

# Lakes Region Climate & Health Intervention FY16 and FY17 Intervention Summary Report

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## 1. Background

This climate and health adaptation project is an outgrowth of the NH State Climate Action Plan<sup>1</sup> created by a stakeholder process in 2009. That Plan's adaptation chapter recommended that the public health community identify and protect the vulnerable populations at risk for climate impacts.

In 2015, Partnership for Public Health (PPH) and its partner Lakes Region Planning Commission (LRPC) reviewed the latest research on climate patterns<sup>2, 3</sup> in the region and the potential impacts on the health and well-being of people in the area.

Beginning in May, 2015, the planning process reviewed relevant research from available data sources including local/regional hazards, existing climate indicators and anticipated changes, vulnerable populations, and Census data.<sup>4</sup>

Input was gathered during meetings with the region's Public Health Emergency Preparedness and Response Council (and its Medical Subcommittee) as well as the Winnepesaukee Public Health Council (WPHR) Public Health Council. Guidance and resources were tapped from Department of Health and Human Services (DHHS), and the Bureau of Infectious Diseases BIDC/DPHS. Stephenson Strategic Communications (SSC) a behavioral public relations firm assisted with behavioral intervention and research expertise.

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- <sup>1</sup> [NH State Climate Action Plan, 2009.](#)
  - <sup>2</sup> [Climate Change in Southern New Hampshire: Past, Present, and Future \(2014\)](#) documents and predicts a warmer and wetter climate for the region
  - <sup>3</sup> Wake, C.P. et al. (2015) *Climate Change and Human Health in New Hampshire: Past, Present, and Future. Climate Solutions New England Report, Sustainability Institute t the University of New Hampshire.* [https://sustainableunh.unh.edu/sites/sustainableunh.unh.edu/files/media/candhreport4.30\\_0\\_0.pdf](https://sustainableunh.unh.edu/sites/sustainableunh.unh.edu/files/media/candhreport4.30_0_0.pdf)
  - <sup>4</sup> [The NH Tickborne Disease Prevention Plan, 2015](#) – humid climate/microclimate is a good environment for ticks.

It was determined that the Lakes Region was at risk for an increase in vector-borne diseases like Lyme Disease, by youths, 5-14 years of age and others that spend time outdoors, and that the municipalities of Laconia and Franklin would offer the best options for pilot testing a program to educate and move behaviors. The plan was completed February, 2016.

## **Goals**

Two overarching goals were set out for the plan:

1. Increasing awareness and education on Lyme disease risks among:
  - a. Youth
  - b. Adults that spend time out of doors
  - c. Tourists
2. Reduce exposure through:
  - a. Protection (clothing, repellants, behavior)
  - b. Identification and removal
  - c. Land management techniques

The plan was started during key times for tick activities, Spring/Summer 2016 and focus work in areas where the target audiences would be most accessible and observable: Schools, Park & Recs, and Camps.

- This project was designed differently from the past interventions by
  - adding a new target audience and
  - seeking to impact true behavior change rather than just increased awareness.

The plan established a consistent set of audience-based learner outcomes and how to appropriately measure these (variables include age and setting)

## **2. Methods**

Based on the review of available literature<sup>5</sup>, educating children (in order to change tick-related behavior) required an approach that uses trusted educators along with ongoing reinforcement of messages over time. Therefore, a two-pronged approach was developed, focusing on campers at two discreet recreational camps, one in Laconia, NH and one in Franklin, NH. Each program was designed with two components:

- Train the trainers (i.e. camp counselors aged ~16-18) via an educational intervention with lecture and skills practice.
- Train the youth target population (i.e. summer day campers, aged 5-15) via an educational intervention intended to raise awareness (environmental knowledge), improve protection (clothing and repellent), inspect, remove, and observe tick habitat for possible changes to

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<sup>5</sup> *Research Literature Review and Recs\_FINAL 5-18-16.docx*

avoid easy transfer.

Table 1: Elements of the Logic Model for Tick Intervention Project in Lakes Region.

INPUTS	ACTIVITIES	OUTPUTS	OUTCOMES
<ul style="list-style-type: none"> <li>• DHHS Support and Counsel</li> <li>• DHHS Funding</li> <li>• Partners</li> </ul>	Identify appropriate stakeholders, trainers, gauge support, recruit,	Identification of 2 appropriate training sites and participation by willing participants, 50-100 students maximum in target audience	Readiness to train; conducting training & evaluation, reinforce training
<ul style="list-style-type: none"> <li>• Stakeholders</li> </ul>	Conduct assessment of effective methods of educating and training children, effective lesson plans, research methodology, handouts and giveaways	A document on children's education, lesson plans, handouts and toolkit with studies showing effectiveness of lessons, methods or handouts	A report on best intervention methods for the target audience
	Train the Trainers	1 training presentation conducted within 1-2 weeks of actual student training, # handouts, pre and post evaluation tools	Increase in knowledge, skills or behaviors
	Train the Youth	1 PowerPoint presentation, hands-on materials including coloring sheet, tick spoon, tick samples, pre and post evaluation tools	Increase in knowledge, skills or behaviors
	Evaluate the project with pre and post-test for tick knowledge	1 pre-presentation survey, 1 post-presentation survey, # survey responses, report on analysis,	Evaluation feedback, children participation in training, parental feedback, camp counselor input and reports

- *For full logic model, see attached spreadsheet document (multiple sheets)*

In consultation with staff from DHHS, UNH Cooperative Extension, and partners working with youth, agreement was reached on a consistent set of anticipated outputs and outcomes (see above) and how to appropriately measure them. Some materials have already been utilized, including the Toolkit developed during the summer of 2016.

A list of studies or existing tick interventions that guided design of the intervention included:

- Connelly et.al. (2009) indicated that conducting tick checks, bathing within a few hours of exposure to likely tick environments, and possibly use of repellants can reduce exposure to Lyme disease.
- Daltroy, et.al. (2007) demonstrated that education, modeling of preventative behaviors, and distribution of outreach materials can lower the rates of tick-borne illnesses in children. While this work was conducted under particular circumstances (entertainment troupe on a ferry to Nantucket), there are many elements that should be transferable to other circumstances.
- The most successful effort that we have seen appears to be the one being used by the Prescott Farm Environmental Education Center in Laconia. These include:
  - **Prescott Farms practice is to provide ongoing training to their staff and campers/program participants related to lyme disease protection/prevention and removal/disposal**
  - Tick checks are part of their routine
  - Children assume some of this responsibility
  - The presence of a tick is approached as part of the natural world, not something unusual or scary
  - Basic information about ticks and what to do if found is communicated
  - The camp has a system for documenting found ticks and communicating with home (once tick is removed, it is placed in tape and stored in the camper's file).
- Unfortunately, changing the external environment shade/vs sun, is not pragmatic. Most of the outdoor learning areas are shaded.

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- Materials for a wide variety of audiences and settings (schools, camps, health professionals, veterinarians, multi-lingual, and those working and recreating outdoors) are readily available at:
  - The city of Nashua <http://www.nashuanh.gov/607/Lyme-Disease-Toolkit>,
  - Maine DHHS <http://www.maine.gov/dhhs/mecdc/infectious-disease/epi/vector-borne/lyme/>, and
  - Vermont Department of Health <http://healthvermont.gov/prevent/zoonotic/tickborne/resources.aspx>

The LRPHN design team participated in a variety of DHHS trainings along with receiving training and input from B IDC and UNH. B IDC had already established an in-school educational program that we observed and modified for the camp base environment (training at point in time when ticks are actually active) and for a wider variety of ages (1-6th grade versus just 4th and 5th grades).

UNH Coop Extension training (by Alan Eaton) was at the adult level, geared primarily for the trainers, not the children. Specifically:

- Past (2015 & 2016):
  - Participated in required training with DHHS and SSC on how to develop work plan and logic model
  - Utilized DHHS Infectious Disease staff for elementary student instruction
  - Utilized DHHS and SSC for development of pre- and post-questionnaires
  - Utilized UNH Coop. Ext. staff for counselor instruction
- Fiscal Year 2017 Project Goals
  - Future training and meetings which could be useful include meeting with staff at Nashua, Maine DHHS, and VT Dept. of Health to learn about what has been successful.
  - Coordinate Public Health Regional requests for Lyme Prevention Education with the staff of NH Bureau of Infectious Disease (B IDC). (Schools, others)
  - Develop a Lyme Prevention Toolkit for Municipalities with a focus on reducing costs related to employee illness/sickness from tick-borne disease
  - Coordinate and deliver PPH Staff Training and Board of Directors training
  - Coordinate and deliver Training to members of the Winnepesaukee Public Health Council
  - If intern is obtained during summer, 2017, outreach to one veterinarian re: project promotion/collaboration and outreach to regional veterinarians

In addition, we plan to follow up with the Parks & Rec, school, and camp programs to:

- Gauge the success of our initial implementation efforts with Park and Rec Directors in Laconia and Franklin
- Coordinate follow-up training (at a minimum of one Park and Rec (Laconia or Franklin) by ensuring that the information, tools, and methods are appropriate for the audience (counselors and teachers) and readily usable as part of their programs with children

- Query repeat counselors on retention of last year's training
- Share Park and Rec Toolkit with on PPH website and with stakeholders as appropriate plan for follow-up training with an eye towards sustaining the effort through a Train-the-Trainer program (Camp counselors should leave with "tick-teaching" materials.)
- Insert Logic Model under 2 (methods) for submission of progress report



**3. Evaluation of Impact FY16 and FY17**

- Two different written surveys were prepared, both with pre and post test versions. Both reflected similar questions, but with campers -- many under the age of 12 and some whose reading skills were questionable, required a simplified form, language and visuals. In some cases the survey had to be read to the youngest students and answers recorded for them. *Note: this was conducted in a group setting which allowed the campers to hear other's responses. We urge caution that the camper data (pre and post) should assumed to be slightly lower (less knowledge) since the data collection methods were somewhat tainted by groupthink.*
- The project was careful to measure awareness and knowledge levels pre and post project and activity. It included:
  - 1) Overall community data on reports of Lyme disease were notated (even though comparable post measurement stats on this would be long coming and influenced by a variety of other events including weather patterns, etc.)
  - 2) Pre and post surveys administered to camp counselors and campers themselves.
- Findings from the pre and post tests on camp counselor's showed 58% had previously been bitten by a tick, yet most (69%) felt only "somewhat knowledgeable" about the causes of Lyme. That increased to 84% feeling "Very Knowledgeable" after the lecture. Most camp counselors (81%), pre-lecture, felt "not very comfortable" or "not comfortable at all" teaching campers about ticks. That too increased after the session with 44% feeling "very comfortable". Yet many, 52%, still only felt "somewhat comfortable". This caused a shift in methodology to having a professional trainer do the camper teaching.<sup>6</sup>
- Describe your baseline measures and methods. This should be part of the evaluation template you completed as part of Appendix G in the climate adaptation guidebook.

Audience	Baseline Measure Methodology	Post Intervention Methodology
Focus Groups	Facilitator led conversation	----
Camp Counselors	Pre-test	Post Test (short term)
Campers	Age-appropriate pre-test	Age-appropriate post-test (short term)
Community	BIDC data	BIDC data

<sup>6</sup> <https://docs.google.com/presentation/d/1VYcgkOtC--KI8agu2cXQICaKfXpX-dHjezeowJfWpXM/edit#slide=id.p35>

- Establishing baseline measures meant first understanding the broader scope of tick/lyme knowledge in the general community before drilling down to measures for the targeted audience. BDC scheduled focus groups on the subject, one of which was conducted on June 21, 2016 with members of the general public at the Smyth Public Library. Designed to explore general knowledge and communication opportunities, questions included: "what to tell family/friends on how to prevent tick bites" and "where printed materials on the subject should be distributed". Evident from the group was that many were someone "unknowledgeable of tick/Lyme disease", that the online presence of information was limited, and those who had a prior bad experience with Lyme disease were more interested in the "scare tactic information" than those who had not.
- Given the low levels of knowledge by adults, it was clear that pre and post test of camp counselors and campers themselves (children) would need to start with asking very basic information and not make ANY assumptions of knowledge.
  - A study of literature on research with children, protocols, question style, materials proved enlightening. Though we could use the traditional written survey with camp counselors (all young adults), the children would need a shorter survey that included pictures, short sentences and small words, etc. Even then, some of the youngest campers needed assistance with reading and completing the survey pre and post. As different campers filtered through the training, those younger or with reading issues were quickly guided to work with partners who could assist. This likely skewed the data in that those with less knowledge may have been influenced by their helper. It was clear, though, that age- and circumstance-appropriate tools to ask questions and convey messages was imperative.
  - Next steps are to follow up with the Parks & Recreation Department , schools, and camp programs to:
    - gauge the success of our initial implementation efforts
    - plan for follow-up training by ensuring that the information, tools, and methods are appropriate for the audience (counselors and teachers) and readily usable as part of their programs with children
    - plan for follow-up training with an eye towards sustaining the effort through a Train-the-Trainer program

#### 4. Findings FY16 and FY17

- In addition to the campers who were the primary target for the intervention, another group was influenced by the work as a result of targeting this single audience: camp counselors. As part of training the trainer, they were educated and now better able to protect themselves, their friends and families. The parents and siblings of the campers were also more likely to be influenced by the camper themselves, though there is no hard evidence for this at this time. The education of both groups on landscaping options to lessen the presence of tick habitat could also flow to outside audiences through changes influenced by these participants at home and in the workplace later.
- In addition, a variety of community groups were involved in the initial outreach through the PHN Advisory Committee to determine what effort should be tackled. This included informing them on the



impact of weather related events in our region. This led to increased awareness of problems and opportunities for additional efforts. Hopefully it will stimulate further investment and attention on these potential problems.

- It will not be clear, ultimately, until data can be collected over time to assess impact of the intervention on actual rates of Lyme disease. And, scientific data is likely never going to be 100% accurate because variables affecting disease transmission are many. However, we can assume that some awareness among both campers and camp counselors will translate into a fanning out of data into the community over time -- to parents, siblings, friends, co-workers, teachers, etc. Thus, the possibility of increasing awareness and lowering infections in the community could be influenced. Even one less incident of Lyme disease is a benefit of the effort.
- Given the possible benefits, the next phase of implementation would seek to 1) educate more children just prior to summer when ticks are most active, 2) reinforce learning with parents, perhaps during parent session in preparation for camp, 3) take the prepared presentation and presenters on the road to other "outdoor" type of audiences in the immediate area -- e.g. landscapers, outdoor workers, dog walkers, etc. to widen the swath of local residents both educated and knowledgeable about transmission, treatment and correct disposal.
- Lessons learned that might be helpful for others adopting this approach would be 1) having a dedicated person focused on doing outreach and scheduling to assure maximum use of trainers when they are on-deck, 2) tailoring visuals to be age appropriate -- many of the children were fascinated on how ticks feed and enjoyed watching videos of that process which would cement the learning, 3) not relying on outsiders (BIDC, UNH) for training but using homegrown trainers who know the area and have built-in credibility with the audiences ahead of time, 4) targeted multiple groups beyond camps and teaching them in a set time period, and 5) using media (social and traditional) during the period of time of training to reinforce information and stimulate conversations around the community so transmission of this valuable information can occur quicker.
- Climate change was discussed only as a cause of greater tick populations -- generally warmer and wetter conditions. It was important audiences focused on the outcome -- tick population increase and how to avoid and treat -- rather than getting into discussion of climate change and its causes. Leaving that conversation out of the equation allowed the population to address the very real danger of ticks without dismissing because of a discussion of climate change and its causes.

#### Activities and Findings FY17

##### OUTREACH

- Received 8 requests for presentations related to Lyme Disease Risks and Prevention
- Coordinated with BIDC staff to provide school-based Training
  - BIDC staff provided Pleasant Street and Union Sanborn
    - BIDC staff administered pre and post test and data is located at BIDC

Pre and Post Test administered (below)  
Sanbornton Tick Presentation Survey

**1) What type of repellent should you use to prevent tick bites?**

- a) 5% DEET
- b) 20% DEET
- c) 50% DEET
- d) 100% DEET

**2) Ticks can be found in which of the following habitats?**

- a) dirt
- b) wood chips
- c) tall grass
- d) short grass

**3) How long does a tick need to be attached to spread Lyme disease?**

- a) 30 minutes
- b) 2 hours
- c) 24 hours
- d) 48 hours

**4) Which of the following will not help you prevent tick bites?**

- a) Wear long pants and long-sleeved shirts when you go outside
- b) Wear tick repellent
- c) Walk on the edge of trails
- d) Treat your pets with tick medication

**5) Which of the following is not true about the Lyme disease bullseye rash?**

- a) It begins 3-30 days after a tick bite
- b) Everyone infected with Lyme disease gets a bullseye rash
- c) It can appear on any are of the body
- d) It expands gradually over several days

**6) How likely are you to perform a daily tick check?**

Extremely likely  
Moderately likely  
Not likely

**7) How likely are you to use repellent when you go outside?**

Extremely likely  
Moderately likely  
Not likely

**Post-test questions only:**

**8) How do you feel about the amount of information in this talk?**

More than I would like  
About right  
Less than I would like

**9) The presenter connected with the group and made people feel comfortable**

Disagree  
Neutral  
Agree

**Additional comments:**

**Findings:**

Results of Pre and Post Test  
Susan Laverack Tick Presentation 5.2.17

Sanbornton Town Hall  
15 attendees, mostly 70+ age

Pre-test:

- 1) 2 "A little bit", 10 "moderately"
- 2) 58% (7 of 12)
- 3) 33% (4 of 12)
- 4) 83% (10 of 12)
- 5) 75% (9 of 12)

Post-test:

**1) American dog ticks and black-legged ticks are common in New Hampshire. Write the letter of the most appropriate description in front of each tick**

Pre: 58% correct (7 of 12)  
Post: 80% correct (8 of 10)

**2) The most likely habitat for ticks is: Circle one**

Ponds, hardwood forests, urban areas, beaches, tall grass or meadows, all of the habitats above  
Pre: 33% (4 of 12)  
Post: 70% correct (7 of 10)

**3) Early symptoms associated with Lyme disease may include:**

- a) upset stomach, fever, dry mouth, blue rash
- b) headache, fever, muscle aches, red rash
- c) headache, fever, diarrhea, blue rash
- d) upset stomach, muscle aches, red rash

Pre: 83% correct (10 of 12)

Post: 80% correct (8 of 10)

**4) Which of the following lists of steps will help reduce the chances of getting Lyme disease?**

- a) Wear a repellent, avoid brush and tall grass, do a tick check, burn the tick
- b) Wear protective clothing, avoid hardwood forests, do a tick check, smother the tick
- c) Wear repellent, avoid brush and tall grass, do a tick check, remove any ticks

Pre: 75% (9 of 12)

Post: 80% correct (8 of 10)

**5) How knowledgeable do you consider yourself to be about ticks, Lyme disease, and how to protect yourself and your family against Lyme disease?**

Pre: 2 "A little bit", 10 "moderately"

Post: 1 "a little bit", 6 "moderately", 3 "very"

**Discussion notes:**

- How long does it take for a tick to "swell up"? (meaning "engorge")
- Some participants did not understand what the word "embedded" means
- Is there a time limit for when you should get tested for Lyme, and how do you get a doctor to give you a test?
- One participant said he'd had success removing ticks by circling it with a Q-tip dipped in olive oil (he said she was often unsuccessful with tweezers)
- One participant asked how he could distinguish between aches and arthritis of old age and Lyme symptoms
- One participant was skeptical of the idea of saving ticks in tape for testing and questioned how he should label the ticks and how he would know which tick was worth testing for Lyme.
  - Tilton School - school-wide health fair with BIDC Staff – 100+ students
  - Franklin Park and Rec Counselors (15)
    - Provided training (Alan Eaton's PPP from 2016) to Counselors
    - Returning counselors reported that they retained 100% of the information from 2016 (3)
  - Laconia Park and Rec Campers (34)
  - PPH Board of Directors (7)
  - PPH Staff (17)
- Collaborate with Tick Free NH – participated on advisory committee / purchased products related to Lyme prevention through Tick Free NH – Updated on Regional Activities
- Provide interview to Union Leader for article related to Lyme Disease Prevention
- Met with Park and Rec Directors to determine changes in behavior after PH1 training:  
\*Findings: Directors reported that there was increased attention on behalf of counselors  
Both Directors are considering implementing a Lyme Prevention Practice / Policy

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- Provided Written Testimony, Executive Departments & Administration, 306, LOB , 2:30 PM, Public Hearing, NH HB540, Relative to funding for climate change adaptation

**References** – Links to any key research literature that supports the intervention

<https://drive.google.com/drive/folders/OB8ujZelvAlxichRVVEdjaHdKTE0>

<sup>1</sup> <https://docs.google.com/presentation/d/1VYcgkOtC--KI8agu2cXQlCaKfXpX-dHjezeowJfWpXM/edit#slide=id.p35>

*Research Literature Review and Recs\_FINAL 5-18-16.docx*

*Health and Climate Change in New Hampshire's Lakes Region: An Action Plan*  
[http://www.lakesrpc.org/documents/LakesRegion\\_climateplan\\_201602d.pdf](http://www.lakesrpc.org/documents/LakesRegion_climateplan_201602d.pdf)

*NH State Climate Action Plan, 2009.*

*Climate Change in Southern New Hampshire: Past, Present, and Future (2014) documents and predicts a warmer and wetter climate for the region*

*The NH Tickborne Disease Prevention Plan, 2015 – humid climate/microclimate is a good environment for ticks.*

*Alan Eaton's (UNH) Tickborne Disease web page:*

<http://extension.unh.edu/Integrated-Pest-Management/Public-Health-IPM>

*NH DHHS Tick Card:*

<http://www.dhhs.nh.gov/dphs/cdcs/lyme/documents/tick.pdf>

*NH DHHS STOP Mosquito and Tick Bites:*

<http://www.dhhs.nh.gov/dphs/cdcs/lyme/documents/arboavoid.pdf>

*Protect Yourself and Your Family Poster*

<http://www.dhhs.nh.gov/dphs/cdcs/arboviral/documents/mosquito-tick.pdf>

*Bug News For Kids:*

<http://www.dhhs.nh.gov/dphs/cdcs/lyme/documents/kidstickprevention.pdf>

*CDC Lyme Disease and Tick Removal Bookmark*

<http://www.cdc.gov/lyme/toolkit/index.html>

**Suggested Appendices and Tables:**

Diagram of original logic model

List of Specific Goals and Objectives, see format from Appendix G in the adaptation workbook

Table for Comparison of interventions, see format from Appendix F, Table E