

**TO:** Chair and members of the Board of Health

**MEETING DATE:** June 7, 2017

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*Original signed document on file*

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## Recommendations

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It is recommended that the Board of Health:

1. **Receive this report for information.**

## Key Points

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- Lyme disease remains the most common vector-borne disease in North America.<sup>1</sup>
- In 2016, there were 1.4 cases per 100,000 people of lab-confirmed Lyme disease (count: 4 cases) reported within Wellington-Dufferin-Guelph (WDG). However none are known to have been acquired in this area.
- In 2016 in Ontario, there were 2.3 cases per 100,000 people of lab-confirmed Lyme disease (count: 315 confirmed cases).
- Passive surveillance involved accepting ticks from both human and animal hosts for identification purposes. In 2016, 72 ticks were submitted to Wellington-Dufferin-Guelph Public Health (WDGPH) and over one-third were blacklegged ticks (26).
- Two (2) ticks submitted to WDGPH in 2016 tested positive for *Borrelia burgdorferi* by Health Canada. Both ticks were submitted from within the borders of WDG.
- Active surveillance continued in 2016. Tick-dragging, was carried out in areas where the majority of blacklegged tick submissions were from, and which had habitat suitable for blacklegged ticks. No blacklegged ticks were collected through active surveillance.

- Public education in 2016 included communicating key messages about cause and symptoms of Lyme disease, characteristics of blacklegged ticks, preventing tick bites and tick removal through online and print materials.
- Passive and active surveillance are used to develop baseline data for blacklegged ticks within Wellington and Dufferin counties and the province. This data can be used to inform resource allocation and targeted program development.

## Discussion

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Lyme disease is a bacterial infection transmitted through the bite of an infected tick. In Ontario, the spiral-shaped (spirochete) bacterium that causes Lyme disease, *Borrelia burgdorferi*, is only transmitted by the blacklegged tick (*Ixodes scapularis*). The majority of reported human cases occur as a result of exposure to areas known to harbour infected blacklegged ticks, and Lyme continues to be the most commonly transmitted vector-borne disease in North America.<sup>1</sup>

### Blacklegged Ticks

The range of the blacklegged tick in Ontario has expanded. There are currently seven known endemic Lyme disease areas and several estimated risk areas, identified through active surveillance (see Appendix “A”).<sup>2,3</sup> In Lyme disease endemic areas, blacklegged ticks are established and there is evidence that ticks are transmitting *B. burgdorferi* among reservoir hosts, having been confirmed over multiple years of active surveillance.<sup>3,4</sup> Lyme disease risk areas are locations where at least one blacklegged tick has been identified through active surveillance, or are known to occur, and where humans have the potential to come into contact with infected ticks, but where the presence of *B. burgdorferi* has not yet been confirmed.<sup>2,3</sup>

Endemic and risk areas are similar in that they are typically zones of deciduous or mixed forests, and are populated by large and small-sized mammals which act as reservoirs for the bacteria and hosts for the ticks. This habitat, as well as similar climatic characteristics, are conducive to the proliferation and survival of both the tick species and the bacteria. These areas are also located near bodies of water and are known destinations for, or on the flight paths of, migrating birds; together with deer, these are considered important factors in tick distribution.

### Lyme Disease

No human vaccine exists for Lyme disease, and the best protective steps one can take to prevent infection is to avoid tick bites by using insect repellent (with DEET or Icaridin) when outdoors, and wearing light-coloured shirts with long sleeves and pants with long legs. It is important to do a full body check after spending time outdoors if in a suitable tick habitat. Pets should also be checked regularly after being in tick habitats in order to prevent ticks from being brought into the home.

## Lyme Disease in WDG and Ontario

Lyme disease is a reportable disease. In 2016, there were 1.4 cases per 100,000 people of lab-confirmed Lyme disease (count: 4 cases) reported within the boundaries of WDG. However, none are known to have been acquired in this area. In comparison, in 2015, there was 0.4 cases per 100,000 people of lab-confirmed Lyme disease (count: 1 case) (see Appendix “B”), in WDG. Please note that WDG rates are based on very low numbers of lab-confirmed cases and need to be interpreted with caution.

In comparison, in 2016 in Ontario, there were 2.3 cases per 100,000 people of lab-confirmed Lyme disease (count: 315 confirmed cases), a decrease from 2015 when there was 2.7 cases per 100,000 people of lab-confirmed Lyme disease in Ontario (count: 372 confirmed cases) (see Appendix “B”).

## WDGPH’s Prevention and Control Program

With the increase in the number of blacklegged ticks throughout the province, and continued expansion of the tick’s range, due in part to climate change, Lyme disease has the potential to become a more serious public health threat. Ticks, once established in an area, cannot easily be eliminated. Therefore, WDGPH’s prevention and control program for Lyme disease focuses on passive and active surveillance and public education with the goal of preventing the transmission of *Borrelia burgdorferi* to the population. A summary of WDGPH’s prevention program can be found in Appendix “C”.

### Passive Surveillance

WDGPH began recording the number and type of ticks that were submitted by the public in 2011. Before that time, tick inquiries were rare. During the years that followed, the number of ticks being submitted to WDGPH has been increasing, though submissions in 2016 remained relatively the same as in 2015 when data collection techniques were more formalized. In 2016, 72 ticks were submitted by the public with the majority being adult females during the early spring and later autumn months. See Appendix “D” for more details.

In order to help continue developing the baseline for tick activity in WDG, and to assist with provincial and federal surveillance efforts, WDGPH continued to share the message to the public to submit any ticks found, including those found on pets. Veterinarians in WDG were also notified to submit ticks for identification that were collected from dogs and cats in their practice. Submitted ticks were identified by WDGPH staff, where possible, any positively identified blacklegged ticks were forwarded to Health Canada’s National Microbiology Laboratory (Field Studies—Zoonotic Diseases and Special Pathogens) in Winnipeg for bacterial testing.

In 2016, 79% of all blacklegged ticks submitted to WDGPH came from within WDG, of which 8% (count: 2) ticks tested positive for *Borrelia burgdorferi*.

Recently, WDGPH conducted an analysis of the numbers and types of ticks submitted by the public to WDGPH in order to determine whether there were any patterns in terms of tick species, spatial, and temporal trends over time. Although submissions had been ongoing from 2011 to 2016, only data from 2015 and 2016 were utilized. Tick submission data appeared to follow a seasonal pattern, aligning with the times of year and temperature ranges when each

tick species is known to be active. This report determined that monitoring of passive tick surveillance data is recommended to explore long-term trends and provide a clear picture of tick activity in WDG, to inform public health messaging regarding tick and Lyme disease prevention.

## Active Surveillance

Considering the blacklegged tick's expanding range and population numbers, and the corresponding increase in tick-human encounters, WDGPH began active surveillance in 2015 in partnership with the University of Guelph. Active surveillance was initiated in the form of "tick dragging" in areas with habitat that would be suitable for the blacklegged tick and bacteria. Standard operating procedures based on Public Health Ontario guidelines were adopted.<sup>7</sup>

Tick-dragging (also known as tick-flagging) involves "dragging" a 1m x 1m square of white flannel fabric attached to a wooden pole through a potential tick habitat in the hopes that "questing" ticks will attach to the material. Areas for dragging were selected based on known tick habitats as well as areas deemed suitable for potential tick habitats. Each of the following areas was dragged twice in 2016, once in spring/early summer, and once in late summer/early fall:

- Luther Marsh Conservation Area, Grand Valley
- Island Lake Conservation Area, Orangeville
- Fletcher Creek Ecological Preserve, Puslinch Township
- Preservation Park, Guelph
- Speed River Trail, Guelph
- Watson Road Trail, Guelph

In 2016, no blacklegged ticks were found in any of the areas being flagged at that point in time.

## Public Education

In 2016, several strategies were used to raise awareness of Lyme disease among the community and share steps for preventing tick bites.

- A media release regarding ticks, Lyme disease, and prevention strategies was distributed on May 17, 2016. This media release was picked up by the Guelph Mercury Tribune, The Wellington Advertiser, CJOY 1460, and Magic 106.1FM.
- Approximately 3000 tick identification cards were distributed in 2016 to veterinary clinics through Wellington County, Dufferin County, and City of Guelph, as well as WDGPH offices. This tick ID card, which was shared with many other local and provincial agencies, is also available on our website. See Appendix "E".
- The Ticks and Lyme disease webpage was updated. The website had 477 unique page views in 2016, an increase from 2015 (29 unique page views).
- WDGPH's blog post 'Fight the Bite' featured an article on ticks and Lyme disease and was posted on May 10, 2016. This blog had 128 unique page views. Our blog post on April 19, 2016 also mentions using insect repellent to protect people from ticks.
- Key messages were tweeted and posted on Facebook in the summer of 2016.
- An article about ticks and Lyme disease was featured in the June edition of the One Health e-newsletter that is sent to veterinarians in WDG. This newsletter was opened by 52% of recipients (55/106).

#### Key messages included:

- The blacklegged tick may transmit the bacteria that cause Lyme disease.
- Typical symptoms of Lyme disease include fever, headache, and fatigue. Some people will get a bull's eye rash at the site of the tick bite.
- Ticks do not jump, fly, or move very quickly and are usually found in wooded or brushy areas.
- If you have been bitten by a tick and are concerned, contact your healthcare provider. Keep the tick so that it can be submitted for identification.

#### Preventing Tick Bites:

- Use caution in areas where ticks are more likely to be found.
- Wear light-coloured pants and long-sleeved shirt so ticks are easy to see.
- Wear closed footwear and tuck pants into socks.
- Use a repellent that contains DEET or Icaridin.
- Perform daily full-body tick checks on yourself, children and pets.

#### Tick Removal:

- Using tweezers or a tick remover:
- Grasp the tick firmly between the body of the tick and the skin.
- Pull the tick straight out.
- Clean the bite area with soap and water.

## Conclusion

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In 2016, in WDG, there was a slight increase in the rate of cases of Lyme disease, from 0.4 cases per 100,000 people of lab-confirmed Lyme disease in 2015, to 1.4 cases per 100,000 people of lab-confirmed Lyme disease in 2016. The number of ticks submitted to WDGPH for identification in 2016 was similar to 2015.

Blacklegged ticks have been found in the WDG area – two (2) tested positive for *Borrelia burgdorferi* in 2016. Considering the expanding range of the blacklegged tick and the favourable habitat that exist within areas of Wellington and Dufferin counties, it remains highly likely that the blacklegged tick will become endemic in the future increasing the risk of exposure to the bacteria that causes Lyme disease, *Borrelia burgdorferi*.

Passive and active surveillance are necessary to develop baseline data for the blacklegged tick, and better understand its progress, within Wellington and Dufferin counties. Measuring and mapping blacklegged tick numbers and range expansion over time will allow WDGPH to better utilize resources and target future education and awareness campaigns towards specific areas and populations. Overall, WDGPH's prevention and control program will allow WDGPH to better communicate the risks of Lyme disease to the population.

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# Ontario Public Health Standard

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## Health Hazard Prevention and Management Program Standard

Goal: To prevent or reduce the burden of illness from health hazards in the physical environment.

The board of health shall develop a local vector-borne management strategy based on surveillance data and emerging trends in accordance with the *Infectious Diseases Protocol, 2015*.

## WDGPH Strategic Direction(s)

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Check all that apply:

- Health Equity  
We will provide programs and services that integrate health equity principles to reduce or eliminate health differences between population groups.
- Organizational Capacity  
We will improve our capacity to effectively deliver public health programs and services.
- Service Centred Approach  
We are committed to providing excellent service to anyone interacting with Public Health.
- Building Healthy Communities  
We will work with communities to support the health and well-being of everyone.

## Health Equity

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People who work outside or enjoy outdoor activities like hiking, camping, or hunting are at higher risk for tick bites, particularly those people who work in or visit provincial parks.<sup>8</sup> Anecdotally, a large number of tick submissions come from people who have recently spent time at their cottages, highlighting another population at risk for tick bites. Given these factors, WDGPH accepts and identifies ticks acquired from areas outside of WDG, so as to allow WDG residents who may have acquired the tick outside of WDG, the opportunity to confirm the tick's identification and risk of carrying *Borrelia burgdorferi*, the bacteria that causes Lyme disease.

## Appendices

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Appendix "A" – Endemic and High Risk Areas in Ontario

Appendix "B" - Lyme Disease Rates in WDG and Province of Ontario - 10-year Trend

Appendix "C" – Infographic: Summary of WDGPH's Lyme disease program

Appendix “D” – Summary of Tick Submissions to WDGPH

Appendix “E” – WDGPH’s Tick Identification Card

## References

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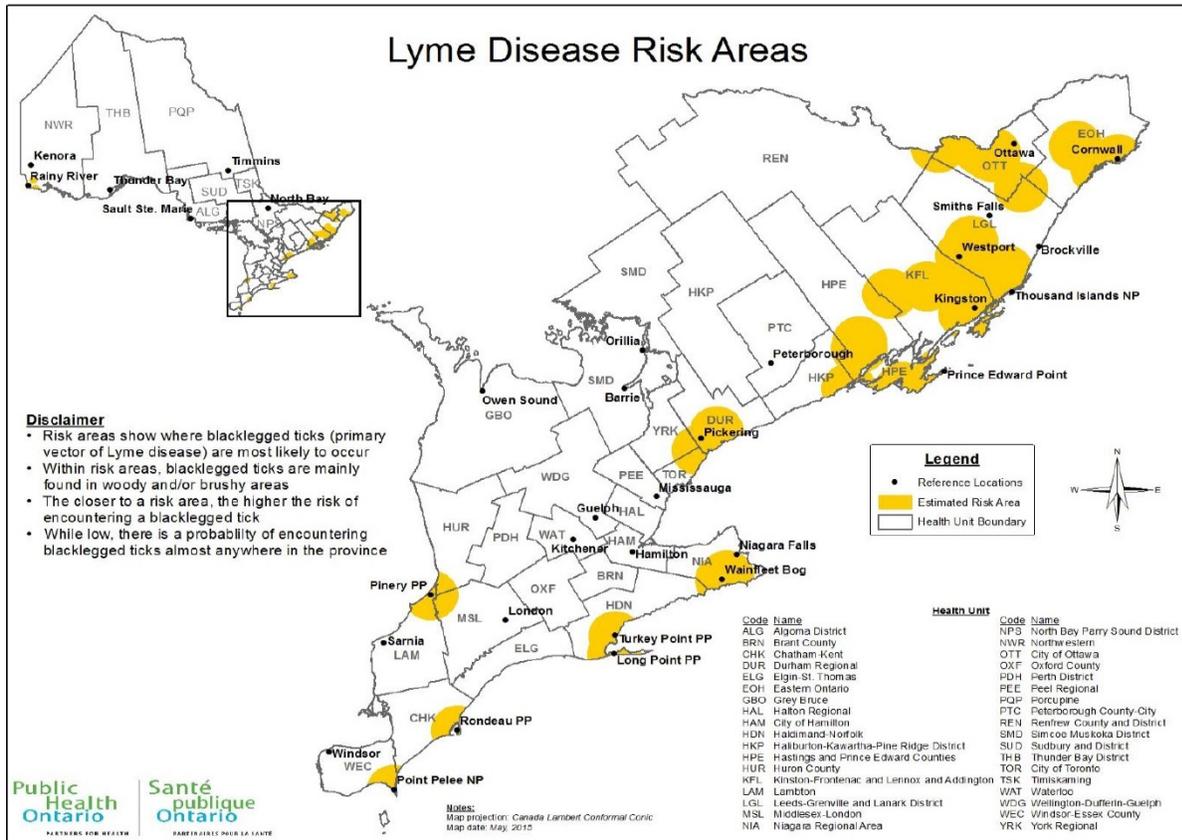
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8. Government of Canada. [Internet]. Risk of Lyme disease to Canadians. [updated 2017 Mar 22; cited 2017 May 17]. Available from: <https://www.canada.ca/en/public-health/services/diseases/lyme-disease/risk-lyme-disease.html>

# APPENDIX “A”

## List of Endemic Areas for Lyme Disease in Ontario<sup>2</sup>

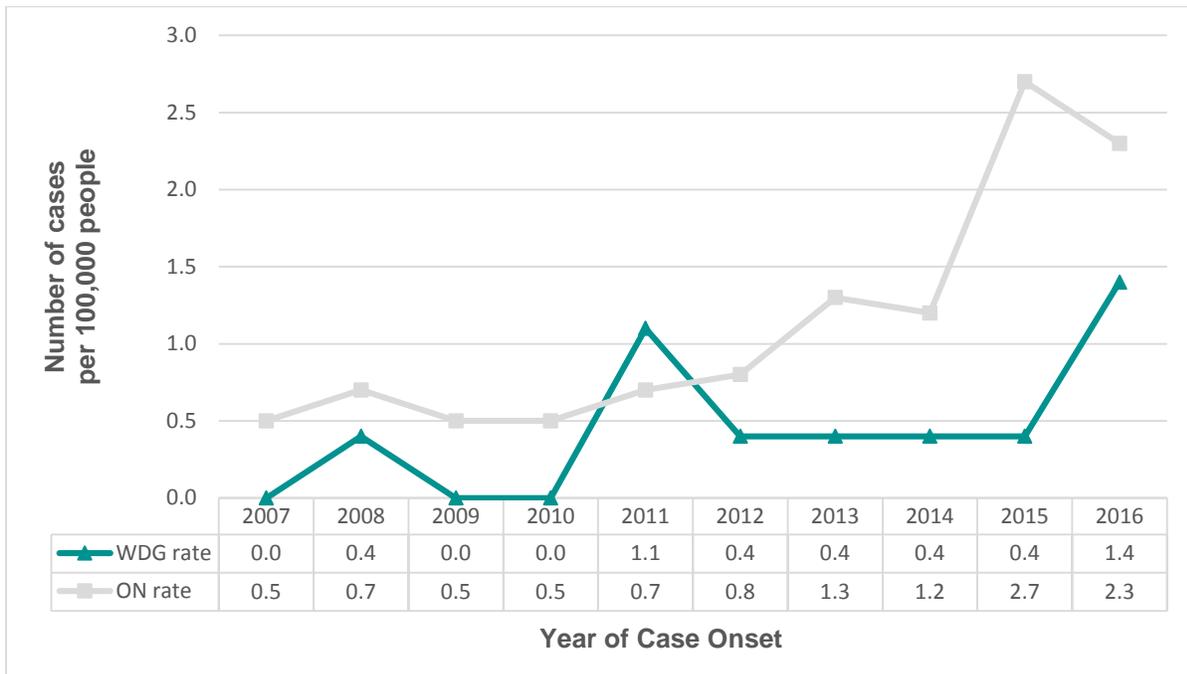
- Long Point Provincial Park
- Turkey Point Provincial Park
- Rondeau Provincial Park
- Point Pelee National Park
- Prince Edward Point National Wildlife Area
- Wainfleet Bog Conservation Area
- St. Lawrence Thousand Islands National Park

Figure A: Map of Risk Areas for Lyme Disease in Ontario<sup>4</sup>



# APPENDIX “B”

Figure 1: Incidence Rates of Lyme Disease\* in WDG and Ontario - 10-year Trend



\*lab-confirmed cases only.

Data source: iPHIS, 2007 – 2016 Case counts and crude rates of reportable diseases by year. Date extracted: May 9, 2017.

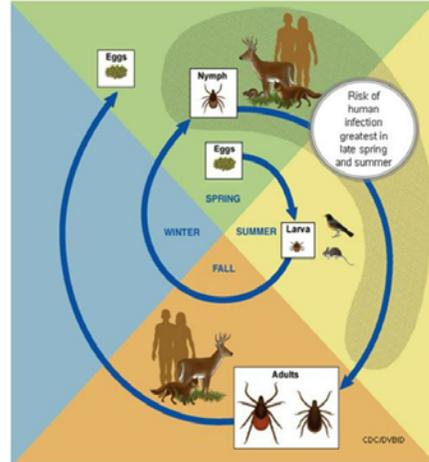
# APPENDIX “C”

## 2016 Lyme Disease Program Report

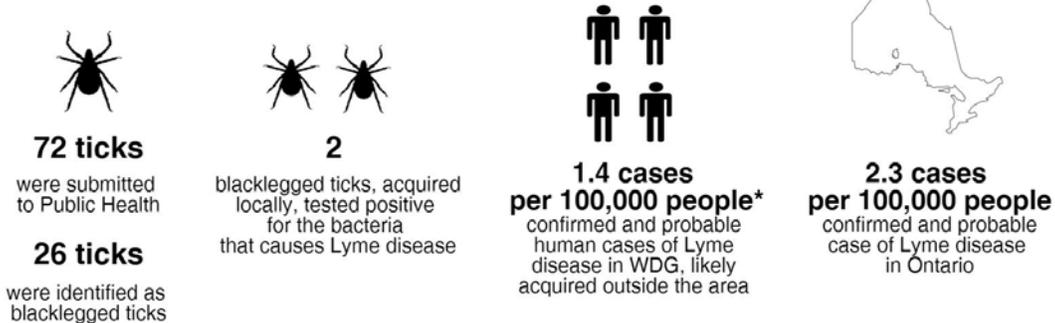
Wellington-Dufferin-Guelph Public Health

### Background

The bacterium that causes Lyme disease, *Borrelia burgdorferi*, is spread to humans and other animals through the bite of an infected blacklegged tick (also known as a deer tick). Typically, a tick needs to be attached and feeding for at least 24 hours to transmit the bacteria



### Passive Surveillance and Reporting



### Active Surveillance

Public Health partnered with the University of Guelph to conduct tick dragging at 6 sites in Wellington, Dufferin, and Guelph. This activity helps determine if blacklegged ticks are prevalent in a particular area.

### Public Education

-  **2000** tick ID cards were distributed
-  **Media release** picked up by local newspapers and radio stations
-  **Fight the Bite** blog post on staywellwdg.ca
-  **Social Media** key messages shared on Twitter and Facebook

\*WDG rates are based on very low number of cases and should be interpreted with caution.

# APPENDIX “D”

**Figure 1: Summary of Tick Submissions in 2016**

Summary of Passive Tick Surveillance (Submitted by Public to WDGPH) 2016					
Tick Species	Female	Male	Nymph	Larvae	Total
Blacklegged Tick ( <i>Ixodes scapularis</i> )	25	1	-	1	26
American Dog Tick ( <i>Dermacentor variabilis</i> )	18	13	-	-	31
Groundhog Tick ( <i>Ixodes cookie</i> )	3	-	8	-	11
Brown Dog Tick ( <i>Rhipicephalus sanguineus</i> )	1	-	-	-	1
Lone Star Tick ( <i>Amblyomma americanum</i> )	1	2	-	-	3
<b>TOTAL SUBMITTED to PUBLIC HEALTH</b>	<b>45</b>	<b>17</b>	<b>9</b>	<b>1</b>	<b>72</b>

**Figure 2: Summary of Tick Submissions from 2011 to 2016**

Summary of Passive Tick Surveillance (Submitted by Public) 2011-2016							
Tick Species	2011	2012	2013	2014	2015	2016	TOTAL
Blacklegged Tick ( <i>Ixodes scapularis</i> )	3	3	8	14	28	26	82
American Dog Tick ( <i>Dermacentor variabilis</i> )	5	1	2	-	36	31	75
Groundhog Tick ( <i>Ixodes cookie</i> )	1	3	3	2	15	11	35
Brown Dog Tick ( <i>Rhipicephalus sanguineus</i> )	-	-	-	-	1	1	2
Lone Star Tick ( <i>Amblyomma americanum</i> )	-	-	-	-	3	3	6
<i>Amblyomma inoratum</i>	-	-	-	-	1	-	1
<b>TOTAL SUBMITTED to PUBLIC HEALTH</b>	<b>9</b>	<b>7</b>	<b>13</b>	<b>16</b>	<b>84</b>	<b>72</b>	<b>201</b>

# APPENDIX “E”

Figure D: WDGPH’s Tick Identification Card

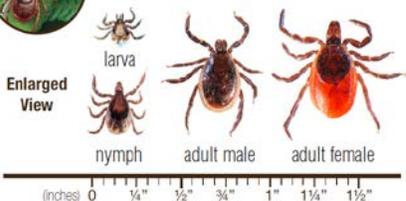
## TICK ID

KNOW THEM, PREVENT THEM.



### Blacklegged Tick (Deer Tick)

Image source: URI TickEncounter Resource Center



Enlarged View

Approx. Size  
 nymph (1/8"-1/4")  
 adult male (1/8")  
 engorged adult (up to 1/2")



### American Dog Tick (Wood Tick)

Image source: Maine Medical Center Research Institute



Enlarged View

## PREVENT TICK BITES

Use caution in areas where ticks are more likely to be found:



Wear light-coloured pants and a long-sleeved shirt so ticks are easy to see.



Wear closed footwear and tuck pants into socks.



Use a repellent that contains DEET and follow the manufacturer's directions.



Perform daily full-body tick checks on yourself, children and pets.

Ticks can be submitted for identification. For more information call Public Health at

**1-800-265-7293**

## TICK REMOVAL

Using tweezers or a tick remover:



- 1 Grasp the tick firmly between the body of the tick and the skin (do not pinch too tightly or bacteria from the tick may be squeezed into the bloodstream).
- 2 Pull the tick straight out.
- 3 Clean the bite area with soap and water.

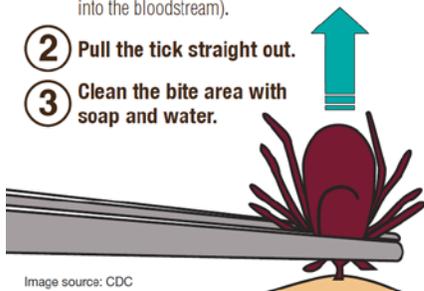


Image source: CDC

If you have been bitten by a tick and are concerned, contact your healthcare provider. Keep the tick so it can be submitted for identification.

## TICK FACTS

- 1 Ticks are usually found in wooded or brushy areas.
- 2 Ticks do not fly, jump or move very quickly.
- 3 The most common tick in Wellington, Dufferin and Guelph is the American Dog Tick – it is not associated with Lyme disease.
- 4 The Blacklegged tick may transmit the bacteria that cause Lyme disease.
- 5 The Blacklegged tick needs to be actively feeding for at least 24 hours to transmit Lyme disease.
- 6 A tick that is feeding will appear to be swollen and oversized.
- 7 In Ontario, Blacklegged ticks are more commonly found on the north shores of Lake Ontario and Lake Erie.



wdgpublichealth.ca  
 1-800-265-7293 ext. 4753

WDG1015