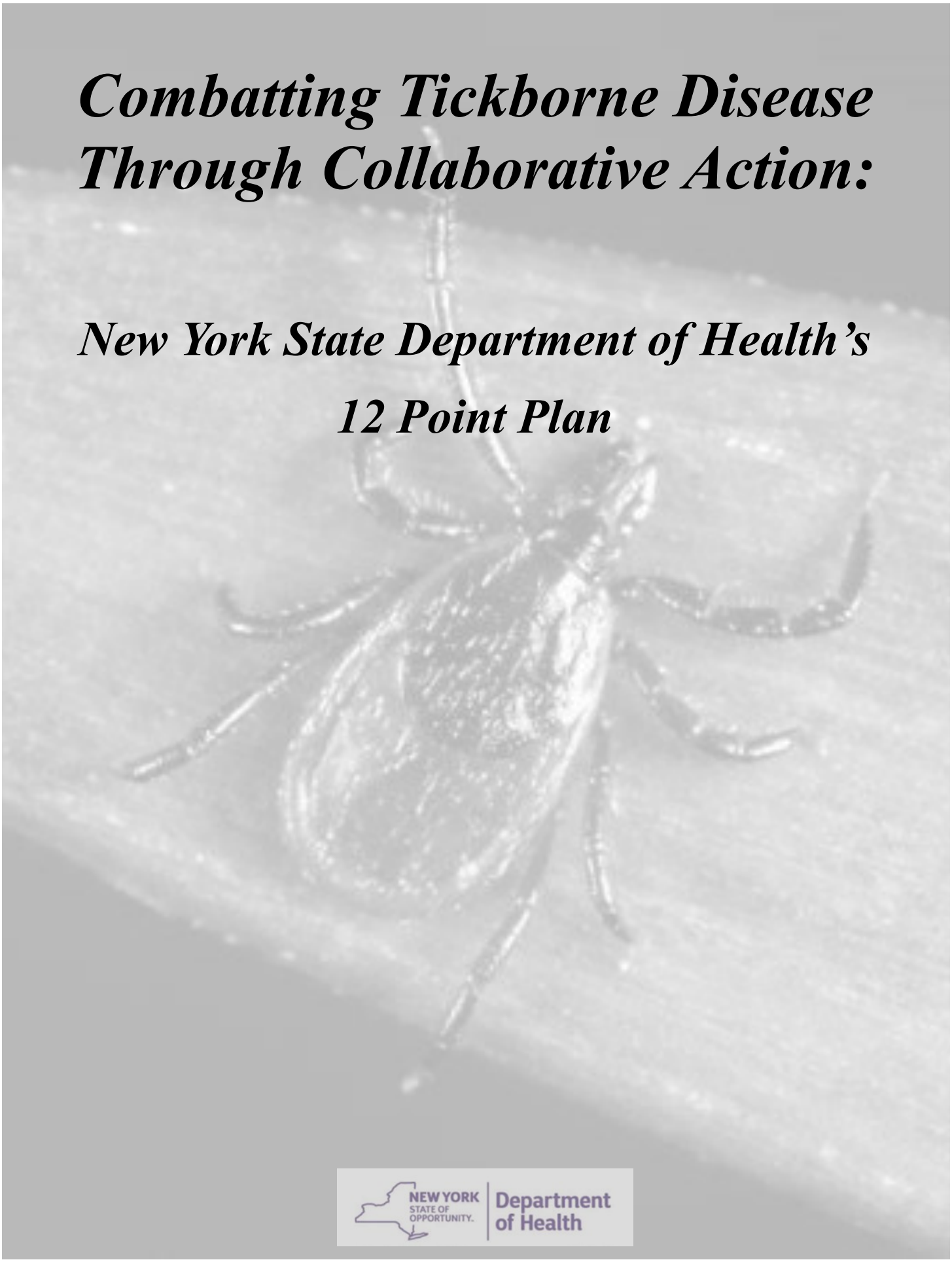
Combatting Tickborne Disease Through Collaborative Action:

New York State Department of Health's 12 Point Plan



NEW YORK STATE OF OPPORTUNITY. Department of Health

About the New York State Department of Health

The New York State Department of Health has been overseeing the health, safety, and well-being of New Yorkers since 1901 – from sanitation and vaccinations to utilizing new developments in science as critical tools in the prevention and treatment of infectious diseases. In the face of today's new public health challenges and evolving health care system, the Department's commitment to protecting the health and well-being of all New Yorkers is unwavering.

Mission: We protect, improve and promote the health, productivity and well-being of all New Yorkers.

Vision: New Yorkers will be the healthiest people in the world - living in communities that promote health, protected from health threats, and having access to quality, evidence-based, cost-effective health services.

Values: Dedication to the public good, Innovation, Excellence, Integrity, Teamwork, Efficiency

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EXECUTIVE SUMMARY

Tickborne diseases affect thousands of New Yorkers each year, resulting in millions of dollars in healthcare-related costs. ***Combatting Tickborne Disease Through Collaborative Action: New York State Department of Health's 12 Point Plan*** is an important step in the Department's long-standing efforts to protect the health of New Yorkers and exemplifies the Department's commitment to its mission, vision and values. Efforts to prevent and control tickborne diseases are also being made by a variety of stakeholders, but more can be accomplished by working together. Operating from the premise that all stakeholders have valuable contributions to make, the plan provides a statewide framework for the prevention and control of tickborne diseases by focusing on four pillars: surveillance; education and awareness; research and evaluation; and partnerships.

Surveillance

- Improve the quality and completeness of human case related data transmitted to the Centers for Disease Control and Prevention (CDC).
- Enhance existing tick collection and testing to ensure sites from all counties in the state are regularly sampled.
- Continue collaboration with national partners to address existing limitations with human tickborne disease surveillance.

Education and Awareness

- Continue to improve the availability of prevention-related information, tools and supports for people — when, where and how they need them.
- Deliver targeted advertising of tickborne disease education and prevention messages.
- Expand health care provider education to improve their knowledge of tickborne diseases and risk areas.

Research and Evaluation

- Facilitate the development and clinical evaluation of new or improved diagnostic tests for tickborne diseases.
- Contribute to the development of a statewide tickborne disease research agenda and facilitate funding opportunities for New York State (NYS) researchers.
- Continue to expand the New York State Department of Health's (NYSDOH) applied research activities through TickNET, a public health network with CDC and other state health departments.

Partnerships

- Strengthen intergovernmental coordination of tickborne disease initiatives and prevention with the New York State Department of Environmental Conservation (DEC), New York State Office of Parks, Recreation and Historic Preservation (OPRHP), the New York State Department of Agriculture and Markets, and the State Education Department (SED).
- Engage a broad range of representatives from professional organizations, academic institutions, local health departments and non-governmental organizations in the state.
- Effectuate collaborations between academic communities and public health organizations at federal, state, and local levels for tickborne diseases surveillance, prevention, and response through the NYSDOH's role in the Northeast Regional Center of Excellence in Vector-Borne Diseases.

BACKGROUND: TICKBORNE DISEASES IN NEW YORK STATE

Through their bites, ticks expose humans to a remarkable array of pathogenic agents, including neurotoxins, allergens, bacteria, parasites, and viruses. The clinical features of tickborne illnesses range from mild to life-threatening, and collectively, tickborne diseases constitute a substantial and growing public health problem in NYS and across the United States. New agents of tickborne disease are described regularly and known agents and the vectors that carry them are spreading to new areas.

Lyme disease is the most common vector-borne disease in the state and the nation. With more than 7,500 cases reported in NYS every year, and many more that are treated but are not reported, Lyme disease is recognized as a major public health burden. Lyme disease is caused by the spirochetal bacterium *Borrelia burgdorferi* and is transmitted via the bite of an infected black-legged, *Ixodes scapularis*.

Less common, but potentially serious tickborne infections seen in the state include anaplasmosis, babesiosis, ehrlichiosis, Powassan disease, Rocky Mountain spotted fever, and tularemia. The recent identification of NYS residents infected with *Borrelia miyamotoi* and the identification of Heartland and Bourbon virus infections elsewhere in the nation all serve to highlight the potential for discovery of novel tickborne pathogens. Furthermore, several tickborne diseases of unknown etiology have also been described, most notably STARI (southern tick–associated rash illness). Easily confused with early Lyme disease, STARI is a distinct, idiopathic entity associated with bite of the lone star tick, *Amblyomma americanum*. This tick species has also been implicated recently as a cause of hypersensitivity to red meat and certain chemotherapeutic agents. Other ticks of public health significance in the state include the American dog tick, *Dermacentor variabilis*, and the woodchuck tick, *Ixodes cookei*. The longhorned tick (*Haemaphysalis longicornis*) has recently been found in NYS but it is not yet known if this tick will become a vector of public health significance in the State.

Table 1. Human cases of tickborne disease in NYS and the United States, 2013-2016

	New York State				United States			
	2013	2014	2015	2016	2013	2014	2015	2016
Lyme Disease	7,587	6,686	8,272	7,543	36,307	33,063	38,069	32,436
Human granulocytic anaplasmosis (HGA)	477	453	783	775	2,451	2,758	2,638	3,828
Babesiosis	534	471	583	481	1,796	1,717	1,740	1,737
Human monocytic ehrlichiosis (HME)	107	118	116	170	1,509	1,440	1,098	1,197
Ehrlichiosis/Anaplasmosis, undetermined	18	11	11	19	220	194	118	192
Rocky Mountain Spotted Fever	27	21	40	37	3,353	3,372	4,198	3,891
Powassan Disease	5	2	1	2	13	8	7	13
Tularemia	0	3	0	0	203	180	244	200

Table 2. Ticks of public health importance found in NYS

Scientific Name	Common Name	Distribution/Frequency	Associated Disease
Amblyomma americanum	Lone star tick	Most common in Lower Hudson Valley and Long Island; increasing in abundance in these areas	Human monocytic ehrlichiosis (HME); STARI
Dermacentor variabilis	American dog tick	Found across NYS; less common	Rocky Mountain spotted fever (RMSF); Tularemia
Ixodes cookei	Woodchuck tick	Found across NYS; rarely encountered by humans—most commonly found in or around woodchuck burrows	Powassan disease
Ixodes scapularis	Blacklegged tick (Deer tick)	Found across NYS, becoming more and more common in central and western NYS; most common human-biting tick in NYS	Lyme disease; Human granulocytic anaplasmosis (HGA); Babesiosis; Powassan disease; Tickborne relapsing fever (*Borrelia miyamotoi* infection)

Tickborne diseases pose special challenges for clinicians and health departments alike. Although tickborne diseases occur throughout the state, the distribution of any given disease can vary significantly from one area to the next; this information must be known and considered by health care providers when assessing patients. In addition, laboratory testing is often limited to serologic assays that require paired specimens drawn several weeks apart to confirm recent infection, which impacts both patient management and public health surveillance.

With regard to prevention, while personal protective measures such as tick checks and repellent use are generally harmless and inexpensive, getting the public to adopt these protective behaviors has been challenging. Despite providing education about these measures for many years, case reports for the more common tickborne diseases continue to increase. Pesticide use can reduce tick abundance in the environment but has not been proven to reduce tickborne disease in humans. Finally, only one human vaccine against tickborne diseases has ever been licensed in the United States. Lymerix, developed to prevent Lyme disease, was removed from the market during 2003 amidst poor sales and unsubstantiated reports of increased adverse events.

12 POINT TICKBORNE DISEASE COLLABORATIVE ACTION PLAN

Surveillance

1. Improve the quality and completeness of human case related data transmitted to the Centers for Disease Control and Prevention.

Key activities will include:

- In collaboration with local health departments (LHD), establish performance indicators by which to measure the effectiveness of their surveillance programs.
- Improve tickborne disease case investigation forms to facilitate completion by health care providers.
- Provide LHDs with monthly surveillance reports that identify untimely and incomplete investigations. The reports will allow each LHD to compare their data with counties within their region, counties of similar size in different regions and with statewide averages.
- Facilitate a learning collaborative for LHDs to share best practices on investigation, surveillance, data analysis and evaluation.
- Automate the process of electronic case notification to CDC's National Notifiable Disease Surveillance System utilizing Health Level 7-based (HL7) messaging. Utilizing HL7 messaging allows for more comprehensive, timely, and higher quality data.

2. Enhance existing tick collection and testing to ensure sites from all counties in the state are regularly sampled.

Key activities will include:

- Conduct standardized walking, flagging and dragging surveys according to established protocols to monitor and sample host-seeking tick populations during peak tick activity periods (April-July and October – December). Coordinate efforts with external partners to maximize areas sampled.
- Conduct molecular testing of tick specimens to detect the pathogens associated with Lyme disease, anaplasmosis, babesiosis, tickborne relapsing fever (*Borrelia miyamotoi* infection), and Powassan disease.
- Conduct standardized surveys of hunter-killed white-tailed deer to collect ticks and deer blood to be screened for tickborne pathogens and evidence of arboviral exposure, respectively.

3. Collaborate with national partners to address existing limitations with human tickborne disease surveillance

Key activities will include:

- Participate on national working groups and vector-borne disease subcommittees, such as those sponsored by the Council of State and Territorial Epidemiologists (CSTE), to reassess current surveillance methodologies and consider new methodologies. Since

existing surveillance methods have not been standardized across jurisdictions, the true burden of tickborne diseases has been unable to be measured.

- Participate on national working groups designed to create and/or modify existing national surveillance case definitions to address advances in laboratory testing or the recognition of emerging pathogens and diseases.
- In collaboration with national partners such as CSTE and CDC, establish surveillance guidelines for *Borrelia miyamotoi* infection, a newly identified tickborne disease, to allow for a more thorough understanding of the risk factors, clinical hallmarks, and incidence of this tickborne relapsing fever.

Education and Awareness

4. Improve the availability of prevention-related information, tools and supports for people — when, where and how they need them

Key activities will include:

- Develop, distribute and promote smartphone and web applications that contain risk and prevention information for the public, including travelers.
- Publish tick surveillance data, including test results, on the HealthDataNY website. Use these data, in conjunction with human surveillance data, to direct awareness and prevention activities. Provide guidelines for LHDs on how to use tick surveillance data.
- Support the availability of consistent signage and information at all State parks and preserves and encourage their adoption at locally administered parks and public lands.
- In partnership with the NYS Department of Agriculture and Markets and the Cornell College of Veterinary Medicine, engage veterinarians and veterinary technicians and develop educational materials for pet owners.
- Assure the availability of prevention-related information, at appropriate literacy levels in the most common languages used in the state (Spanish, traditional Chinese, Russian, Haitian-Creole, Korean and Italian).

5. Deliver targeted tickborne disease education and prevention messages.

Key activities will include:

- Pursuant to NYS Education Law § 305(55), collaborate with the State Education Department (SED) to disseminate and promote a recently-developed educational curriculum to be administered statewide to assist in the education and awareness program to protect children from lyme disease and tick-borne infections.
- Develop and distribute a similar curriculum, described in the bullet above, through school-aged summer camp programs.
- Collaborate with LHDs, community-based organizations and retail stores on initiatives designed to help prevent tickborne diseases among certain occupational and recreational groups (e.g. children, landscapers, forestry workers, pest control applicators, farmers, parks or wildlife management workers, hikers, campers and gardeners).

- Expand educational initiatives for hunters by ensuring that tickborne disease prevention materials are available through DEC hunter safety training and related education programs.
- Promote the availability of free NYSDOH-developed tick-borne disease prevention educational materials.
- Collaborate with partner programs to perform outreach to school districts and school grounds' maintenance staff on non-toxic ways to reduce tick populations on school grounds.

6. Expand health care provider education to improve their knowledge of tickborne diseases and risk areas.

Key activities will include:

- Distribute advisories to healthcare providers, including emergency/urgent care physicians, prior to peak tick activity periods reminding them about signs, symptoms, diagnosis, and reportability of tickborne diseases. Distribute health alerts to providers when an increased incidence of tickborne diseases is recognized and when a novel or emerging tickborne disease or condition is identified in the State.
- Summarize and distribute local tick surveillance and testing information to healthcare providers through LHDs and encourage the use of the data in their clinical practice.
- Update health care provider educational materials as recommended by the U.S. Department of Health and Human Services Tick-borne Disease Working Group. Distribute to all licensed healthcare providers in the state to educate them about the distribution, identification and treatment of tickborne diseases, including interpreting and understanding test results and to better enable them to address questions from patients.

Research and Evaluation

7. Facilitate the development and clinical evaluation of new or improved diagnostic tests for tickborne diseases.

Key activities will include:

- Evaluate new tickborne disease diagnostic test method validation data that are submitted to the NYSDOH's Clinical Laboratory Evaluation Program (CLEP) to ensure the accuracy and reliability of test results in clinical laboratories located in the state or that accept specimens from state residents.
- Assess new laboratory methods for detecting tick-borne agents using a variety of laboratory analyses.
- Assure continued availability of testing for Powassan virus and *Borrelia miyamotoi* infection. While the vast majority of laboratory testing for tickborne diseases is performed at commercial labs, the NYSDOH's Wadsworth Center is the primary human and vector testing lab for these two pathogens in NYS. The NYS Veterinary Diagnostic Laboratory is the primary lab for animal testing.
- Conduct confirmatory testing at Wadsworth Center of specimens positive for certain tickborne diseases at clinical laboratories.

- Partner with the NYS Veterinary Diagnostic Laboratory to assess the prevalence of tick-borne diseases in companion and agricultural animals, which may provide early warning signs of the emergence of new disease agents that could potentially impact humans.

8. Contribute to the development of a statewide tickborne disease research agenda and facilitate funding opportunities for New York State researchers.

Key activities will include:

- Develop a technical report about the status of tickborne diseases in the state. The report will be published on the NYSDOH website and will be made available to researchers to help inform the design and conduct of their studies.
- Consistent with law and NYSDOH policy, provide timely access to data and, when appropriate, and at the sole discretion of NYSDOH, letters of support to researchers, professional organizations, community-based organizations and other groups applying for federal and/or philanthropic sources of tickborne disease funding.

9. Expand the Department's applied research activities through TickNET, a public health network with CDC and other state health departments.

Key activities will include:

- Conduct a study on the total societal and individual level costs of Lyme disease. The results of the study, which is being conducted with CDC and three other states, will allow for a better understanding of the burden borne by New Yorkers who have been diagnosed with Lyme disease and will help to guide impact assessments of current and future prevention methods.
- Conduct a study to estimate the proportion of people in several Northeast and Mid-Atlantic states who would get vaccinated with a Lyme disease vaccine if one were to become available. The results of the study, which is being conducted with CDC and three other states, will aid in gaining an understanding of motivations for and barriers to vaccine acceptance.

Partnerships

10. Continue to enhance coordination of tickborne disease initiatives and prevention with the NYS Department of Environmental Conservation, Office of Parks, Recreation and Historical Preservation, the New York State Department of Agriculture and Markets, and the State Education Department.

Key activities will include:

- Provide technical assistance to DEC and OPRHP as they undertake tick control activities in several State-owned parks and preserves. Control efforts will consist of four different approaches—chemical control, biological control, host-targeted control, and habitat modification.

- Support DEC and OPRHP in their efforts to assure the availability of consistent signage and information at all parks and preserves and the expansion of educational initiatives to occupational and recreational groups.
- Coordinate with the SED, to evaluate the impact of the tickborne disease educational curriculum.

11. Engage a broad range of representatives from professional organizations, academic institutions, local health departments and non-governmental organizations in the state.

Key activities will include:

- Establish a new tickborne diseases working group to review current strategies and improve the prevention, diagnosis and treatment of tickborne diseases in NYS.
- Convene a tickborne disease summit bringing together national experts, members of the new working group and local health departments to review New York's existing initiatives, and to make recommendations for future policy actions.

12. Effectuate collaborations between academic communities and public health organizations at federal, state, and local levels for tickborne disease surveillance, prevention, and response through the NYSDOH's role in the Northeast Regional Center of Excellence in Vector-Borne Diseases.[1]

Key activities will include:

- Educate the next generation of medical entomologists and field biologists with the knowledge and skills required to rapidly prevent, detect and respond to tickborne disease threats.
- Build effective communities of practice via collaborations between academic communities and public health organizations at federal, state, and local levels for tickborne disease surveillance, response and prevention.
- Conduct applied research to develop and validate effective tickborne disease prevention and control tools and methods necessary to anticipate and respond to disease outbreaks.
- Improve translation of research findings to public health practice and create and disseminate best practices among public health institutions.
- Strengthen connections among network stakeholders, including public health practitioners, the lay public and elected officials, through the development and implementation of a structured communication campaign.

[1] Lead Institution: Cornell University. Partners and Associated Institutions include the Center for Vector Biology and Zoonotic Diseases, the Connecticut Agricultural Experiment Station; New York State Department of Health; Columbia University; Connecticut Department of Public Health and Fordham University.

WHAT YOU CAN DO: PREVENTION

While the Department is collaboratively working with a broad range of representatives from professional organizations, academic institutions, public health agencies and non-governmental organizations to combat tickborne diseases, all New Yorkers need to get involved and do their part. NYSDOH encourages all residents to access the current information about tickborne diseases through the Department's website.

Reducing exposure to ticks is the best defense against tickborne diseases. Below are actions that NYS residents can take to reduce their risk of exposure. These are especially important in warmer months (April–November) when ticks are most active, however it is important for New Yorkers to remember that ticks can be active anytime temperatures are above 40 degrees F.

Avoid Direct Contact with Ticks

- Avoid wooded and bushy areas with high grass and leaf litter.
- Walk in the center of trails.
- Consider using repellents that contain DEET, picaridin, or IR3535. Always follow label instructions and use the repellent strength that is appropriate for the type of activity and amount of time outdoors. Parents should apply repellents to their children, avoiding hands, eyes, and mouth. The Environmental Protection Agency (EPA) has an online tool to help you select the repellent that is best for you and your family.
- Use products that contain permethrin to treat clothing and gear, such as boots, pants, socks and tents. It remains protective through several washings. Pre-treated clothing is available and may be protective longer.

Find and Remove Ticks from Your Body

- Bathe or shower as soon as possible after coming indoors (preferably within two hours) to wash off and more easily find ticks that are crawling on you.
- Conduct a full-body tick check using a hand-held or full-length mirror to view all parts of your body upon return from tick-infested areas. Parents should also check their children for ticks under the arms, in and around the ears, inside the belly button, behind the knees, between the legs, around the waist, and especially in their hair.
- Attached ticks are best removed with a pair of fine-point tweezers, grasping the tick as close to the skin as possible, and slowly pulling straight up. A video showing proper tick removal is available at: https://youtu.be/oGrK4ZKUfhQ.
- Inform your health care provider if you have been bitten by a tick. If someone you know has been bitten by a tick, encourage them to see their health care provider.
- Examine gear and pets. Ticks can ride into the home on clothing and pets, then attach to a person later, so carefully examine pets, coats, and day packs. Tumble clothes in a dryer on high heat for 10 minutes after coming indoors to kill ticks; if clothes are damp, additional time may be needed. Discuss tick control for your pets with your veterinarian.

Preventing Ticks in the Yard

- Make your yard less attractive to ticks with changes to your home landscape.
- Clear tall grasses and brush around homes and at the edge of lawns.
- Place a three-foot wide barrier of wood chips or gravel between lawns and wooded areas and around patios and play equipment. This will restrict tick migration into recreational areas.
- Mow the lawn frequently and keep leaves raked.
- Stack wood neatly and in a dry area (this discourages rodents that ticks feed on).
- Keep playground equipment, decks, and patios away from yard edges and trees and place them in a sunny location, if possible.
- Remove any old furniture, mattresses, or trash from the yard that may give rodents a place to hide.

Apply Pesticides Outdoors to Control Ticks

- A single springtime application of an acaricide (tick pesticide), such as bifenthin, can greatly reduce the number of ticks in your yard however you should not rely on pesticide application alone to reduce your risk of getting a tickborne illness.

If you have pets

- Discuss appropriate tick control methods for your pet with a veterinarian.
- Regularly check pets that spend time outdoors for ticks (ticks may attach to pets, be carried indoors and then drop onto carpets, flooring or furniture and reattach to people in the household).

FOR MORE INFORMATION

General Inquiries

NYSDOH Bureau of Communicable Disease Control
Phone: 518.473.4436
Email: bcdc@health.ny.gov
Hours of operation: Monday to Friday, 8:30 a.m. –4:45 p.m.

NYSDOH Wadsworth Center Laboratories
Phone: 518.474.7592
Email: wcwebm@health.ny.gov
Hours of operation: Monday to Friday, 8:30 a.m. –4:45 p.m.

Local Health Departments
Contact information for local health departments in NYS is available at http://www.nysacho.org/i4a/pages/index.cfm?pageID=3779.

Media Inquiries

NYSDOH Public Affairs Group
Phone: 518.474.7354
Email: press@health.ny.gov

Educational and Additional Resources

New York State Department of Health
- Lyme Disease and Other Diseases Carried by Ticks
- Tick and Insect Repellents: Deciding on Their Use
- Be Tick Free- A Guide for Preventing Lyme Disease
- Communicable Disease Fact Sheets
- Wadsworth Center Arbovirus Laboratory
- Wadsworth Center Diagnostic Immunology Laboratory
- Wadsworth Center Clinical Laboratory Evaluation Program
- Communicable Disease Annual Reports and Statistics
- Tick-borne Disease Educational Materials Order Form

New York State Department of Environmental Conservation
- New York State Pesticide Administration Database (NYSPAD)

Centers for Disease Control and Prevention
- Ticks and Tickborne Diseases
- Lyme Disease: Frequently Asked Questions
- Educational Materials

Northeast Regional Center for Excellence in Vector-borne Diseases

- Northeast Regional Center for Excellence in Vector-borne Diseases

U.S. Environmental Protection Agency

- Find the Repellent that is Right for You

Other Resources

- University of Rhode Island Tick Encounter Resource Center
- Companion Animal Parasite Council's Pets and Parasites Guide

APPENDIX: LIST OF ACRONYMS

CDC: Centers for Disease Control and Prevention

CLEP: New York State Department of Health's Clinical Laboratory Evaluation Program

CSTE: Council of State and Territorial Epidemiologists

DEC: New York State Department of Environmental Conservation

DEET: N, N-diethyl-meta-toluamide

EPA: Environmental Protection Agency

HL7: Health Level 7

LHD: Local Health Department

NYS: New York State

NYSDOH: New York State Department of Health

OPRHP: New York State Office of Parks, Recreation and Historic Preservation

SED: New York State Education Department

STARI: Southern Tick Associated Rash Illness