (17%). Lack of knowledge was significantly higher in Region 1 (33% in Region 1, 22% in Region 2).

- Only 23% knew that ticks need to be attached to the skin for at least 36 hours before a person becomes infected with Lyme disease; 49% provided an incorrect answer, and 28% didn't know the answer to the question.
- Even though 78% of respondents knew that mice and other small rodents are important in the transmission of Lyme disease, 16% didn't know. Again, lack of knowledge was significantly higher in Region 1 (26% compared to 17% in Region 2).

Knowledge of Detection

- The vast majority of respondents were well informed with regards to the detection of Lyme disease, including identification of early symptoms, the medical ramifications of Lyme disease, and the occurrence of a bull's eye rash.
 - The percentage of respondents who were well informed was always lower in Region 1. The difference was significant with regards to the association of a bull's eye rash with Lyme disease (91% in Region 1 versus 96% in Region 2) and with regards to knowledge that Lyme disease can affect the heart and nervous system (90% in Region 1 compared to 96% in Region 2).

Knowledge of Treatment

- Almost all respondents knew that Lyme disease won't go away if left untreated (92%).
- Just under two thirds were aware that not every tick bite should be treated with antibiotics (65%).
- For both of the above questions, Region 1 was significantly less knowledgeable than Region 2.
 - 11% in Region 1 compared to 4% in Region 2 for need to treat Lyme disease.
 - 40% in Region 1 compared to 31% in Region 2 for antibiotic treatment.

Personal Protection

- The majority of respondents took precautions against exposure to ticks in high risk areas either by consistently avoiding wooded, brushy, or high grass areas (69%) or by proactively protecting themselves with barrier methods (tucking pants – 59%, using insect repellent – 65%).
- When outdoors but not in wooded, brushy, or high grass areas, the most frequently used precaution was checking oneself for ticks (53%), followed by use of insect repellent (26%).

Protecting Property

- Only 10% of respondents stated that chemical pesticides had been used to control or kill ticks on their property in the last 12 months and most stated that this method was very likely or somewhat likely to be used again in the future.
 - Among the 80% who did not use chemical pesticides, the main reason by far was safety concerns (39%).
- To protect property against ticks, mowing the grass short and pushing back wooded area boundaries as far from the house as possible were the most frequently used methods (80% and

35% respectively). The use of leaf/brush removal could not be assessed due to too many missing responses.

- Region 1 was far less likely to use lawn mowing and pushing back wooded areas than Region 2 (78% versus 87% for lawn mowing, 29% versus 43% for pushing back wood line).

Environmental Risk Factors

- Three quarters of respondents were aware of deer visiting their property or had a wooded area on or next to their property.
- Less than 10% of respondents had a fence around their property to specifically keep deer out of the yard. The percent in Region 1 was significantly higher than in Region 2 (14% compared to 6%).
- Of the 37% respondents who had pets that go outdoors, 70% used a tick repellent on the pet. Region 1 had a significantly higher use of tick repellent than Region 2 (83% compared to 59%).

Information Sources on Lyme Disease

- There was no one predominant source of information. The top three sources of information in the past 12 months were fact sheet/brochures/pamphlets (20%), DCDOH tick warning signs (15%), and DCDOH booth at community events (12%).
- The most prevalent venue for obtaining information in the past 12 months was word of mouth – neighbors/friends/acquaintances (50%), followed by newspapers (32%), healthcare providers/hospitals (31%), Internet other than DCDOH website (30%).
 - Region 1 favored radio and television while Region 2 favored word of mouth and local veterinarians (all statistically different except for television).

Adopting Prevention Strategies

- Three quarters of respondents were interested in getting more information on how people can protect themselves from getting Lyme disease.
- Close to 50% of respondents felt that pesticides should be used on public property, such as recreational areas, to reduce the tick population but a fifth had no opinion (neither agreed nor disagreed).
- Half of respondents wanted to see measures taken to control the county's deer population, significantly more so in Region 1 (55% compared to 47% in Region 2). However, almost a fifth neither agreed nor disagreed.
- Most respondents would like more research funded to find methods to control the tick population, significantly more so in Region 2 (94% compared to 86% in Region 1).

Personal and Family Medical History Involving Ticks

- Almost half of respondents had ever been tested for Lyme disease (47%).
 - The most prevalent reason for testing was presence of symptoms of Lyme disease (57%), followed by a tick bite or attached tick (32%), and part of routine blood work (21%).
- A diagnosis of Lyme disease by a healthcare professional was reported by 23% of respondents for themselves and by 25% for family members. Thirty percent of respondents with a diagnosis of Lyme disease had been diagnosed with Lyme more than once.
- One fifth of respondents had found ticks attached to themselves, and the percent reporting ticks attached to family members was only slightly higher (26%); 18% had ever found a bull's eye rash on themselves.
- Only 8% of respondents had received a DCDOH tick-removal kit. Half of them used the kit.

Discussion

Overall, most county residents consider Lyme disease to be a problem in Dutchess County, are concerned about contracting Lyme disease and are favorably disposed towards having measures taken to reduce the tick population although a fifth had no opinion with regards to controlling the deer population or to using pesticides on public property. Of note is a certain disconnect between perceptions of public versus private use of chemical pesticides as half of respondents felt these should be used on public property but only 10% had used chemical pesticides on their property in the past year (with safety concerns being most frequently cited as a reason for not using this method).

The majority appear to be generally knowledgeable regarding risks of exposure, symptom identification, Lyme disease treatment, and protection. Residents are also interested in obtaining more information on how to protect themselves against getting Lyme disease.

There are some gaps with regards to knowledge that ticks can cause diseases other than Lyme. Rather than incorrect answers, there were many instances where the residents didn't know the answer to the question, notably that one can only get Lyme via a tick bite, the role of small rodents in the transmission of Lyme, and that a tick needs to be attached at least 36 hours before a person becomes infected with Lyme.

Regional Differences

Knowledge: Region 2 is overall more knowledgeable about Lyme disease and less concerned about contracting the disease than Region 1. Some of the differences may be due to the more rural composition of Region 2, where one might expect residents to be more aware of animal populations and the risks they may carry.

Protection: Personal methods are generally similar in both regions although Region 1 uses insect repellent significantly more often than Region 2, both for self and for outdoor pets. Methods of protecting property are far more aggressive in Region 2 (mowing and pushing back wood line).

Information: Region 1 leans toward obtaining information via radio and television while Region 2 gets information more often by word of mouth and local veterinarians.

Prevention strategies: While both Regions are interested in deer population control and funding research, Region 1 feels more strongly about deer control and the reverse is observed for funding research.

RECOMMENDATIONS

While the majority of county residents are knowledgeable and concerned about Lyme disease, there are still those who are uninformed about other tick-borne diseases. While misinformation did not appear to be a big problem among survey respondents, lack of knowledge was more noticeable as was a lack of opinion or indifference (neither agreed nor disagreed).

Educational and programmatic efforts should continue to focus on increasing awareness of tick-borne diseases and their symptoms, risks of exposure and ways to minimize them; an apparent disconnect between perceptions of public versus private use of chemical pesticides may warrant addressing the benefits and risks of using chemical pesticides. Efforts to reach out to residents should be mindful of the regional differences identified in this report, such as most commonly used sources of information.

Particular attention should be directed to Region 1. More urban and more densely populated than Region 2, it appears to be less knowledgeable but more concerned about contracting Lyme disease.

INTRODUCTION

Lyme disease and other tick-borne diseases have been an important health issue in Dutchess County since 1986. The Dutchess County Department of Health (DCDOH) has been working to prevent and control Lyme disease through a variety of interventions including surveillance activities and educational programs.

Awareness campaigns and educational programs have been effective in preventing exposure to ticks by encouraging modification of personal behavior. Throughout the years, these programs have been evaluated by conducting community surveys to measure people's knowledge, attitudes, and behaviors regarding tick-borne diseases. The DCDOH has been able to develop and modify interventions based on the survey results.

Following the format of previous Dutchess County community surveys conducted in 2001, 2002, and 2003, a new community survey was conducted in the fall of 2009.

METHODOLOGY

Sampling

The county was divided into two regions based on population density and environmental characteristics, following zip code boundaries. Region 1 covered the more densely populated southwestern portion of the county and consisted of the zip codes covering the municipalities of Hyde Park, Poughkeepsie (town and city), Wappinger, East Fishkill, Fishkill, and the City of Beacon. Region 2 comprised the larger, less densely populated and generally more rural remainder of the county. The regions are outlined in the map in appendix A.

A target sample size of 310 surveys per region was determined, for a total of 620 surveys.

Survey Data Collection

A professional survey company was contracted to randomly call county residents living within the two designated regions. Telephone calls to land line phone numbers were made in the fall of 2009, Monday through Saturday, from 9am to 9pm and on Sundays between 12pm and 8pm. However, during the first week of survey administration, it was found that making calls during the day was yielding poor response. To improve the response rate, the vast majority (95%) of calls were then made between 5pm – 9pm. The survey took approximately 25 minutes to complete.

Only English speaking, non-institutionalized, county residents, 18 years of age and older, were surveyed.

Responses were entered into a database by the contractor. A total of 7,975 calls were made to achieve the target sample sizes (total of 620 - 8% of all calls).

Survey Data Analysis

Statistical analysis was conducted using Stata/IC 10.0. Results were analyzed for the county as a whole and for each region separately. Chi-square or Fisher Exact were used to identify any significant difference between the two regions.

Survey Tool

The survey covered the following topics:

- a. General awareness and concerns about Lyme and other tick-borne diseases.
- b. Knowledge of risks of exposure, symptoms, and treatment of Lyme disease.
- c. Personal and property protection against ticks.
- d. Presence of environmental risk factors.
- e. Sources of information about Lyme disease.
- f. Willingness to adopt and support prevention strategies.
- g. Personal Lyme and other tick-borne diseases status.
- h. Respondent sociodemographics (age, gender, income, education, race/ethnicity, and residence zip code).

Data Limitations

- Residents who do not have landline telephones, whose primary language is not English, and who are institutionalized, were not included. The Dutchess County Department of Health will be implementing a survey for Spanish speaking residents in the near future.
- Surveys contain self-reported responses and thereby have an intrinsic bias. Respondents may under-report undesirable behaviors but may over-report desirable behaviors. Ability to recall information may also affect the accuracy of responses.
- The population sample was not stratified to reflect Census demographic characteristics such as gender, age, race/ethnicity, educational attainment, and income level. Consequently, while sociodemographics are described in the report, statistical correlations related to these characteristics could not be made, and some responses may be skewed due to sociodemographic imbalances that do not reflect actual Census proportions.
- When the number of responses to a question was very small, statistically significant conclusions across regions could not be drawn and descriptive statistics should be interpreted with caution.

RESULTS

Understanding the Data

Denominators are adjusted for missing values (blank responses). When missing values exceed nine or more for the total survey sample, the adjusted denominators are included in the tables.

With the exception of the demographic data where statistical comparisons were not made, statistically significant differences between regions are identified with a p value either at the bottom of the table or as an additional column in the table. Non-significant regional differences are identified as “p ns”.

In tables containing multiple choice answers, the percentages do not total 100% since a respondent had the option to choose more than one answer. The denominators reflect the number of respondents.

Demographic Characteristics of Survey Respondents

As mentioned under *Data Limitations*, the population sample was not stratified to reflect Census characteristics for gender, age, race/ethnicity, educational attainment, and income level.

Gender

Female residents were over-represented.

Table 1: Gender				
Gender	Total Survey Sample	Region 1	Region 2	Census ⁺
Female	73.0%	73.1%	72.8%	49.9%
Male	26.9%	26.9%	26.9%	50.1%
Refused	0.2%	0.0%	0.3%	

⁺ Census Bureau Population Estimates 2008

Age

The age groupings used in the survey do not match those used by the Census Bureau except for 60-64 (Census = 5.3%) and 65 + (Census = 12.8%) so it is not possible to provide a complete Census comparison. However, overall, older residents tended to be over-represented and younger residents under-represented (*Census Bureau Populations Estimates 2008*).

Table 2: Age Distribution			
Age Group	Total Survey Sample	Region 1	Region 2
18-29	5.4%	5.9%	4.9%
30-39	13.8%	14.3%	13.3%
40-49	18.3%	12.7%	23.9%
50-59	26.0%	27.7%	24.3%
60-64	11.7%	12.1%	11.3%
65 and over	19.5%	23.8%	15.2%
Refused	5.4%	3.6%	7.1%

Race

White and Black proportions were somewhat under-represented but the differences between the two regions are consistent with the actual county demographics as Region 1 is known to encompass the highest concentrations of Black residents, notably in the City of Poughkeepsie (*Census Bureau Population Estimates 2008*). Nine percent of respondents refused to provide their race.

Table 3: Race				
Race	Total Survey Sample	Region 1	Region 2	Census ⁺
White	77.6%	72.6%	82.6%	84.5%
Black	8.7%	10.3%	7.1%	10.3%
Other	3.1%	3.5%	2.6%	
Refused	9.2%	11.9%	6.5%	
Don't know	1.3%	1.6%	1.0%	
Unknown	0.2%	0.0%	0.3%	

⁺ *Census Bureau Population Estimates 2008*

Ethnicity

Since the survey was conducted only in English, one would expect to see a small percentage of Hispanic residents. Census reports an estimate of 9.1% Hispanic residents (*Census Bureau Population Estimates 2008*).

Table 4: Ethnicity			
Ethnicity	Total Survey Sample	Region 1	Region 2
Hispanic	6.6%	7.4%	5.8%
Non-Hispanic	93.4%	92.6%	94.2%

Educational Attainment

The sample was heavily skewed towards individuals with a higher education. The refusal rate was high for this question.

Table 5: Educational Attainment				
Education	Total Survey Sample (n=602) [*]	Region 1 (n=299)	Region 2 (n=303)	Census ⁺
High school diploma or less	0.0%	0.0%	0.0%	40.1%
Some college	36.0%	38.0%	35.0%	18.0%
Bachelor's degree	37.0%	44.0%	31.0%	19.1%
Graduate degree	4.0%	4.0%	3.0%	13.3%
Refused	23.0%	14.0%	31.0%	

^{*} *Adjusted for 18 missing values*

⁺ *Census Bureau American Community Survey 2008*

Income Level

The survey population did not capture lower income residents. One fifth of respondents refused to answer this question.

Table 4: "In which category would you classify your gross household income?"				
Income	Total Survey Sample (n=606) *	Region 1 (n=309)	Region 2 (n=297)	Census +
Less than \$15,000	0%	0%	0%	9.3%
\$15,000 - \$34,000	0%	0%	0%	14.9%
\$35,000 - \$49,000	6.9%	3.9%	10.1%	12.2%
\$50,000 - \$99,000	19.3%	15.5%	23.2%	33.1%
\$100,000 or greater	39.4%	45.3%	33.3%	30.6%
Don't Know	13.0%	13.3%	12.8%	
Refused	21.3%	22.0%	20.5%	

* Adjusted for 14 missing values

+ Census Bureau American Community Survey 2008

Housing Characteristics

The survey housing groupings do not match for the most part those used by the Census Bureau. Three quarters of respondents resided in a single-family home compared to 65% in the Census Bureau American Community Survey 2008.

Table 5: "Which of the following choices best describes your residence"			
Response	Total Survey Sample	Region 1	Region 2
Single-family home	75.0%	68.7%	81.3%
Apartment condominium or townhouse	17.1%	21.6%	12.6%
Two three or four family home duplex triplex or quadriplex	4.2%	6.1%	2.3%
Refused	2.6%	2.6%	2.6%
Other	1.2%	1.0%	1.2%

Survey Question Analysis

General Awareness and Concerns

Key Findings

- Three quarters of respondents (74%) felt they knew “a lot or some” about Lyme disease. The proportion of respondents who felt they were knowledgeable was significantly higher in Region 2 (p=0.004, Table 6).
- The majority of respondents (87%) felt that Lyme disease is a problem in Dutchess County (Table 7).
- Only 40% were aware that ticks can cause diseases other than Lyme disease (Table 9).
- Close to three quarters of respondents (72%) were concerned that they or their family members will contract Lyme disease. The concern was significantly higher in Region 1 (77% versus 67% in Region 2) and Region 2 had no opinion (neither agree nor disagreed) significantly more often than Region 1 (17% versus 8%) (Tables 11, 12).

Detailed Findings and Tables

- Region 2 was significantly more knowledgeable than Region 1.

Response	Total Survey Sample	Region 1	Region 2
A lot or some	73.9%	69.0%	78.7%
A little or nothing	26.1%	31.0%	21.3%

p=0.004

- While the majority of respondents felt that Lyme disease is a problem, 10% didn’t know if it was or not.

Response	Total Survey Sample	Region 1	Region 2
Yes	86.9%	84.8%	89.0%
No	2.7%	2.9%	2.6%
Don't know	10.3%	12.3%	8.4%

p ns

- The percentage of respondents who felt that Lyme disease is a serious problem in their neighborhood was somewhat lower than the percentage of those who thought the disease is a problem in the county. Again, 10% didn't know the answer to the question.

Table 8: "In your opinion, how serious of a problem is Lyme disease in your neighborhood?"

Response	Total Survey Sample	Region 1	Region 2
Very serious or Somewhat serious	69.2%	69.4%	69.0%
Not much of a problem or Not a problem at all	20.5%	18.1%	22.9%
Don't know	10.3%	12.6%	8.1%

p ns

- Less than half of respondents were aware that ticks can cause diseases other than Lyme.

Table 9: "Are you aware of any other diseases caused by ticks?"

Response	Total Survey Sample	Region 1	Region 2
Yes	40.0%	36.8%	43.2%
No	58.1%	61.0%	55.2%
Don't know	1.8%	2.3%	1.3%
Refused	0.2%	0.0%	0.3%

p ns

- Respondents who answered "Yes" in Table 9 were almost all aware of Rocky Mountain Spotted Fever and half were aware of Ehrlichiosis. There were no significant regional differences although awareness of Tularemia was noticeably higher in Region 2.

Table 10: "Which of the following tick-borne diseases are you aware of?"

Response	Total Survey Sample (n=248)	Region 1 (n=114)	Region 2 (n=134)
Rocky Mountain Spotted Fever	80.6%	78.1%	82.8%
Ehrlichiosis	50.4%	50.9%	50.0%
Tick Paralysis	38.3%	36.8%	39.6%
Babesiosis	34.7%	38.6%	31.3%
Tularemia	23.8%	17.5%	29.1%
Anaplasmosis	18.1%	20.2%	16.4%
Other	2.4%	3.5%	1.5%

p ns

- Many respondents (72%) were concerned that they or their family members will contract Lyme disease. There were significant differences between regions; Region 1 respondents were far more concerned while Region 2 respondents had no opinion.

Response	Total Survey Sample	Region 1	Region 2
Agree	72.3%	77.4%	67.1%
Disagree	13.9%	13.2%	14.5%
Neither agree nor disagree	12.6%	7.7%	17.4%
Don't know	1.3%	1.6%	1.0%

p=0.002

- Concern regarding contracting other tick-borne diseases was lower than for Lyme disease.

Response	Total Survey Sample	Region 1	Region 2
Agree	55.0%	57.1%	52.9%
Disagree	23.1%	23.9%	22.6%
Neither agree nor disagree	17.6%	13.9%	21.3%
Don't know	4.4%	5.2%	3.6%

p ns

Knowledge of Risk of Exposure

Key Findings

- Overall, respondents had a good understanding of the risks of exposure. However, knowledge was somewhat lacking in the following areas:
 - Greater than a quarter of respondents either believed that they can get Lyme disease in ways other than a tick bite (11%) or didn't know if that was possible (17%). Lack of knowledge was significantly higher in Region 1 (p=0.005) (Table 13).
 - Only 23% knew that ticks need to be attached to the skin for at least 36 hours before a person becomes infected with Lyme disease; 49% provided an incorrect answer, and 28% didn't know the answer to the question (Table 16).
 - Even though 78% of respondents knew that mice and other small rodents are important in the transmission of Lyme disease, 16% didn't know. Again, lack of knowledge was significantly higher in Region 1 (p=0.02) (Table 17).

Detailed Findings and Tables

- As noted above, Region 1 was overall significantly less informed than Region 2. Of note is the much higher percentage of respondents who didn't know the answer to the question compared to those who gave an incorrect answer, especially in Region 1.

Table 13: "You can get Lyme disease by methods other than from the bite of a tick."			
Response	Total Survey Sample	Region 1	Region 2
True	11.0%	12.9%	9.0%
False	72.6%	66.8%	78.4%
Don't know	16.5%	20.3%	12.6%

p=0.005

- Most respondents believed that ticks can be found on cut grass such as in a backyard lawn.

Table 14: "Ticks can be found on cut grass such as in a backyard lawn."			
Response	Total Survey Sample	Region 1	Region 2
True	92.4%	91.3%	93.6%
False	4.2%	4.2%	4.2%
Don't know	3.4%	4.5%	2.3%

p ns

- The majority of respondents were aware that not every tick bite results in Lyme disease. Awareness was significantly higher in Region 2.

Table 15: "Every tick bite results in Lyme disease."			
Response	Total Survey Sample	Region 1	Region 2
True	3.7%	4.5%	2.9%
False	90.3%	87.1%	93.6%
Don't know	6.0%	8.4%	3.6%

p=0.019

- Few respondents knew that ticks generally need to be attached to the skin for at least 36 hours before a person becomes infected with Lyme disease. Half gave an incorrect answer and more than a quarter didn't know the answer.

Table 16: "Generally, ticks need to be attached to your skin for at least 36 hours before a person becomes infected with Lyme disease."			
Response	Total Survey Sample	Region 1	Region 2
True	22.9%	25.2%	20.7%
False	49.0%	44.8%	53.2%
Don't know	28.1%	30.0%	26.1%

p ns

- While close to 80% of respondents knew that mice and other small rodents are important in the transmission of Lyme disease, 16% didn't know the answer to the question. Region 1 was significantly less informed than Region 2.

Response	Total Survey Sample	Region 1	Region 2
True	78.4%	73.9%	82.9%
False	5.3%	6.1%	4.5%
Don't know	16.3%	20.0%	12.6%

p=0.022

Knowledge of Detection

Key Findings

- The vast majority of respondents were well informed with regards to the detection of Lyme disease, including identification of early symptoms, the medical ramifications of Lyme disease, and the occurrence of a bull's eye rash (Tables 18-21).
 - The percentage of respondents who were well informed was always higher in Region 2. The difference was significantly higher with regards to the association of a bull's eye rash with Lyme disease (p=0.036) and the knowledge that Lyme disease can affect the heart and nervous system (p=0.007) (Tables 18, 21).

Detailed Findings and Tables

- The majority of respondents knew that a "bull's-eye" rash can be associated with Lyme disease. The percentage was significant higher in Region 2.

Response	Total Survey Sample	Region 1	Region 2
True	93.6%	91.0%	96.1%
False	1.1%	1.6%	0.7%
Don't know	5.3%	7.4%	3.2%

p=0.036

- Respondents were also well informed regarding early symptoms of Lyme disease.

Table 19: “Some early symptoms of Lyme disease can resemble those of the flu, such as fever, chills, muscle aches, and fatigue.”

Response	Total Survey Sample	Region 1	Region 2
True	94.5%	92.9%	96.1%
False	1.0%	1.6%	0.3%
Don't know	4.5%	5.5%	3.6%

p ns

- Notably, most respondents were aware that Lyme disease can occur without the development of a “bull’s-eye” rash. While 14.5% of Region 1 respondents didn’t know the answer to this question, the difference was not statistically different from Region 2.

Table 20: “Lyme disease can occur without a “bull’s-eye” rash.”

Response	Total Survey Sample	Region 1	Region 2
True	85.3%	82.3%	88.4%
False	3.1%	3.2%	2.9%
Don't know	11.6%	14.5%	8.7%

p ns

- The majority of respondents knew that Lyme disease can affect the heart and nervous system, significantly more so in Region 2.

Table 21: “Lyme disease can affect the heart and nervous system.”

Response	Total Survey Sample	Region 1	Region 2
True	93.1%	90.0%	96.1%
False	0.8%	1.3%	0.3%
Don't know	6.1%	8.7%	3.6%

p=0.007

Knowledge of Treatment

Key Findings

- Almost all respondents knew that Lyme disease won’t go away if left untreated (92%) (Table 22).
- Just under two thirds were aware that not every tick bite should be treated with antibiotics (65%) (Table 23).
- For both the above questions, Region 1 was significantly less knowledgeable than Region 2 (p=0.002 and p=0.015 respectively).

Detailed Findings

- As mentioned above, Region 1 was significantly less informed than Region 2.

Table 22: “Lyme disease will go away if left untreated.”

Response	Total Survey Sample	Region 1	Region 2
True	2.4%	2.9%	1.9%
False	92.3%	88.7%	95.8%
Don't know	5.3%	8.4%	2.3%

p=0.002

- The significant differences between the two regions are attributable to a higher percentage of Region 1 respondents who didn't know the answer to the question and a lower incidence of correct answers in that region.

Table 23: “Every tick bite should be treated with antibiotics.”

Response	Total Survey Sample	Region 1	Region 2
True	25.7%	27.1%	24.2%
False	64.5%	60.0%	69.0%
Don't know	9.8%	12.9%	6.8%

p=0.015

- Most respondents believed that tweezers are a safe and effective way to remove a tick.

Table 24: “In your opinion, which of the following are safe and effective ways to remove a tick?”

Response	Total Survey Sample (n=610) *	Region 1 (n=304)	Region 2 (n=306)
Tweezers	93.1%	91.4%	94.8%
Vaseline or other chemicals	9.5%	11.2%	7.8%
Fingers	9.0%	9.5%	8.54%
Matches/Heat source	7.5%	8.9%	6.2%
Razor	0.8%	1.0%	0.76%
Don't know	3.3%	4.6%	2.0%

* Adjusted for 10 missing values

p ns

Personal Protection

Key Findings

- The majority of respondents take precautions against exposure to ticks in high risk areas either by consistently avoiding wooded, brushy, or high grass areas (69%) or by proactively protecting themselves with barrier methods (tucking pants – 59%, using insect repellent – 65%) (Tables 25-27).

- When outdoors but not in wooded, brushy, or high grass areas, the most frequently used precaution is checking oneself for ticks (53%), followed by insect repellent use (26%) (Table 29).

Detailed Findings and Tables

- Of the 69% who avoided wooded, brushy, or high grass areas to prevent exposure to ticks, 46% did so on every occasion. Comparison of those who always/often avoid to those who only occasionally or never avoid these areas reveals a significant difference between the two regions (67.5% in Region 1 and 71% in Region 2).

Table 25: “How often do you avoid wooded, brushy, or high grass areas to prevent exposure to ticks in the last 12 months?”			
Response	Total Survey Sample	Region 1	Region 2
Always	45.7%	42.3%	49.0%
Often	23.7%	25.2%	22.3%
Occasionally	16.8%	19.0%	14.5%
Never	12.9%	11.9%	13.9%
Don't know	1.0%	1.6%	0.3%

Regional difference: p=0.035 for comparison of always/often to occasionally/never

- Among those who only occasionally or never avoided wooded, brushy, or high grass areas (30%), more than half used other precautions, and the remainder did nothing as a result of misconception, indifference or lack of knowledge.

Table 25-1: If Never or Occasionally, “Why is that?”			
Response	Total Survey Sample (n=153) *	Region 1 (n=80)	Region 2 (n=73)
Used other precautions	60.1%	58.8%	61.6%
Too troublesome	15.0%	16.3%	13.7%
Don't know	12.4%	13.8%	11.0%
Didn't think there was any risk	10.5%	10.0%	11.01%
Wasn't aware the precaution would work	2.6%	2.5%	2.73%
Refused	1.3%	1.3%	1.4%

* Adjusted for 31 missing values

p ns

- More than half of respondents always or often tucked their pants into their socks before entering wooded, brushy, or high grass areas to prevent exposure to ticks.

Table 26: “How often do you tuck your pants into your socks before entering wooded, brushy, or high grass areas to prevent exposure to ticks?”			
Response	Total Survey Sample (n=591) *	Region 1 (n=294)	Region 2 (n=297)
Always	35.7%	32.7%	38.7%
Often	22.3%	20.4%	24.2%
Occasionally	13.7%	14.3%	13.1%
Never	24.7%	28.6%	20.9%
Don't know	1.7%	2.0%	1.4%
Refused	1.9%	2.0%	1.7%

* Adjusted for 29 missing values

p ns

- Of the 227 (38%) respondents who occasionally or never tucked their pants into their socks, 190 identified reasons why; 45% used other precautions, and the remainder did nothing due to misconception, indifference or lack of knowledge.

Table 26-1: If Never or Occasionally, “Why is that?”			
Response	Total Survey Sample (n=190) *	Region 1 (n=106)	Region 2 (n=84)
Used other precautions	45.3%	44.3%	46.4%
Too troublesome	25.3%	27.4%	22.6%
Didn't think there was any risk	13.7%	14.2%	13.1%
Wasn't aware the precaution would work	12.1%	10.4%	14.3%
Don't know	10.0%	9.4%	10.7%
Refused	0.5%	0.0%	1.2%

* Adjusted for 37 missing values

p ns

- Two thirds of respondents always or often used insect repellent before entering wooded, brushy or high grass areas to prevent exposure to ticks. While not statistically significant, Region 1 was far less compliant than Region 2, including when grouping “always” with “often” and “occasionally” with “never”.

Table 27: “How often do you use insect repellent before entering wooded, brushy, or high grass areas to prevent exposure to ticks?”			
Response	Total Survey Sample (n=572) *	Region 1 (n=286)	Region 2 (n=286)
Always	42.5%	38.1%	47.0%
Often	22.6%	23.1%	22.0%
Occasionally	16.4%	16.8%	16.1%
Never	15.4%	18.2%	12.6%
Don't know	1.1%	1.1%	1.1%
Refused	2.1%	2.8%	1.4%

* Adjusted for 48 missing values

p ns

- Among those who never or occasionally used insect repellent, almost half used other precautions, and the remainder did nothing due to misconception, indifference or lack of knowledge. Note that this question was left blank in one fifth of respondents (38/182).

Table 27-1: If Never or Occasionally, “Why is that?”			
Response	Total Survey Sample (n=144) *	Region 1 (n=79)	Region 2 (n=65)
Used other precautions	48.6%	45.6%	52.3%
Too troublesome	22.2%	27.8%	15.4%
Wasn't aware the precaution would work	13.9%	10.1%	18.5%
Didn't think there was any risk	11.8%	10.1%	13.8%
Don't know	6.9%	8.9%	4.6%
Refused	1.4%	1.3%	1.5%

* Adjusted for 38 missing values

p ns

- Eighty five percent of respondents always or often checked themselves for ticks after being in wooded, brushy, or high grass areas.

Table 28: “How often do you check yourself for ticks after being in wooded, brushy, or high grass areas?”			
Response	Total Survey Sample (n=572)	Region 1 (n=286)	Region 2 (n=286)
Always	68.4%	65.4%	71.3%
Often	16.6%	16.1%	17.1%
Occasionally	6.3%	6.6%	5.9%
Never	7.2%	9.8%	4.6%
Don't know	0.9%	1.1%	0.7%
Refused	0.7%	1.0%	0.4%

* Adjusted for 48 missing values

p ns

- Of the 13% (n=77) who never or occasionally checked themselves for ticks, one quarter used other precautions, and the remainder did nothing as a result of misconception, indifference or lack of knowledge. While there are notable differences between regions, these were not statistically significant; Region 1 was far less likely to take other precautions than Region 2. Note that this question was left blank in 23% of respondents.

Table 28-1: If Never or Occasionally, “Why is that?”			
Response	Total Survey Sample (n=59) *	Region 1 (n=34)	Region 2 (n=25)
Used other precautions	27.1%	23.5%	32.0%
Didn't think there was any risk	32.2%	38.2%	24.0%
Too troublesome	23.7%	26.5%	20.0%
Wasn't aware the precaution would work	8.5%	2.9%	16.0%
Don't know	10.2%	11.8%	8.0%

* Adjusted for 18 missing values

p ns

- Checking oneself for ticks was the most often used precaution when outdoors but not in wooded, brushy, or high grass areas. Region 1 used insect repellent significantly more often than Region 2. “Other precautions” were not identified.

Table 29: “Which of these precautions do you take to prevent exposure to ticks, when you are outdoors but not in wooded, brushy, or high grass areas (ex. watering garden, lawn etc.)?”

Response	Total Survey Sample (n=553) *	Region 1 (n=271)	Region 2 (n=282)	p values
Check yourself for ticks	52.6%	52.0%	53.2%	ns
Use insect repellent for ticks	25.7%	31.4%	20.24%	0.003
Tuck pants into socks	14.3%	16.2%	12.4%	ns
Avoid outdoors	8.9%	10.0%	7.8%	ns
None of the above	30.9%	27.3%	34.4%	ns

* Adjusted for 67 missing values

Protecting Property

Key Findings

- Only 10% of respondents stated that chemical pesticides had been used to control or kill ticks on their property in the last 12 months, and most stated that this method was very likely or somewhat likely to be used again in the future (Tables 30, 30-1).
 - Among the 80% who did not use chemical pesticides, the main reason by far was safety concerns (39%).
- To protect property against ticks, mowing the grass short and pushing back wooded area boundaries as far from the house as possible were the most frequently used methods (80% and 35% respectively) (Table 31). The use of leaf/brush removal could not be assessed due to too many missing responses.
 - Region 1 was far less likely to use lawn mowing and pushing back wooded areas than Region 2 (p=0.01 and p=0.000 respectively).

Detailed Findings and Tables

- The majority of respondents did not have chemical pesticides applied to their property in the last 12 months, and greater than 8% didn’t know if pesticides had been used on their property.

Table 30: “In the last 12 months, has a chemical pesticide been used to control or kill ticks on your property?”

Response	Total Survey Sample	Region 1	Region 2
Yes	10.3%	11.6%	9.0%
No	80.7%	77.1%	84.2%
Don’t know	8.7%	11.0%	6.5%
Refused	0.3%	0.3%	0.3%

p ns

- Of the 10% who had chemical pesticides used on their property, almost all stated that this method was very likely or somewhat likely to be used again.

Response	Total Survey Sample n=64	Region 1 n=36	Region 2 n=28
Very likely	71.9%	75.0%	67.9%
Somewhat likely	25.0%	19.4%	32.1%
Not very likely	1.6%	2.8%	0.0%
Don't Know	1.6%	2.8%	0.0%

p ns

- Among the 81% who did not have chemical pesticides used on their property (Table 30), and among those who were not likely to have chemical pesticides re-applied (1.6% from Table 30-1), the main reason given by far was safety concerns (39%); a tenth felt it was too costly or used other precautions. A small percent of respondents were not aware that pesticides work against ticks or felt it was too troublesome to use the chemicals. In 5% of cases, using chemicals was not an option as the respondents did not own the land.
- **Question: “In the last 12 months, has leaf and/or brush litter been removed from your lawn area?”**
Only 119/620 (19%) respondents provided an answer to this question making it impossible to provide a meaningful analysis and comparison of regions.
- Excluding the above question regarding having leaf/brush removed from lawns, the most frequently used method by far used to control or kill ticks on property was mowing the grass short, followed by pushing back wooded area boundaries. Both methods were used significantly more often in Region 2.

Response	Total Survey Sample (n=602) *	Region 1 (n=299)	Region 2 (n=303)	p values
Mowing the grass short	82.4%	78.3%	86.5%	0.010
Push back wooded area boundaries as far from the house as possible	35.7%	28.8%	42.6%	0.000
Let yard or garden dry thoroughly before re-watering	13.3%	16.4%	10.2%	ns
Don't know	10.0%	12.7%	7.3%	ns
Laying down a three foot woodchip barrier where lawn backs up to woods	4.7%	4.0%	5.3%	ns
N/A (ex. Don't have a lawn area)	4.5%	5.7%	3.3%	ns
Refused	0.5%	0.3%	0.6%	ns

* Adjusted for 18 missing values

Environmental Risk Factors

Key Findings

- Approximately three quarters of respondents were aware of deer visiting their property or had a wooded area on or next to their property (Table 32, 33).
- Less than 10% of respondents had a fence around their property to specifically keep deer out of the yard. The percent in Region 1 was significantly higher than in Region 2 (p=0.000) (Table 35).
- Of the 37% respondents who had pets that go outdoors, 70% used a tick repellent on the pet, especially in Region 1 (p=0.000) (Table 37).

Detailed Findings and Tables

- Respondents were aware for the most part of deer visiting their property.

Table 32: “Do you see, or are you aware of deer visiting your property?”

Response	Total Survey Sample	Region 1	Region 2
Yes	76.5%	75.2%	77.7%
No	23.1%	24.5%	21.6%
Don't know	0.5%	0.3%	0.7%

p ns

- Three quarters of respondents had a wooded area on or next to their property.

Table 33: “Do you have a wooded area on or next to your property?”

Response	Total Survey Sample	Region 1	Region 2
Yes	75.2%	71.8%	78.7%
No	24.3%	27.6%	21.0%
Don't know	0.5%	0.7%	0.3%

p ns

- Less than a quarter of respondents had a stone wall on, or bordering their property.

Table 34. “Is there a stone wall on, or bordering, your property?”

Response	Total Survey Sample	Region 1	Region 2
Yes	23.8%	23.3%	24.2%
No	75.1%	74.8%	75.5%
Don't know	1.1%	1.9%	0.3%

p ns

- Only 9.5% of respondents had a fence around their property to specifically keep deer out of the yard. The percentage was significantly higher in Region 1.

Table 35: “Do you have a fence around your property to specifically keep deer out of the yard?”

Response	Total Survey Sample	Region 1	Region 2
Yes	9.5%	13.6%	5.5%
No	89.5%	84.8%	94.2%
Don't know	1.0%	1.6%	0.3%

p=0.000

- More than a third of respondents had pets that go outdoors (230/620).

Table 36: “Do you have pets that go outdoors?”

Response	Total Survey Sample	Region 1	Region 2
Yes	37.1%	34.5%	39.7%
No	62.6%	64.8%	60.3%
Don't know	0.3%	0.7%	0.0%

p ns

- The majority of pets that go outdoors were dogs.

Table 36-1: “If yes, what kind of pet?”

Pet	Total Survey Sample (n=230)	Region 1 (n=107)	Region 2 (n=123)
Dog	84.3%	84.1%	84.6%
Cat	35.7%	35.5%	35.8%
Horse	1.3%	0%	2.4%

p ns

- The majority of respondents who had pets that go outdoors usually accompanied them outdoors (91%). The regions were similar (90% Region 1, 92% Region 2)
- Tick repellent was used widely on outdoor pets, significantly more so in Region 1.

Table 37: “Do you use a tick repellent on your outdoor pet(s), such as a tick collar or topical repellent (e.g., Frontline®)?”

Response	Total Survey Sample (n=230)	Region 1 (n=107)	Region 2 (n=123)
Yes	70.4%	83.2%	59.4%
No	26.5%	14.0%	37.4%
Don't know	3.0%	2.8%	3.3%

p=0.000

- Almost none of the outdoor pets had ever been diagnosed with Lyme by a veterinarian (2%).

- One third of respondents found ticks on their outdoor pets during spring, summer, and fall.

Response	Total Survey Sample (n=230)	Region 1 (n=107)	Region 2 (n=123)
Yes	33.9%	41.1%	27.6%
No	61.3%	54.2%	67.5%
Don't know	4.8%	4.7%	1.9%

p ns

- Most of those who found ticks on their outdoor pets did so only occasionally.
- Only three respondents found ticks on their outdoor pets during winter.

Information Sources on Lyme Disease

Key Findings

- There was no one predominant source of information. The top three sources of information in the past 12 months were fact sheet/brochures/pamphlets (20%), DCDOH tick warning signs (15%), and DCDOH booth at community events (12%) (Table 39).
- The most prevalent venue for obtaining information in the past 12 months was word of mouth – neighbors/friends/acquaintances (50%), followed by newspapers (32%), healthcare providers/hospitals (31%), and Internet other than DCDOH website (30%) (Table 40).
 - Region 1 favored radio and television while Region 2 favored word of mouth and local veterinarians (all statistically different except for television).

Detailed Findings and Tables

- Even though the Tick Smart Program and DCDOH Lyme hotline were seldom used, (6% and 5% respectively), Region 1 used the hotline significantly more often than Region 2 while Region 2 made use of the Tick Smart Program significantly more often than Region 1.

Response	Total Survey Sample	Region 1	Region 2	p values
Fact sheets, brochures, or pamphlets	20.0%	22.2%	17.8%	ns
DCDOH tick warning signs (ex. at parks, recreational areas and schools)	15.3%	16.1%	14.6%	ns
DCDOH booth at community events	11.9%	10.8%	13.0%	ns
Tick Smart Program	6.2%	3.4%	8.4%	0.037
DCDOH website	6.1%	7.9%	4.2%	ns
DCDOH Lyme disease hotline	4.9%	7.3%	2.6%	0.028
At a Hudson Valley Renegades game	0.8%	0.7%	1.0%	ns

- Of the 20% (n=122) who obtained fact sheets/brochures/pamphlets, only 40% (n=50) identified where they got the materials from. The two main sources identified were the doctor's office (26%) and the DCDOH (14%).
- In the past 12 months, the main source providing information about Lyme disease was neighbors/friends/acquaintances. Region 2 relied significantly more on word of mouth (neighbors/friends) and local veterinarians while Region 1 obtained information via radio; Region 1 also used TV far more often (approaching statistical significance).

Response	Total Survey Sample	Region 1	Region 2	p values
Neighbors, friends, or acquaintances	51.1%	46.8%	55.5%	0.037
Newspaper	32.4%	35.2%	29.7%	ns
Healthcare providers or hospitals	31.0%	31.6%	30.3%	ns
Internet (other than DCDOH website)	29.5%	27.4%	31.6%	ns
Local veterinarians	21.3%	17.7%	24.8%	0.039
TV	19.0%	22.3%	15.8%	ns (0.052)
Radio	16.6%	20.3%	12.9%	0.017
None of the sources listed here	16.6%	18.1%	15.2%	ns
Local or state elected officials	3.2%	3.2%	3.2%	ns
Lyme Advocacy/Support Groups	2.7%	2.6%	2.9%	ns
Don't know	0.6%	1.0%	0.3%	ns
Refused	0.2%	0.0%	0.3%	ns

Adopting Prevention Strategies

Key Findings

- Three quarters of respondents wanted more information on how people can protect themselves against getting Lyme disease (Table 41).
- Close to half of respondents felt that pesticides should be used on public property, such as recreational areas, to reduce the tick population, and almost 20% neither agreed nor disagreed (Table 42).
- Half of respondents wanted to see measures taken to control the county's deer population, particularly in Region 1 (p=0.000). However, almost a fifth of respondents neither agreed nor disagreed (Table 43).
- Most respondents wanted to see more research funded to find methods to control the tick population, particularly in Region 2 (p=0.015) (Table 44).

Detailed Findings and Tables

- There was generally interest in obtaining more information on how to protect oneself against getting Lyme disease.

Table 41: “I would like more information on how people can protect themselves from getting Lyme disease.”

Response	Total Survey Sample	Region 1	Region 2
Agree	74.4%	71.1%	77.7%
Disagree	17.5%	19.8%	15.2%
Neither agree nor disagree	7.0%	7.5%	6.5%
Don't know	1.1%	1.6%	0.7%

p ns

- Thirty percent of respondents didn't think pesticides should be used on public property to reduce the tick population but almost a fifth had no opinion.

Table 42: “I think pesticides should be used on public property, such as recreational areas, to reduce the tick population.”

Response	Total Survey Sample	Region 1	Region 2
Agree	47.3%	47.1%	47.4%
Disagree	29.6%	30.7%	28.6%
Neither agree nor disagree	17.8%	16.5%	19.2%
Don't know	5.3%	5.8%	4.9%

p ns

- Half of respondents felt that measures should be taken to control the county's deer population, significantly more so in Region 1. Again, a fifth had no opinion.

Table 43: “I think measures should be taken to control the county's deer population.”

Response	Total Survey Sample	Region 1	Region 2
Agree	51.1%	54.8%	47.4%
Disagree	24.8%	24.2%	25.3%
Neither agree nor disagree	20.7%	15.2%	26.3%
Don't know	0.2%	0.3%	0%

p=0.000

- Most respondents agreed that there should be more research funded to find methods to control ticks. The percentage was significantly higher in Region 2.

Table 44: “I would like to see more research funded to find methods of tick control.”

Response	Total Survey Sample	Region 1	Region 2
Agree	89.6%	85.8%	93.5%
Disagree	2.9%	4.2%	1.6%
Neither agree nor disagree	4.5%	5.8%	3.3%

p=0.015

Personal and Family Medical History Involving Ticks

Key Findings

- Close to half of respondents (47%) had ever been tested for Lyme disease (Table 45).
 - The most prevalent reason for testing was presence of symptoms of Lyme disease (57%), followed by a tick bite or attached tick (32%), and part of routine blood work (21%) (Table 45-1).
- A diagnosis of Lyme disease by a healthcare professional was reported by 23% of respondents for themselves and by 25% for family members. Thirty percent of respondents with a diagnosis of Lyme disease had been diagnosed with Lyme more than once (Tables 46-47).
- One fifth of respondents had found ticks attached to themselves, and the percent reporting ticks attached to family members was only slightly higher (26%); 18% had ever found a bull's eye rash on themselves (Tables 48-50).
- Only 8% of respondents had received a DCDOH tick-removal kit. Half of them used the kit (Table 51).

Detailed Findings and Tables

- As mentioned above, the sample was evenly divided between those who had and those who had not been tested for Lyme disease.

Response	Total Survey Sample	Region 1	Region 2
Yes	46.2%	46.5%	46.0%
No	50.2%	50.0%	50.5%
Don't know	3.2%	3.2%	3.2%
Refused	0.3%	0.3%	0.3%

p ns

- Of the 46% who had been tested for Lyme disease, the top two reasons for testing were symptoms of Lyme disease (59%) and a tick bite or attached tick (32%).

Response	Total Survey Sample (n=277) *	Region 1 (n=137)	Region 2 (n=140)
I had symptoms of Lyme disease	58.8%	57.7%	60.0%
I had a tick bite/tick attached to me	32.9%	33.6%	32.1%
It was part of a routine checkup (standard blood work)	21.7%	21.2%	22.1%
Health care professional recommended it	19.9%	17.57%	22.1%
I asked to be tested	8.7%	11.7%	5.7%
Don't Know	0.3%	0.0%	0.7%
Blank Records	(n=9)	(n=7)	(n=2)

* Adjusted for 9 missing values

p ns

- The most frequently diagnosed tick-borne disease was by far Lyme disease.

Table 46. “Have you ever been diagnosed by a health care professional as having any of the following?”

Response	Total Survey Sample	Region 1	Region 2
Lyme	22.9%	23.5%	22.3%
Ehrlichiosis	1.8%	1.3%	2.3%
Don't know	1.5%	1.0%	1.9%
Babesiosis	1.3%	1.9%	0.6%
Rocky Mountain Spotted Fever	0.5%	0.6%	0.3%
Tick Paralysis	0.2%	0.3%	0.0%
Refused	0.2%	0.3%	0.0%

p ns

- Among the 142 respondents diagnosed with Lyme, 30% had been diagnosed more than once.

Table 46-1: “Have you been diagnosed with Lyme disease more than once?”

Response	Total Survey Sample (n=142)	Region 1 (n=73)	Region 2 (n=60)
Yes	29.6%	28.8%	30.4%
No	69.0%	69.9%	68.1%
Don't know	1.4%	1.4%	1.5%

p ns

- A quarter of respondents stated that their family members had been diagnosed with Lyme disease by a healthcare professional. The incidence of other tick-borne diseases was negligible.

Table 47: “Have any other members of your household (other than yourself) been diagnosed by a healthcare professional as having any of the following?”

Response	Total Survey Sample	Region 1	Region 2
Lyme	25.0%	23.2%	26.8%
Other tick-borne diseases	1.8%	1.0%	2.2%
Don't know	1.0%	0.3%	0.3%
Refused	0.2%	0.3%	0.0%

p ns

- Of the 155 respondents who stated that their family members were diagnosed with Lyme, the average number of family members per respondent was 1.5 in Region 1 and 1.6 in Region 2.

- Few respondents had ever found a “bull-eye” rash on themselves.

Table 48: “Have you ever found a “bulls-eye” rash on yourself?”			
Response	Total Survey Sample	Region 1	Region 2
Yes	17.9%	16.5%	19.4%
No	81.8%	82.9%	80.6%
Don't know	0.3%	0.7%	0.0%

p ns

- One fifth of respondents had found ticks attached to themselves in the past 12 months.

Table 49: “In the past 12 months, have you found any ticks attached to yourself?”			
Response	Total Survey Sample	Region 1	Region 2
Yes	20.0%	20.3%	19.8%
No	79.2%	78.7%	79.6%
Don't know	0.8%	1.0%	0.7%

p ns

- The percent of respondents who reported that family members had found ticks attached to themselves in the past 12 months was only slightly higher than for self.

Table 50: “In the past 12 months, have any other members of your household (other than yourself) found any ticks attached to themselves?”			
Response	Total Survey Sample	Region 1	Region 2
Yes	26.1%	26.2%	26.1%
No	71.9%	71.2%	72.6%
Don't know	2.0%	2.6%	1.3%

p ns

- Only 8% (n=49) of respondents had received a DCDOH tick-removal kit.

Table 51: “Have you ever received a Dutchess County Department of Health tick-removal kit?”			
Response	Total Survey Sample	Region 1	Region 2
Yes	7.9%	8.7%	7.1%
No	90.5%	90.3%	90.6%
Don't know	1.6%	1.0%	2.3%

p ns

- Half of those who received the kit used it (26/49). Region 2 used the kit more frequently than Region 1 but the difference was not statistically significant (64% and 44% respectively).

- The DCDOH was the most frequent source for the tick removal kit. “Other” was not broken down because the numbers per response were too small (1 to 3 on average).

Response	Total Survey Sample (n=48)	Region 1 (n=26)	Region 2 (n=22)
DCDOH directly	35.4%	30.8%	40.9%
Healthcare provider	12.5%	11.5%	13.6%
Family or friends	10.4%	15.4%	4.5%
Other	31.2%	30.8%	31.8%
Don't Know	10.4%	11.5%	9.1%

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DISCUSSION

Overall, most county residents feel that Lyme disease is a problem in Dutchess County, are concerned about contracting Lyme disease, and are favorably disposed towards having measures taken to reduce the tick population, although a fifth had no opinion with regards to controlling the deer population or to using pesticides on public property. Of note is a certain disconnect between perceptions of public versus private use of chemical pesticides as half of respondents felt these should be used on public property but only 10% had used chemical pesticides on their property in the past year (with safety concerns being most frequently cited as a reason for not using this method).

The majority appear to be generally knowledgeable and perceive themselves to be knowledgeable regarding risks of exposure, symptom identification, how to treat Lyme disease, and how to protect oneself. Residents are also interested in obtaining more information on how to protect themselves against getting Lyme disease.

There are some gaps with regards to knowledge that ticks can cause diseases other than Lyme. Rather than incorrect answers, there were many instances where the residents didn't know the answer to the question, notably that one can only get Lyme via a tick bite, the role of small rodents in the transmission of Lyme, and that a tick needs to be attached at least 36 hours before a person becomes infected with Lyme.

Regional Differences

Knowledge: Region 2 is overall more knowledgeable than Region 1 - how one gets Lyme, the role of small rodents, a tick bite doesn't always result in Lyme disease, symptom identification, medical consequences, how to treat Lyme. It also perceives itself to be more knowledgeable than Region 1 but is less concerned about contracting Lyme disease, perhaps due to better understanding of the issues. Some of these differences may be due to the more rural composition of Region 2, where one might expect residents to be more aware of animal populations and the risks they may carry.

Protection: Personal protection methods are generally similar in both regions although Region 1 uses insect repellent significantly more often than Region 2, both for self and for outdoor pets.

Methods of protecting property are far more aggressive in Region 2 (mowing and pushing back wood line).

Information: Region 1 leans toward obtaining information via radio and television while Region 2 gets information more often by word of mouth and local veterinarians.

Prevention strategies: While both Regions are interested in deer population control and funding research, Region 1 feels more strongly about deer control and the reverse is observed for funding research.

RECOMMENDATIONS

While the majority of county residents are knowledgeable and concerned about Lyme disease, there are still those who are uninformed about other tick-borne diseases. While misinformation did not appear to be a big problem among survey respondents, lack of knowledge was more noticeable as was a lack of opinion or indifference (neither agreed nor disagreed).

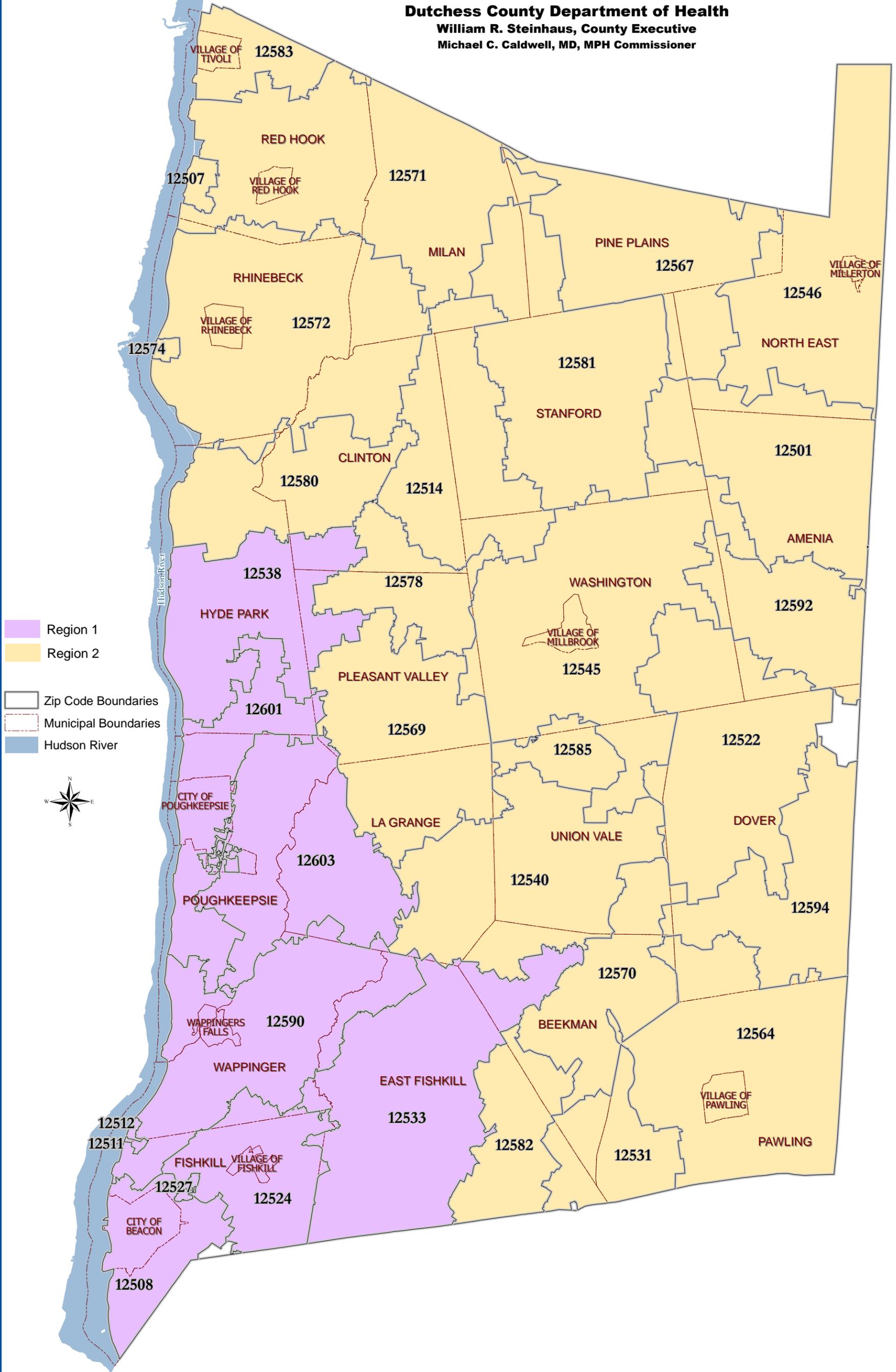
Educational and programmatic efforts should continue to focus on increasing awareness of tick-borne diseases and their symptoms, risks of exposure and ways to minimize them; an apparent disconnect between perceptions of public versus private use of chemical pesticides may warrant addressing the benefits and risks of using chemical pesticides. Efforts to reach out to residents should be mindful of the regional differences identified in this report, such as most commonly used sources of information.

Particular attention should be directed to Region 1. More urban and more densely populated than Region 2, it appears to be less knowledgeable but more concerned about contracting Lyme disease.

Lyme Disease Community Survey 2009

Survey Regions

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- Region 1
- Region 2
- Zip Code Boundaries
- Municipal Boundaries
- Hudson River

