

Climate & Health Intervention Project

Plan-of-Action Report: Tick Safe Practices

Grantee Name: Seacoast Public Health Network

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1. Introduction

This Plan of Action summarizes the proposed activities of a training and outreach project to address tick-safe practices and related health impacts in the Seacoast region from January 2019 through June of 2020. The project proposes to address the issues of expanding tick habitat, tick-safe practices, and other aspects of how to prevent Tickborne Disease (TBD). The prevention and treatment of tick-related health impacts are known to be an important issue for Seacoast residents and health professionals.

The Seacoast Public Health Network (PHN) serves 23 towns in Rockingham County with a combined population of 140,210. The mission of the Seacoast PHN is to build and sustain public health partnerships to better serve our communities. In 2018, the Seacoast PHN received funding from the New Hampshire Division of Public Health Services (DPHS) to identify local climate-related hazards and associated health outcomes, propose interventions to reduce risks associated with the hazards, and implement the interventions through a Plan of Action.

PROBLEM STATEMENT: The Northeastern US climate is becoming warmer, wetter, with more severe weather events, and rising sea levels. One of the results of these changes is an expansion of tick habitat, a longer tick season, and greater exposure to tick bites and related pathogens. Changes in land uses, such as more suburbs expanding into forest areas, have also increased tick habitat and exposure. Greater tick activity has increased mental stress and emotional worry about the potential for tick bites and health problems. In regard to health impacts, once a tickborne infection begins, there is the personal burden of illness and suffering, as well as, the rising social costs of medical treatment and environmental control of ticks. In addition, there are many public misunderstandings regarding the science of how to prevent and treat the acute tickborne infections versus any associated chronic illness.

THEORY OF CHANGE: People are able to adapt to changing climate conditions and related health impacts via education, environmental controls, supportive policies, and other actions. Education and [behavior change theories](#) to be explored include the Health Belief Model that has been proven effective to influence the confidence to act and feelings of self-efficacy to reduce the risk of tick bites. Environmental science and recent research literature demonstrate that changes in landscaping and pest management can reduce exposure to ticks and may reduce related disease. Change in policies can also influence human risks by creating default decisions (i.e. use of insect repellents) or improve landscaping to help reduce or avoid tick habitat along the forest edge.

2. Hazards & Health Assessment

There is a need to assess and address these environmental hazards and health threats via traditional management of both the insect and human behavior, as well as, the use of innovative approaches to building community resilience to these changes. In regard to weather hazards, research findings show the average annual maximum temperatures have warmed 1.1 to 2.6F and are expected to continue through the next century ([UNH, 2014](#)). While the entire population is at risk for TBD, individuals who participate in outdoor recreation, individuals who work outdoors, and youth are at higher risk. These at-risk groups and their caretakers (parents, employers, teachers, etc.) often lack the appropriate knowledge, skills, and abilities (i.e. confidence) to adequately protect themselves and others. There is

also a lack of standardization of teaching, environmental controls, and policies to protect at-risk individuals. Additionally, there are misunderstandings about the spectrum of health risks and their potential to become worse in the future due to changes in weather and climate.

The Seacoast PHN identified the need to increase knowledge of tick-safe practices and prevention of TBDs among youth and their caregivers, as well as, to increase clinician knowledge of diagnosis and treatment of TBDs, such as Lyme disease, babesiosis, and other illnesses. This assessment is informed by the following:

- UNH Sustainability Institute documents that overall temperatures are increasing in southern New Hampshire including fewer days below freezing, which leads to an expanded tick season and increased risk of exposure to TBDs.¹ Suburban development also leads to more tick habitat via cuts into the forest for homes and roads, creating more edge habitat that deer and mice can feed and live in.
- New Hampshire Bureau of Infectious Disease Control (BIDC) documents that Rockingham County had the highest estimated number of cases of Lyme disease between 2011-2016.²
- The 2015 New Hampshire Tickborne Disease Prevention Plan documents that Lyme disease rate is highest among ages 5-14 years.³
- New Hampshire DPHS documents that the communities with the highest level of vulnerability to TBDs in the Seacoast PHR are Hampton Falls, East Kingston, and Brentwood.⁴
- A UNH survey of tick-safe practices was completed in May 2016, and found that the top three risky behaviors were forgetting to do tick checks, forgetting to apply repellent, and failing to identify themselves as at-risk. Also, over 25% of respondents reported 'never' applying insect repellent.⁵

3. Community Needs Assessment

The Seacoast PHN Public Health Advisory Council (PHAC) established a tickborne disease and tick-safe workgroup to guide development and implementation of a Plan of Action to reduce exposure to TBDs. Members of the workgroup participated in the BRACE training, as well as informational meetings with subject matter experts with New Hampshire DPHS. The workgroup also reached out to staff in the Tick-Free NH project. The training and informational meetings allowed workgroup members to review similar projects that were implemented in other areas of the state and to identify the interventions outlined in the Plan of Action. Additional outreach was made to the Seacoast PHN Preparedness Coalition to keep them informed about the project and to identify additional opportunities for collaboration.

Seacoast PHN staff met with area infectious disease specialists to identify a clinical champion with

¹ The Sustainability Institute at the University of New Hampshire. [Climate Change in Southern New Hampshire: Past, Present, and Future \(2014\)](#). Webpage 5 Dec 2018.

² New Hampshire Bureau of Infectious Disease Control. [Reported Cases of Lyme Disease in New Hampshire, 2011-2016](#). 25 July 2017. Webpage 12 Nov 2018.

³ New Hampshire Division of Public Health Services. [State of New Hampshire Tickborne Disease Prevention Plan](#). 31 Mar 2015. Webpage 5 Dec 2018.

⁴ [New Hampshire Health WISDOM](#).

⁵ [University of New Hampshire \(UNH\) Survey Center, Granite State Poll w tick questions, Spring 2016](#).

the knowledge of diagnosis and treatment of TBDs. Additionally, staff met with the UNH Cooperative Extension to identify subject matter experts with knowledge of prevention and control measures that reduce tick habitat and exposure to TBDs. Lastly, staff met with camp administrators to discuss the project, gain buy in for participation, and identify specific camp needs related to the topic.

4. Interventions Assessment

[Tick Free NH](#) is an online statewide educational resource and print media clearinghouse. These educational resources have been reviewed for clinical accuracy, evaluated in other prevention initiatives, developed with integrated social media and video capabilities, and are recognized as a trusted source of information. Tick Free NH has conducted polling (2016)⁶ on awareness of and attitudes toward risk reduction practices. Results from these polls were used to inform health education goals to increase use of repellants, increase tick-checks among youth, increase knowledge of proper tick removal, and report removed ticks to an adult. Additionally, the U.S. [Centers for Disease Control and Prevention](#) offer complementary validated and trusted sources of health and prevention information related to TBDs.

The Bureau of Infectious Disease Control (BIDC) at the New Hampshire Division of Public Health Services (DPHS) is another important resource for information and expertise on vector-borne disease transmitted by ticks and mosquitos. The [DPHS website](#) has a NH Tickborne Disease Prevention Plan, disease surveillance reports, fact sheets on TBD, education curriculums, and guidance for health care providers. The DPHS staff can provide guidance on available interventions to prevent TBD, and examples of past efforts.

The DPHS Climate and Health Program staff is also a resource to understand the changing conditions that influence tick habitat. This program has supported other local communities with funding and guidance to develop tick-safe interventions for summer camp programs in the Lakes Region. The staff also promotes a CDC-developed framework to assess interventions and build community resilience to climate and weather-related health impacts.

UNH and the Cooperative Extension offer extensive academic and educational resources on the biology and management of ticks, including environmental approaches to reducing tick habitat.⁷ The Cooperative Extension manages the Master Gardener program which offers youth education on plants and gardens and includes a Speakers Bureau. The Cooperative Extension and the Master Gardeners are recognized as subject matter experts on pest management in outdoor spaces.

The Maine Center for Disease Control and Prevention developed a [vector borne train-the-trainer program](#) for health education on mosquito and TBDs. These educational resources and health education strategy serve as a model practice that will be reviewed and replicated where appropriate.

A more complete review of the peer-reviewed research literature on tick-safe interventions will be completed in cooperation with our partners in order to assess the evidence-base for these actions in relation to the needs of the target audiences. One of the best available [systemic reviews](#) of interventions to prevent TBD in humans was recently published and will be used to guide our efforts

⁶ University of New Hampshire (UNH) Survey Center, [Granite State Poll w tick questions, Spring 2016](#).

⁷ University of New Hampshire Cooperative Extension. Dr. Alan T. Eaton, Entomologist. [Biology and Management of Ticks in New Hampshire](#). Web page 4 Dec 2018.

(Richardson, et al. 2018). The final product is expected to be a table of interventions that provides a summary of the strength of evidence and likely cost-effectiveness.

5. Proposed Interventions

The target audiences for the project are:

1. youth attending after-school programs and summer camps (the high-risk age group)
2. adult caregivers at after-school programs & camps (able to influence the risk group)
3. landscape facility staff at camps (able to manage tick habitat)
4. adult summer camp administrators and counselors, (able to change policy)
5. clinicians in high risk areas in the region (able to influence high-risk patients)

The type of location for the interventions were chosen as outdoor camp facilities or after-school programs with outdoor components due to the higher risk nature of these environments. The specific locations were chosen due to the higher motivation of leaders to address the issues of ticks and related health impacts. The following camps were identified and agreed to participate in the pilot of this project by June 2019: Camp Lincoln in East Kingston and the Exeter YMCA After-School Program.

The clinical target audience will be accessed via a local physician with an interest in both prevention and treatment of TBD, and may include physicians, PAs, nurse practitioners, or others who can diagnose and treat the condition. [Continuing Education Credits \(CEUs\)](#) for TBD are available free via the CDC. Apará Dave, MD, an Infectious Disease Clinician at Exeter Hospital, has been identified as a champion for creating a continuing education program on TBD for primary care physicians, pediatricians, and specialists.

The Plan of Action outlines the following interventions to address the relationship between rising temperatures and increased exposure to ticks due to expanding tick habitat and a longer tick summer season. The specific five (5) interventions include:

1. Education and training of adult counselors or caregivers at after-school programs and summer camps to instruct others in tick-safe knowledge, skills, and abilities.
2. Education of youth participating in school or camp programs (by the adult counselors).
3. Policy change related to insect repellent use by targeted camps and after-school programs.
4. Environmental control measures to reduce tick habitat by targeted camps and after-school programs.
5. Continuing Medical Education (CMEs) for clinicians on prevention and the timely diagnosis and treatment of TBDs.

The Seacoast PHN will collaborate with the University of New Hampshire (UNH) Cooperative Extension to develop and implement a train-the-trainer for camp administrators and counselors as well as caregivers at after-school programs. The training will target both the staff and the youth participants on tick-safe practices and prevention of TBDs. The Seacoast PHN will promote adoption of an insect repellent policy by all camps and after-school programs in the region. Further, the Seacoast PHN and the UNH Cooperative Extension will develop a site assessment tool to use with camps and after-school programs to identify and prioritize environmental control measures to reduce tick habitat, including information on landscaping and other pest management techniques (i.e. identifying and addressing tick “hot spots”). Additionally, the Seacoast PHN will identify a clinical champion to offer training on prevention, diagnosis, and treatment of TBDs to clinicians in high risk areas.

The Plan of Action consists of four strategies focused on: (1) health education, (2) policy implementation, (3) behavior change, and (4) environmental control. When implemented in concert, these interventions can create broader awareness of and promote compliance with protective factors (i.e. knowledge, skills, habitat, policy), as well as reduce tick habitat in and around camps and after-school programs and exposure to TBDs among staff and youth at camps and after-school programs. In addition to prevention, the Plan of Action seeks to address barriers to the timely diagnosis and treatment of TBDs through clinician education.

Given limited financial resources, the interventions were selected as complementary, cost effective strategies that also promote cost sharing with camp and after-school organizations. The train-the-trainer model expands opportunities to deliver health messaging about prevention of TBDs to youth and their caregivers. The value of implementing camp/school repellent policies is reinforced by health education and when combined ensure greater compliance with a primary protective factor. The environmental control measures encourage cost sharing among organizations wherein one organization provides an expert assessment and recommends changes to reduce tick habitat and the other organization implements the recommended changes (either at their expense or partially subsidized). Lastly, the use of a clinical champion and other subject matter experts ensures that the proposed interventions are viewed as credible by the target audiences for this project.

In regard to the evaluation plan, a more complete description of ways to measure the effectiveness of the proposed interventions will be developed. The final product is expected to be a brief written summary of the measurement tools for each of the interventions. Examples may include a set of training pre-post assessments that measure knowledge, skills, or abilities (i.e. confidence) to use the new information. Other examples could include pre-post measures of any policy impacts or pre-post measures of tick abundance in relation to landscape changes.

6. Workplan – Goals, Objectives & Activities

The Seacoast PHN will use the following baseline measures to inform development of the proposed interventions, as well as to evaluate their effectiveness and identify needed improvements.

- **Insect repellent policy survey.** The Seacoast PHN will survey camps and after school programs that participate in the pilot project to determine if current policies include the recommended or required use of insect repellents by youth while at camp. A follow-up survey of camps without repellent policies will be completed to evaluate the effectiveness of the proposed policy implementation strategies.
- **Pre and post-testing.** The Seacoast PHN will utilize pre and post-testing to evaluate the train-the-trainer health education for camp staff and youth and their caregivers. Pre and post-testing will also be used to evaluate clinical champion training on diagnosis and treatment of TBDs to clinicians in high risk areas. In both cases, pre and post-tests will be used to:
 - Identify current and preferred sources of information
 - Verify likely behaviors to check for and report ticks
 - Educate and dispel common myths
 - Identify barriers to prevention, diagnosis, and treatment of TBDs
 - Evaluate knowledge and awareness of risks and risk-reduction strategies

The Seacoast PHN will follow a workplan that allows it to remain on-time and on-budget for the duration of the project. The workplan provides an overall goal, with measurable objectives and specific activities designed to reach the short-term and long-term outputs (and possibly health outcomes). An ongoing

assessment of prior tick-safe projects in NH (e.g. Lakes Region tick project in 2016-17), and additional scientific literature will inform the evaluation of the final intervention. Appendix A outlines detailed goals, objectives, strategies, activities, outputs, and outcomes for the project. The workplan objectives have some preliminary measures of proposed change, and these will be updated as new information is gathered. Appendix B provides a timeline for achieving the activities outlined in the workplan.

7. Conclusion & Next Steps

The original proposal for project funding identified the need for health education on the topic of tick-safe practices to avoid TBDs. Through the planning process, the project workgroup identified the need for complementary behavior change and policy focused strategies to support the health education activities – namely promotion of insect repellent policies and identification of potential changes to habitat in and around camps. The initial discussions with camps and after-school programs revealed strong interest and commitment to participate in the pilot project – especially related to increasing knowledge of environmental control measures.

In order to advance the pilot interventions in a timely and fiscally responsible manner, Seacoast PHN staff will need to work closely with UNH Cooperative Extension to develop and validate an assessment tool for identifying risks and recommending changes to reduce tick habitat and to develop and implement the TBDs prevention training.

Simultaneously, Seacoast PHN staff will involve Dr. Dave in the format for, timing of, and contents of a training session for primary care physicians, pediatricians, and specialists in the Seacoast PHN. Dr. Dave, Southern NH Area Health Education Center, and Jackson, Jackson & Wagner will work together on the design of the pre- and post-tests to measure knowledge and competence around this topic.

Appendix A: Workplan & Evaluation Measures, as of April 4, 2019.

Goal	Improve both the prevention and treatment of tickborne disease (TBD) among youth, caregivers, and clinicians in high risk areas of the Seacoast PHN.
Objective 1a & 1b	1a. By May 2019, use an education intervention to increase by 10% knowledge of tick-safe strategies among after-school educators' in high risk areas of the Seacoast PHN. 1b. By June 2019, use an education intervention to increase by 30% knowledge levels of tick-safe strategies among camp counselors, nurse, and staff in high risk areas of the Seacoast PHN.
<p>Strategy 1: Partner with trusted and respected role models for children and families (teachers, counselors, clinicians) to convey information and encourage participation.</p> <p>Strategy 2: Utilize venues where children are already gathered for purposes of learning or recreation to begin process of behavior change and/or reinforcement.</p>	
<p><u>Activities</u></p> <ol style="list-style-type: none"> 1. Identify camps and after-school programs to participate in the pilot project. 2. Survey pilot participants to determine current policy and environmental practices and readiness for implementation of strategies (including train-the-trainer). 3. Identify/develop educational materials/toolkits for use with camps and after-school programs. 4. Conduct an educational session with camp counselors/staff and after-school educators, camp counselors, nurses, and staff. 	
<p><u>Short-Term Outputs/Outcomes</u></p> <ol style="list-style-type: none"> 1. Number of pilot participants. 2. Educational materials identified and validated by experts. 3. Increased number of trainers on prevention of tickborne diseases. 4. Number of camps and youth/families participating in the educational session. 5. Camp counselors and staff's increased knowledge of TBD prevention. (pre- and post-test). 	

Long-Term Outputs/Outcomes

1. Increase levels of knowledge, skills, and, abilities (KSAs) to practice tick-safe practices and prevent TBDs by counselors as a result of the training, including the ability to identify and catalog ticks by type.
2. Increase the number of tick-safe behaviors and environments identified in a survey of the seacoast residents (via UNH poll).
3. Decrease the number of tick-borne diseases in seacoast residents as reported by the NH Bureau of Infectious Disease Control.

Goal	Improve both the prevention and treatment of tickborne disease (TBD) among youth, caregivers, and clinicians in high risk areas of the Seacoast PHN.
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Objective 2	By June 2019, use a policy intervention to engage with 50% of camps and after-school programs that are participating in the pilot project to successfully implement insect repellent policies.
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Strategy 1: Partner with trusted and respected role models for children and families (teachers, counselors, clinicians) to review and change policies around use of insect repellants.

Strategy 2: Provide sample policies in a consistent manner to encourage compliance, and integrate new information into any existing training program.

Strategy 3: Create, wherever possible, opportunities for parents/guardians/children to make the default decisions to use repellants easier rather than having to choose to comply with protection actions.

Activities

1. Identify camps and after-school programs to participate in the pilot project.
2. Survey pilot participants to determine current policy and environmental practices and readiness for implementation of strategies (including train-the-trainer).
3. Identify a prevention champion to promote policy implementation with camps.
4. Research model practices for camp-based insect repellent policies and environmental approaches for reducing tick habitat.
5. Develop template insect repellent policy that includes potential factors for why parents/guardians choose to opt-out. (Additional assessment to inform future changes to strategies).

Short-Term Outputs/Outcomes

1. Number of pilot participants.
2. Number of pilot participants with existing insect repellent policies.
3. Model practices for policy and environmental approaches identified.
4. Template insect repellent policy developed and validated by experts.
5. Number of camps and after-school programs that pledge to adopt the insect repellent policy, including identification of potential barriers to adoption/implementation. (participant survey)
6. Number of camps that implement the insect repellent policy.

Long-Term Outputs/Outcomes

1. Increase levels of compliance with use of repellents that are known to be effective against ticks.
2. Reduce the proportion of participants who opt-out of using repellents.
3. Assess current tick-safe policies at summer camps and change policies to ensure that tick-safe practices (i.e. opt-out policy for repellent use, etc.) are the known standard to best protect the staff and students.
4. Increase the number of tick-safe behaviors and environments identified in a survey of the Seacoast residents (via UNH poll).
5. Decrease the number of TBDs in Seacoast residents.

Goal	Improve both the prevention and treatment of tickborne disease (TBD) among youth, caregivers, and clinicians in high risk areas of the Seacoast PHN.
Objective 3	By March 2019, use an education intervention to increase by 10% the number of health care providers (MD, PA, ARNP, etc.) in the seacoast region who have completed a CEU module on TBD.
Strategy 1: Partner with trusted and respected role models for children and families (teachers, counselors, clinicians) to convey information and encourage participation.	
<u>Activities</u> <ol style="list-style-type: none">1. Identify a health care champion to promote clinician continuing education on the prevention, diagnosis, and treatment of TBDs.	

2. Identify and review existing clinician trainings on the subject of diagnosis and treatment of tickborne diseases, including opportunity for CEUs.
3. Conduct a training session for clinicians and offer CEUs.

Short-Term Outputs/Outcomes

1. Clinical champion identified.
2. Educational materials identified and validated by experts.

Long-Term Outputs/Outcomes

1. Increase the levels of knowledge, skills, and abilities (KSAs) of clinicians on prevention, diagnosis, and treatment of TBDs.
2. Increase the number of clinicians with diagnosis and treatment capabilities related to TBDs, resulting in early diagnosis.
3. Increase the number of tick-safe behaviors and environments identified in a survey of the Seacoast residents (via UNH poll).
4. Decrease the number of TBDs in Seacoast residents.

Goal	Improve both the prevention and treatment of tickborne disease (TBD) among youth, caregivers, and clinicians in high risk areas of the Seacoast PHN.
Objective 4	By June 2019, use an environmental control intervention to engage with 50% of the targeted camps and after school programs to identify locations of higher-risk tick habitat and develop a written plan to reduce them or restrict access with environmental controls such as landscaping or Integrated Pest Management (IPM) practices.
Strategy 1: Create an environment that reduces opportunities for youth to come into contact with ticks and involve maintenance staff in those plans.	
<u>Activities</u>	
<ol style="list-style-type: none"> 1. Identify camps and after-school programs to participate in the pilot project. 2. Survey pilot participants to determine current policy and environmental practices and readiness for implementation of strategies (including train-the-trainer). 3. Identify an expert in environmental approaches for reducing tick habitat. 4. Research model practices for camp-based insect repellent policies and environmental approaches for reducing tick habitat. 	

5. Develop a site assessment form for identifying environmental approaches to reducing tick habitat.
6. Conduct tick habitat site assessments with camps and after-school programs.

Short-Term Outputs/Outcomes

1. Number of pilot participants.
2. Number of pilot participants that have implemented an environmental approach for reducing tick habitat.
3. Expert in environmental approaches for reducing tick habitat identified.
4. Model practices for policy and environmental approaches identified.
5. Camp site assessment form developed and validated by experts.
6. Number of camps and after-school programs that conduct a tick habitat site survey, including potential barriers to implementing environmental strategies. (participant survey)
7. Number of camps that implement one or more environmental approaches, including type of approach.

Long-Term Outputs/Outcomes

1. Increased ability of camp or after school staff to identify tick “hot spots” and implement remediation strategies (landscape or pest control) in and around camps and after-school programs.
2. Increase the number of tick-safe behaviors and environments identified in a survey of the Seacoast residents (via UNH poll).
3. Decrease the number of TBDs in Seacoast residents.

Appendix B: Timeline

Dates	Activity
07/18/2018	TBD Workgroup kick-off meeting
08/07/2018	Conference call with project contractors
08/27/2018	TBD Workgroup conference call
09/17/2018	TBD Workgroup conference call
09/26/2018	BRACE Training
10/31/2018	TBD Workgroup meeting
12/12/2018	TBD Workgroup meeting
12/20/2018	Plan of Action & Workplan submitted to DHHS
03/08/2019	Training day for BRACE interventions
04/08/19	Great Bay Community College Health Fair
04/27/2019	American Cancer Society's Relay for Life Event, UNH
04/29/2019	Assessment of Tick Habitat at Camp Lincoln and Policy Discussion
TBD	Train-the-Trainer day for instructors of tick-safe practices
05/18/2019	Training day for Exeter YMCA After-School Educators
06/01/2019	Outreach table at Camp Lincoln
TBD (June)	Training day for Camp Lincoln Counselors
06/30/2019	Final Report due to DHHS