

# Tick-borne Diseases Response Plan

June 2024

# TICK-BORNE DISEASES RESPONSE PLAN

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## 1.0 Introduction

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The Nova Scotia Tick-borne Diseases Response Plan is updated by the Nova Scotia Zoonotic Diseases Technical Working Group. The working group consists of experts in ticks, human health, and animal health who work together from a One Health approach to ensure consistency and coordination in the protection of Nova Scotians from vector-borne diseases; including those transmitted by ticks. This group of experts is responsible for developing and implementing this Tick-borne Diseases Response Plan and for the ongoing assessment of risks to Nova Scotians. Members represented on the working group have different roles and responsibilities. Representatives from the Department of Health and Wellness (DHW) Public Health coordinate and co-chair the Nova Scotia Zoonotic Diseases Technical Working Group. The group meets to monitor all activities related to the response plan.

The key components of the plan include:

- Surveillance for tick-borne illnesses in humans;
- Tick surveillance to determine the distribution of vectors for tick-borne diseases and the prevalence of disease-causing pathogens;
- Prevention and control of human infection with tick-borne diseases;
- Communication to public, media, and health care professionals.

The development of the plan was initiated in response to the emergence of Lyme disease and its vector, the blacklegged tick, *Ixodes scapularis*. The focus of the plan has broadened to incorporate other pathogens that are transmitted to humans by blacklegged ticks. Currently, in Nova Scotia, these pathogens include *Anaplasma phagocytophilum*, the cause of human granulocytic anaplasmosis (HGA) or anaplasmosis, *Babesia microti*, a cause of human babesiosis, *Borrelia miyamotoi*, a cause of tick-borne relapsing fever, and Powassan virus disease.

### 1.1 Background

Blacklegged ticks, *Ixodes scapularis*, are the primary vectors of pathogens that cause human disease in Nova Scotia. Blacklegged ticks have established populations throughout the entire province and the entire province is considered a higher risk area for encountering a blacklegged tick. These ticks can transmit the pathogens that cause Lyme disease, anaplasmosis, babesiosis and Powassan virus. Populations of blacklegged ticks were first identified in Nova Scotia in 2003. The agent of Lyme disease, *Borrelia burgdorferi*, is the most common pathogen found in blacklegged ticks in Nova Scotia. Other pathogens, such as, *Anaplasma phagocytophilum*, *Babesia microti*, and *Borrelia miyamotoi* have been detected in a small number of blacklegged ticks or small mammals in the province during active tick surveillance initiatives. Powassan virus has been detected in a single tick in 2016 and 2019, although current prevalence in ticks is unknown. *Ixodes uriae* (seabird tick) is a potential vector of European Lyme borreliosis in Atlantic Canada, especially on coastal islands with seabird colonies. Seabird ticks infected with European Lyme pathogens have been reported from several coastal islands in Atlantic Canada and it is thought to be spread between seabird colonies throughout the North Atlantic by reservoir seabird hosts. This species of tick has not been identified in Nova Scotia to date.

Migratory and non-migratory birds transport larval and nymphal blacklegged ticks into and across Nova Scotia on an annual basis. Incursion of these “bird-borne” ticks does not routinely result in established tick populations because localities where ticks drop from birds do not always have the appropriate habitat and climate required for tick survival and establishment. A locality must also have sufficient populations of deer and small mammals (such as mice and squirrels) in order to support tick populations because these animals are the hosts that the adult and immature (larvae and nymphs) blacklegged ticks prefer to feed upon, respectively.

Range expansion of blacklegged ticks has been influenced by a warming climate; there is a possibility of encountering blacklegged ticks anywhere in the province. Ticks are usually encountered in leaf litter on the forest floor or low-lying vegetation like grasses, shrubs, and other types of herbage. People are most likely to be exposed to blacklegged ticks in environments such as wooded or forested habitats, urban parks and gardens and may be infected with tick-borne pathogens after a bite, of sufficient duration, from an infected nymphal or adult female blacklegged tick. Although most active during the summer months, ticks are active anytime the outside temperature is >4°C.

Although widespread in Nova Scotia, *Dermacentor variabilis*, the American dog ticks cannot transmit any of the pathogens associated with blacklegged ticks. While other tick species can also transmit diseases, at this time only the blacklegged tick is known to carry human pathogens in Nova Scotia.

The first confirmed human case of Lyme disease in Nova Scotia was reported in 2002 and the first confirmed human case of anaplasmosis was reported in 2017. Sporadic confirmed human cases of babesiosis have been reported in recent years. The Annual Notifiable Diseases in NS Surveillance Report provides annual information on tick-borne diseases, the report can be found [here](#).

## 1.2 Goals and Objectives

### Goal:

To reduce the risk of human infection related to tick-borne diseases in Nova Scotia.

### Objectives:

- To estimate the range of blacklegged ticks and the geographic scope of risks of exposure to tick-borne diseases in Nova Scotia based on active and passive tick surveillance data.
- To monitor the distribution of tick-borne diseases and identify geographic areas and age groups at higher risk.
- To identify and implement evidence-based strategies to control the spread of vectors of tick-borne diseases, as appropriate.
- To understand driving factors of the emergence of tick-borne diseases, inclusive of climate change, to inform preparedness and sustainability.
- To increase public and health care professionals’ awareness about the risk of infection with tick-borne diseases.
- To increase public and health care professionals’ awareness about typical symptoms and signs of tick-borne diseases.
- To provide information to the public and health care professionals about effective ways to prevent exposure to and infection with tick-borne diseases.

## 2.0 Roles and Responsibilities

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### 2.1 Nova Scotia Department of Health and Wellness (DHW) Public Health Branch

- Collates surveillance data for human infection with tick-borne diseases, inclusive of rare, unusual or emerging tick-borne diseases.
- Summarizes, interprets and produces reports from human case surveillance information; including, the Vector borne and other Zoonoses section of the Annual Notifiable Disease Surveillance Report and other ad hoc reports ([novascotia.ca/dhw/populationhealth/](https://novascotia.ca/dhw/populationhealth/)).
- Develops policy/guidance documents for public health surveillance.
- Distributes the Infectious Diseases Expert Group (IDEG)'s [Guidance for Primary Care and Emergency Medicine Providers in the Management of Lyme Disease, Human Granulocytic Anaplasmosis, Babesiosis and Powassan virus infection in Nova Scotia](#).
- Provides communication support for provincial prevention initiatives, media coverage, news releases, and other materials as required.
- Coordinates and chairs the Nova Scotia Zoonotic Diseases Technical Working Group.
- Explores opportunities to coordinate and analyze tick and human case surveillance data to inform and prioritize surveillance initiatives.
- Identifies levels of risk and communicates information on changes in risk to the partners, including health care professionals, the Nova Scotia Zoonotic Diseases Technical Working Group and the public.
- Develops and coordinates revisions of the Tick-borne Diseases Response Plan and other related public health guidelines.
- Collaborates with partners to understand factors contributing to expansion of tick populations and emerging tick-borne diseases, such as climate change and other environmental factors.

### 2.2 Nova Scotia Department of Natural Resources and Renewables

- Conducts active tick surveillance in collaboration with DHW Public Health and Public Health Agency of Canada as required.
- Forwards blacklegged ticks and/or samples from small mammals to the National Microbiology Laboratory in Winnipeg for testing as required.
- Contributes to the review and analysis of blacklegged tick surveillance data to prioritize surveillance initiatives.
- Shares communication tools, such as signage and posters, in areas where ticks may be encountered.

### **2.3 Public Health Agency of Canada/National Microbiology Laboratory**

- Has capability to test blacklegged ticks and small mammals for *B.burgdorferi*, *B.miyamotoi*, *Babesia microti*, *Anaplasma phagocytophilum*, Powassan virus and other emerging pathogens as requested in partnership with Nova Scotia Department of Health & Wellness.
- Contributes to the review and analysis of blacklegged tick surveillance data in order to prioritize surveillance initiatives.
- Provides human tick-borne disease testing of samples submitted by the Provincial Public Health Laboratory Network as required.
- Provides, as requested, molecular diagnostic testing on samples collected from humans for evidence of infection with a suite of tick-associated pathogens as requested.
- Reports the outcomes of diagnostic testing on humans to the Provincial Public Health Laboratory Network.

### **2.4 Nova Scotia Health (Public Health)**

- Reviews laboratory data for reported cases of tick-borne diseases (as per the [Communicable Disease Manual](#)) and unusual tick-borne disease occurrences and submits reports to DHW Public Health.
- Provides education to partners and the public about tick-borne diseases and measures to prevent disease.
- Provides advice to the public and health care professionals regarding the risk and prevention of tick-borne diseases when requested.
- Establishes links with local communities and works to promote awareness to decrease the risk of tick-borne diseases.
- Communicates to the public about tick-borne diseases including prevention initiatives, media, news releases, issue management, print materials and others as required.

### **2.5 Nova Scotia Department of Agriculture (NSDA)**

- Provides expertise in animal-related infectious diseases. Surveillance of disease in animals as a sentinal population for human disease.

### **2.6 Indigenous Services Canada**

- Provides linkage from Province to First Nations communities.
- Provides educational materials to First Nations communities.
- Provides guidance on zoonotic diseases including tick-borne diseases to First Nations communities.

## 2.7 Provincial Public Health Laboratory Network (PPHLN)

- Provides expertise in the diagnosis of human infectious diseases and links to the Division of Microbiology in the Department of Pathology and Laboratory Medicine and to the Division of Infectious Disease in the Department of Medicine.
- Provides timely and appropriate human diagnostic laboratory services for Lyme disease and other tick-borne diseases.
- Works in collaboration with the National Microbiology Lab for human diagnostic testing and reports results from the National Microbiology Lab to Public Health via the Panorama laboratory reporting system.
- Reports all confirmed positive tests to Nova Scotia Health, Public Health.
- Responds to questions from physicians, other health care providers and public health staff on laboratory issues.

## 2.8 Nova Scotia Department of Environment and Climate Change

- Provides recommendations and advice on the use of pesticides and other environmental control measures in relation to tick control.
- Assesses environmental health issues related to tick control methods.

# 3.0 Tick-borne Diseases of Concern in Nova Scotia

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Nova Scotia has a suitable climate for tick populations. Blacklegged ticks survive best in areas that provide a moist habitat and are often found in and near wooded or forested areas, shrubs, long grass, leaf litter, urban parks, and gardens. Adult blacklegged ticks are most active in the spring and fall however remain active until the temperature is consistently below 4°C. Larvae and nymphs are most active in the spring and summer. Blacklegged ticks are found throughout Nova Scotia and all areas of the province are considered as having risk of tick-borne disease. It is possible for an individual to have co-infection with more than one tick-borne illness.

## Lyme Disease

Lyme disease is the most common tick-borne disease in Nova Scotia. It is caused by the bacterium *Borrelia burgdorferi* and is transmitted to humans by a bite from an infected blacklegged tick. In Nova Scotia, only the blacklegged tick carries the bacteria that causes Lyme disease, and not all blacklegged ticks carry the bacteria.

## Human Granulocytic Anaplasmosis

HGA, more commonly referred to as anaplasmosis is an emerging tick-borne illness in Nova Scotia. It is an infection caused by the bacterium *Anaplasma phagocytophilum* which is transmitted by a bite from an infected blacklegged tick. The first human case was identified in 2017. There has been an increase in laboratory confirmed cases since 2021.

## Babesiosis

Babesiosis is a parasitic infection transmitted by the black legged tick, *Ixodes scapularis*. Although there are a number of Babesia species, the most common cause of human infection in North America is *Babesia microti*. This is a rare disease in Nova Scotia; however, there have been sporadic human cases of babesiosis, suggesting that the pathogen may be emerging in the province.

## Powassan Virus Infection

Powassan virus is a flavivirus that can be transmitted by black legged ticks (*Ixodes scapularis*) and other ticks such as the squirrel tick (*Ixodes marxi*) or groundhog tick (*Ixodes cookei*) which do not frequently bite humans. Powassan virus is an uncommon pathogen in Canada. Since its identification in 1958, there have been sporadic cases reported each year in the United States (range 2 -22 cases) (Centre for Disease Control 2023). There have also been sporadic cases in Canada; true incidence is not clear. In Nova Scotia, there have been no known human cases of Powassan virus infection.

## Borrelia miyamotoi Disease

*Borrelia miyamotoi*, also known as hard tick relapsing fever, is a parasitic infection transmitted by the blacklegged tick. This is an emerging tick-borne disease in the North America; it was first identified in Canada in 2013. In Nova Scotia, there have been no known human cases of *B. miyamotoi* disease however the pathogen has been identified in blacklegged ticks in Nova Scotia and has been identified along the eastern seaboard of the United States. *Borrelia miyamotoi* disease is not a notifiable disease in Nova Scotia.

## 4.0 Diagnostic Testing for Human Illness

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Detailed information about testing of these tick-borne diseases can be found in the [IDEG Guidance for Primary Care and Emergency Medicine Providers in the Management of Lyme Disease, Human Granulocytic Anaplasmosis, Babesiosis and Powassan Virus Infection in Nova Scotia.](#)

Serological testing for Lyme disease at the QEII Health Sciences Centre Microbiology Laboratory has transitioned to the modified two-tier testing (MTTT) algorithm using 2 enzyme immunoassays (EIAs). With the MTTT algorithm, specimens will first be tested using the Zeus C10/VIsE EIA (ZEUS ELISA Borrelia VIsE1/pepC10 IgG/IgM), with reactive specimens tested in the QEII Laboratory by a second EIA, the Zeus whole cell EIA (ZEUS ELISA Borrelia burgdorferi IgG/IgM), rather than an immunoblot. Specimens with positive results on both EIAs are considered to be positive. While the MTTT approach has improved sensitivity for detecting early infection, it is important for clinicians to remember that patients presenting with early localized Lyme diseases should be treated on the basis of a clinical diagnosis, without relying on serology.

In response to increased numbers of *Anaplasma phagocytophilum* infections detected in Nova Scotia, the QEII Health Sciences Centre Microbiology Laboratory added *Anaplasma* specific polymerase chain reaction (PCR) to Lyme serology. Identification of the bacteria using PCR is the most sensitive method to diagnose anaplasmosis within the first two weeks of infection. While whole blood has traditionally been the specimen of choice, QEII Health Sciences Centre Microbiology Laboratory recently showed that testing serum is an acceptable alternative. As a result, the QEII laboratory has added anaplasmosis to all Lyme disease requests as part of a Tick-borne Illness panel.

The diagnosis of Babesia infection should be considered in an individual presenting with a summertime febrile illness with anemia, thrombocytopenia, evidence of hemolysis and/or increased transaminases, for which no other etiology is apparent and who participated in activities that have potential for exposure to tick bites. Testing for babesiosis should be considered in anyone being treated for Lyme disease or anaplasmosis who has persistent fever after treatment.

Clinicians should consider Powassan virus in people presenting with viral encephalitis who have participated in activities that had potential for exposure to tick bites. The diagnosis is made by sending acute and convalescent serology and cerebrospinal fluid (CSF) testing. Infectious Diseases and Medical Microbiology can be consulted in suspect cases.

*Borrelia miyamotoi* disease can be considered for individuals who present with relapsing fever and have participated in activities that had potential for tick bites.

## 5.0 Public Health Management

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Human cases of specific tick-borne diseases are reportable by health care providers to Public Health under the [Reporting of Notifiable Diseases and Conditions Regulations](#) of the Nova Scotia *Health Protection Act*. Laboratory results are reported to Nova Scotia Health through a comprehensive, integrated public health information system called Panorama. Nova Scotia Health collects and manages the data as well as provides health professionals with relevant tick-borne diseases information when requested.

Guidelines for Public Health case management of tick-borne diseases including clinical information, can be found here: <http://novascotia.ca/dhw/cdpc/cdc/>.

Health care providers, including pharmacists are able to prescribe chemoprophylaxis for the purpose of preventing Lyme disease for individuals bitten by a BLT using the criteria outlined in the [IDEG Management Guidelines](#). Pharmacists may prescribe treatment of early Lyme disease in accordance standards developed by the Nova Scotia College of Pharmacists, which aligns with the guidance developed by Infectious Diseases Expert Group as described above. This enhances timely access to prophylactic treatment and treatment for early Lyme disease and provides additional support for the public in identifying early symptoms of Lyme disease. There is no prophylaxis option for the other tick-borne diseases in Nova Scotia.

## 6.0 Epidemiology and Surveillance

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### 6.1 Epidemiology

The number of Lyme disease cases reported to Public Health showed a consistent upward trend from 2002 to 2019. In 2002, only 2 confirmed cases were reported, with a rate of 0.2 per 100,000 population, however this number increased substantially to 837 confirmed and probable cases (86.2 per 100,000) in 2019 (p-value= 0.001). During the COVID-19 pandemic, the reporting and investigation of Lyme disease cases was impacted. There were 445 (45.3 per 100,000), 594 (59.9 per 100,000) and 333 (32.9 per 100,000) Lyme disease cases (both confirmed and probable) reported in 2020, 2021, and 2022, respectively. This aberration from expected trends likely reflects the impact of the pandemic rather than a true decrease in case numbers.

The trend of increasing Lyme disease cases, is likely due to several factors including:

- an increase in the number of blacklegged tick populations established in Nova Scotia.
- increases in the sizes of the established populations of blacklegged ticks, especially of nymphal cohorts.
- increases in the rate of infection with *B. burgdorferi* within the blacklegged tick populations.
- an increase in awareness among individuals and health care providers leading to increased diagnosis and reporting of Lyme disease.
- Laboratory testing transition to the modified two-tier testing algorithm in 2021 which is more sensitive for detecting early infection.

The first human cases of anaplasmosis in Nova Scotia were identified by the PPHLN in 2017 and 2018. By the end of 2022, a total of 199 positive laboratory results were identified. There have been sporadic cases of babesiosis acquired in Nova Scotia, and no cases of Powassan virus have been identified by the PPHLN.

### 6.2 Surveillance

In May 2023, anaplasmosis, babesiosis and Powassan virus became notifiable in Nova Scotia under the Health Protection Act (It's the Law: Reporting Notifiable Diseases and Conditions). Also, in 2023, Nova Scotia updated the provincial case definition for Lyme disease. The criteria for a confirmed case of Lyme disease under the new case definition is laboratory evidence only; previously clinical evidence of illness was required in addition to laboratory evidence. The new approach to defining a confirmed case is consistent with other regions internationally where the epidemiology of Lyme disease is similar to Nova Scotia. The Public Health surveillance case definitions are found in the Surveillance Guidelines for Notifiable Diseases and Conditions: <https://novascotia.ca/dhw/populationhealth/surveillanceguidelines/>. Health care providers, via the laboratory results, are required to notify Public Health of all human cases of Lyme disease, anaplasmosis, babesiosis and Powassan virus.

DHW Public Health reviews the geographic distribution of human cases of tick-borne diseases, as well as passive tick surveillance from eTick and active tick surveillance infectivity reports from PHAC when available to determine if any further active tick surveillance is required.

The epidemiology of tick-borne diseases in humans is reported annually in Nova Scotia's Annual Notifiable Disease Surveillance Report. These reports illustrate disease trends overall in subpopulations and can be found here: <https://novascotia.ca/dhw/populationhealth/>.

## 7.0 Risk and Prevention

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### 7.1 Risk assessment

Blacklegged ticks have been identified throughout Nova Scotia through passive and active surveillance. Active tick surveillance refers to a proactive approach in which public health authorities actively seek out and collect ticks from specific areas to monitor and study populations, behavior, and the presence of diseases ticks may carry. Whereas passive tick surveillance involves collecting ticks that are submitted voluntarily by the public or collected incidentally by individuals during routine activities (e-tick).

Not all black legged ticks carry pathogens; however, the risk of encountering a tick infected with a pathogen is present in all areas of the province when participating in outdoor activities in areas of long grass, brushes, and woods – including urban parks and gardens.

The province is considered a high incidence area for Lyme disease, meaning that Nova Scotia has met the threshold described by the Centers for Disease Control (CDC) of an average of  $\geq 10$  confirmed cases of Lyme disease/100,000 population for three consecutive years.

The [Lyme disease estimated risk areas map](#) for Nova Scotia uses historical Lyme disease case data and passive tick surveillance data from eTick to describe the gradient of Lyme disease risk.

In addition to Lyme disease, anaplasmosis is an emerging tick-borne disease in Nova Scotia as noted by an increase in human diagnoses. There have been sporadic cases of babesiosis reported in recent years. It is possible for an individual to have tick-borne co-infections which means that they are infected with more than one tick-borne infection.

### 7.2 Risk reduction

To reduce the risk of tick-borne diseases in Nova Scotia, several approaches are used:

- Ongoing interpretation of data from surveillance systems, to estimate and communicate risk to the public and health care professionals.
- Ongoing surveillance for vectors, pathogens and human illness to inform communication strategies.
- Educating health care professionals and veterinarians to recognize symptoms of tick-borne diseases.
- Educating the public on personal protective measures and other methods to reduce exposure to blacklegged ticks.
- Locating and safely removing attached ticks and seeking assessment from a healthcare provider or pharmacist promptly.
- Providing information on landscaping techniques to reduce blacklegged tick habitat around homes.

## 7.3 Awareness and Education

DHW Public Health shares information about the distribution and presence of blacklegged ticks, and tick-borne diseases with NSH, IWK, health care professionals, the public, and media. The information is used to provide guidance about the risk of infection from tick-borne diseases in Nova Scotia and preventive measures to reduce the risk of a tick bite.

Actions taken by the general public play an important role in preventing human cases of tick-borne diseases. Information for the public on the prevention of tick-borne diseases is provided; as well as information on the risks and symptoms associated with these infections. The DHW Public Health website is updated to include new evidence-based information as it becomes available. The public can receive further information from Nova Scotia Health, Public Health.

Press releases, media interviews and social media posts and videos keep the public informed and updated during the spring, summer and fall months as needed.

New in 2023 is the Nova Scotia Health Tick Service. This service is available to all Nova Scotians providing access to timely and relevant information, education, and coordinated care. Clinicians offer support and resources for tick-borne infections. There is also an interactive tool called the [Tick Talk Bot](#) which is designed to provide information on ticks and tick bites. More information about the Tick Service can be found [here](#).

Nova Scotians are encouraged to spend time outdoors, be active and remember to protect yourselves against tick bites, which is the best way to prevent tick-borne diseases disease. Key messages for tick awareness include:

### **Reduce the risk of a tick bite while enjoying the outdoors:**

- Walk on well-traveled paths, avoiding high grass and vegetation.
- Use an insect repellent approved by [Health Canada](#) (following label directions carefully).
- Cover skin when walking, working, or playing in areas where ticks may be found.
- Wear light colored, long sleeve shirts and pants, closed-toe shoes.
- Tuck shirt in pants and pant legs in socks.
- Check companion animals to ensure that ticks are not brought into the home environment.
- Permethrin treated clothing repels and kills ticks when they come in contact with it and is now registered for use in Canada for those 16 years of age and older.

### **Remove ticks as soon as possible:**

- The risk of infection depends on how long the tick has been attached. For most tick pathogens, if a tick is removed within 24 hours, the risk of infection is lower.
- Performing tick checks on yourself, children and pets after spending time in natural habitats in outdoor areas where ticks are found will allow you to identify and remove ticks. Check clothing and inspect skin. Although blacklegged ticks can attach anywhere on the skin, special attention should be provided to in warm, moist areas of the body, including, in and around ears, arm pits, inside belly button, groin, around the waist, and in the hair and scalp area.

- When possible, take a bath or shower within two hours of coming indoors. This increases the chances of promptly finding and removing attached ticks and possibly washes away unattached ticks.
- If the tick is attached, carefully grasp the head of the tick as close to the skin as possible with clean tweezers and slowly pull the tick straight out. Try not to twist or crush the tick. Clean your hands and the bite area with soap and water or alcohol-based sanitizer where the tick was attached to the skin.
- Health care providers and pharmacists are able to prescribe prophylactic treatment for the purpose of preventing Lyme disease for individuals bitten by a blacklegged tick using the criteria outlined in the [IDEG Guidance for Primary Care and Emergency Medicine Providers in the Management of Lyme Disease, Human Granulocytic Anaplasmosis, Babesiosis and Powassan Virus Infection in Nova Scotia](#). Prophylaxis can be given within 72 hours of the removal of an identified high risk tick bite, which is defined as:
  - The tick is identified as a blacklegged tick.
  - The tick was attached for > 36 hours or appears engorged.
  - The tick bite occurred in an at risk area (all of Nova Scotia is considered an at risk area).

#### **Eliminate ticks from clothing:**

- Put clean outdoor clothes in a dryer on high heat for 10 minutes to kill any remaining ticks. If your clothes are damp, additional drying time is needed. If you need to wash your clothes first, hot water is recommended. If the clothes cannot be washed in hot water, tumble on low heat for 90 minutes or high heat for 60 minutes.

#### **Learn to identify ticks:**

- Remove ticks as soon as you find them. To safely remove the tick, carefully grasp the head of the tick as close to the skin as possible with clean tweezers and slowly pull the tick straight out. Try not to twist or crush the tick. Clean your hands with soap and water or alcohol-based sanitizer. Wash the area where the tick was attached to the skin with soap and water and disinfect with rubbing alcohol or hydrogen peroxide.
- E-tick is a public platform for image based identification of ticks available in Canada. Individuals can submit a picture of a tick for species identification at no cost. To have a tick identified please visit [eTick.ca](https://www.eTick.ca) for more information.
- Seek assessment from a healthcare provider about eligibility for treatment to help prevent Lyme disease.

#### **Know the signs and symptoms of infection:**

- See a healthcare professional if symptoms of tick-borne disease develop after a blacklegged tick bite in Nova Scotia or in an area where blacklegged ticks are known to be established.

#### **Reduce ticks around your home:**

- Use simple landscaping techniques to reduce the number of blacklegged ticks around homes and parks: <https://novascotia.ca/dhw/cdpc/documents/Landscape-Management-Handbook.pdf>.

## 7.4 Control Measures

There are multiple measures that can be effective for tick control, such as, landscaping techniques and treatment of vegetation with chemical or biological pesticides. The key to these techniques is an understanding of tick habitat. Reductions in abundance of ticks through treatment of vegetation with pesticides will have varying results depending on the products used, frequency of application and coverage. At the present time, relatively few products are available for vegetative treatments to control ticks in Canada. Although pesticide use has been shown to be effective in reducing blacklegged tick populations, it has not been demonstrated to significantly reduce the risk of tick-borne diseases in the limited number of studies to date. Many factors need to be considered prior to the potential use of pesticides for tick control, such as, seasonal timing, weather and area of application. Reductions in tick populations are likely to be temporary and repeat applications will often be required to maintain tick populations at low levels. In Nova Scotia, any pesticide use must comply with federal and provincial pesticide legislation.

Although pets cannot spread tick-borne diseases directly to humans, they can carry infected ticks into your home or yard. Regular tick checks and prompt tick removal are just as important for pets as for people. Seek veterinary advice on the proper control of ticks on domestic animals.

Although white-tailed deer are a preferred host for adult blacklegged ticks, management of deer populations in urban areas has significant logistical challenges and removal of deer is not seen as a standalone intervention to reduce the risk of tick-borne diseases. In some circumstances, exclusion of deer may reduce tick populations, but the geographic scale of the exclusion is usually small (to several hectares) and not at a community level. In addition, ticks can take a blood meal from a wide variety of mammals and birds, therefore solely addressing the deer population will not be an effective control measure.

## 8.0 Communication Strategy

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To raise awareness of tick-borne diseases within Nova Scotia, DHW Public Health partners with Nova Scotia Health and other government and community partners to:

### **Provide Nova Scotians with consistent, current and reliable information about tick-borne diseases, including Lyme disease:**

DHW Public Health continues to educate Nova Scotians about tick safety and the risk of tick-borne diseases through an annual public awareness campaign. Information is available online through the DHW Communicable Disease Prevention and Control website: <https://novascotia.ca/dhw/CDPC/lyme.asp>. DHW Public Health works with its partners to identify and leverage optimal methods for sharing information with the public.

### **Emphasize the importance of personal responsibility in preventing the transmission of tick-borne diseases:**

DHW Public Health works with Nova Scotia Health and other government and community partners with a focus on creating greater awareness for Nova Scotians to self-manage the prevention of tick-borne diseases. This work includes engaging community organizations and providing information online and through healthcare professionals, so that Nova Scotians have the right information and tools they need to prevent the spread of tick-borne diseases. Nova Scotians can also use tick identification services such as [eTick](#).

### **Ensure healthcare providers, health system and the public have access to information about tick-borne diseases, including Lyme disease:**

Nova Scotians expect their healthcare providers to be knowledgeable when it comes to the identification, management and treatment of tick-borne diseases. DHW Public Health continues to engage healthcare professionals to ensure they have the most current information to address patient questions and concerns and provide an appropriate level of care. For more information, see the [IDEG Guidance for Primary Care and Emergency Medicine Providers in the Management of Lyme Disease, Human Granulocytic Anaplasmosis, Babesiosis and Powassan Virus Infection in Nova Scotia](#).

### **Dispel misinformation about Lyme disease and other tick-borne diseases.**

Supported by its partners, the Department addresses misinformation related to Lyme disease and other tick-borne diseases, as it is identified, to ensure Nova Scotians have access to evidence based and consistent information.

## **9.0 Resources & References**

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