

# **National Tick Awareness and Behaviour Study**

**DRAFT FINAL Version 1.0**

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**Prepared by the Canadian Veterinary Medical Association (CVMA)**

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## 1.0 Introduction

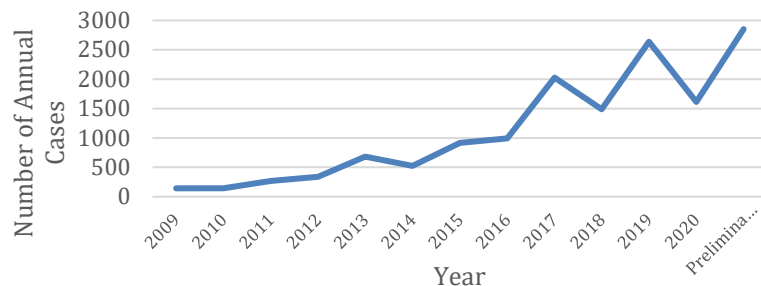
### 1.1 Summary

The Canadian Veterinary Medical Association (CVMA) in collaboration within a team of subject matter experts conducted a set of surveys designed to assess and characterize baseline awareness and preventive behaviours of veterinarians, pet owners, and hunters, anglers and trappers (HATs) towards ticks and tick-borne diseases (TBDs) in Canada. In this summary report, survey findings will be discussed using the One Health framework and will include key observations on desirable future directions and outreach regarding enhancing risk awareness and perception and encouraging preventive behaviours pertaining to ticks and TBDs at subnational and national levels.

### 1.2 Tick-Borne Disease Emergence in Canada

The emergence of Lyme disease and other TBDs in Canada presents a complex public health challenge. TBDs are vector-borne, involving pathogens such as bacteria and viruses, with the potential to cause human and/or animal disease. Pathogens harboured by infected ticks are transmitted to a host through the tick's bite. Humans may encounter ticks directly in the environment or from close contact with wild or domesticated animals.

As such, the disease burden of Lyme disease and other TBDs is shared by human and animal health sectors alike, particularly requiring the expertise of animal health experts such as veterinarians to inform and support relevant public health response. This support has grown increasingly necessary as the incidence of ticks and TBDs have increased at an alarming rate, with annual reported human Lyme disease cases in Canada experiencing almost a fivefold increase between 2009-2014<sup>1</sup> (Figure 1). While Lyme disease



**Figure 1. Reported Lyme Disease cases in Canada from 2009-2021 (Public Health Agency of Canada).<sup>1</sup>**

is the most common TBD in Canada, other TBDs such as anaplasmosis and Powassan virus are examples of several emerging TBDs with grave consequences to animal and human health. Each of these emerging TBDs have different tick species vectors, impacts to human and animal health, and consequent opportunities for public health response.

<sup>1</sup> Public Health Agency of Canada (2022, February 15). *Lyme Disease: Monitoring*. Canada.ca. Retrieved March 23, 2022, from <https://www.canada.ca/en/public-health/services/diseases/lyme-disease/surveillance-lyme-disease.html>

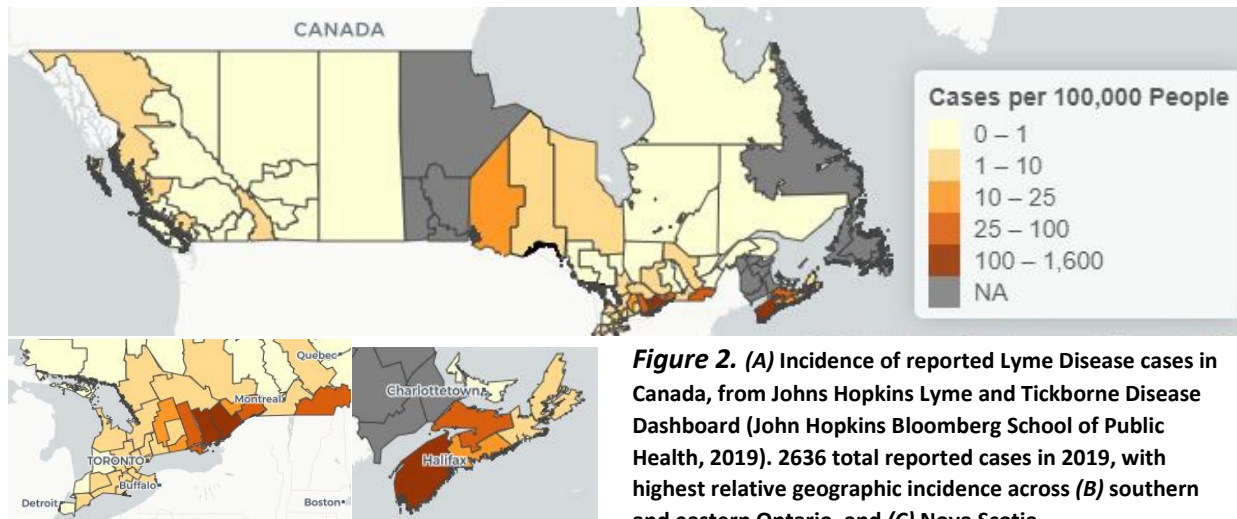
In 2014, the Public Health Agency of Canada (PHAC) embarked on a three-year *Action Plan on Lyme Disease*<sup>2</sup>, focusing on increasing education and awareness of ticks and TBDs, optimizing disease surveillance and control, and supporting further research and diagnostics of TBDs. Since this time, capacity to detect and respond to this emerging health threat has improved to reveal challenges in its sustainable control across Canada, most notably including challenges presented by climate change and other environmental factors.

### 1.3 Environmental Impact on Tick-Borne Disease Incidence

Increased surveillance capacity for ticks and TBDs has highlighted the importance of integrating environmental factors as key variables in studying disease spread at subnational and national levels. Where climate change has impacted general tick incidence<sup>3</sup>, it is also important to consider emergence of new tick species across different regions because of warming temperatures. This may affect disease spread from region to region, and impact regional public health response to ticks and TBDs. Tick risk may also vary due to regionally specific geographic features such as land use and vegetation<sup>4</sup>, which is also intimately connected to climate change.

These factors contribute to regional tick risk across Canada, which has been studied at the federal level to determine high risk areas. Most notably, regions surrounding Ottawa, Toronto, Winnipeg, Victoria and southern inland British Columbia, New Brunswick, and Nova Scotia have been highlighted by PHAC as areas of elevated tick risk<sup>1</sup>. Of these, incidence of Lyme disease has been observed to be highest across southern and eastern Ontario, as well as Nova Scotia (**Figure 2**). With such a heterogenous risk landscape for human health being dependent on factors such as climate and animal health, a robust solution at the federal level must at minimum acknowledge these connections to achieve sustainable disease control.

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- <sup>2</sup> Harymann, M., Ogden, N., Lindsay, R., Lawless, V., Deilgat, M., & Sternthal, S. (2014). Summary of the Public Health Agency of Canada's action plan on Lyme disease. *Canada Communicable Disease Report*, 40(5), 88–90. <https://doi.org/10.14745/ccdr.v40i05a03>
- <sup>3</sup> Bouchard, C., Dibernardo, A., Koffi, J., Wood, H., Leighton, P. A., & Lindsay, L. R. (2019). Increased risk of tick-borne diseases with climate and environmental changes. *Canada Communicable Disease Report*, 45(4), 83–89. <https://doi.org/10.14745/ccdr.v45i04a02>
- <sup>4</sup> Curriero, F. C., Wychgram, C., Rebman, A. W., Corrigan, A. E., Kvit, A., Shields, T., & Aucott, J. N. (2021). The Lyme and Tickborne Disease Dashboard: A map-based resource to promote public health awareness and research collaboration. *PLOS ONE*, 16(12). <https://doi.org/10.1371/journal.pone.0260122>

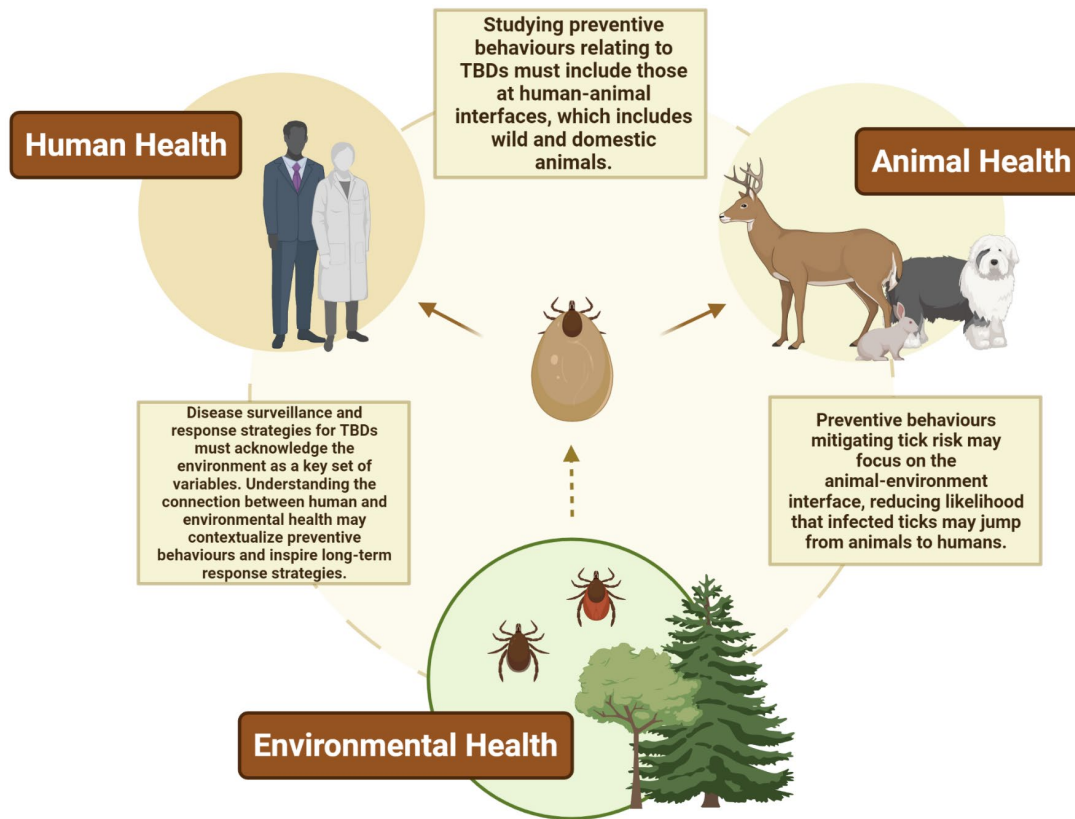


#### 1.4 Relevance of One Health

One Health is an approach to policies and programming which acknowledges the interconnectedness of human, animal, and environmental health<sup>5</sup>. This approach is commonly used to address complex health issues such as antimicrobial resistance and food safety, where the support of animal health or environmental health greatly influences human health (and vice versa). Humans and animals share the greater ecosystems they live in, resulting in a shared burden of disease for illnesses with common vectors such as Lyme disease and other TBDs. This falls against the backdrop of climate change’s argued impact as a driver of tick populations across Canada<sup>3</sup>, underlining the importance and contributions of environmental health to this issue’s long-term solution (**Figure 3**). One Health may be considered a more holistic approach which addresses these relationships. This is due to its nature of embracing collaboration across professional sectors, systems thinking, and even celebrating health interdependency and incorporating it into solutions as opposed to simple acknowledgement.

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<sup>5</sup> World Health Organization. (2017, September 21). *One Health*. World Health Organization. Retrieved March 23, 2022, from <https://www.who.int/news-room/questions-and-answers/item/one-health>



**Figure 3.** Summary of tick-borne disease (TBD) impact on human, animal, and environmental health, as described through a One Health lens.

The control of ticks and TBDs may be used as a hallmark example of an issue appropriate for One Health and has become central to its public health response in Canada. Disease surveillance has been performed at the national level using a One Health approach, acknowledging determinants of animal and environmental health which contribute to human disease. The environment’s key contribution to disease spread underlines the importance of subnational commitment to federal public health campaigns for ticks and TBDs, where provinces and territories across Canada experience different climates, native and emerging tick species, and awareness amongst the general population. Continuing to view tick control and TBDs through a One Health lens is critical to understanding the full spectrum of baseline awareness and perception of tick risk and TBD risk as experienced directly by humans, through their companion animals, or otherwise observed in their natural environment.

### 1.5 Awareness of Tick Risk and Tick-Borne Diseases

As diseases of rapidly increasing incidence over time, accurate disease surveillance of TBDs is essential to successful public health campaigns and other response interventions over the long term. Multiple TBDs of concern are included in these campaigns, however there is a specific focus on Lyme disease due to its prevalence and risk profile. There are no human vaccines or therapeutics which effectively prevent or treat Lyme disease. As such, preventive behaviours have been a primary strategy to control Lyme

disease and other TBDs at individual and population levels of health<sup>6</sup>. These behaviours are aimed to mitigate tick risk, defined as the likelihood of being bitten by a tick which, in turn, influences the risk of contracting a TBD. Preventive behaviours may include, but are not limited to, the use of specific products such as diethyltoluamide (DEET) or permethrin, avoiding areas that are considered to have high tick risk such as tall grasses, as well as regularly checking oneself, others, and clothing or other outdoor gear for ticks.

It must be noted that the success of preventive behaviours as a public health strategy for Lyme disease and other TBDs may be argued to be highly dependent on individual awareness and perception of tick risk and consequent TBD risk. Disease surveillance of Lyme disease and other TBDs has been observed to be challenging due to chronic underreporting of cases<sup>4</sup>, pointing to lack of awareness inside and outside of human health settings. While this issue may be partially attributed to clinical diagnostics for human cases<sup>7</sup>, adoption of preventive behaviours plays an important role in reporting Lyme disease and other TBD cases, even following a tick bite. Proper education concerning tick risk and TBD risk from human and animal health clinicians may be argued to support individual reporting in this respect. Optimization of passive reporting may compose an accurate risk landscape at the national level to inform relevant public health decision- and policy-making.

Awareness and adoption of preventive behaviours to mitigate tick risk and TBD risk in Canada are emerging topics of study. Public surveys across Canada have been performed to determine general knowledge gaps concerning risk awareness and perception, as well as obstacles to the consistent and widespread adoption of preventive behaviours. Across surveyed regions, there is a general trend of high-risk awareness of Lyme Disease and there are varying levels of awareness concerning general tick risk<sup>8,9</sup>. Survey findings report a lack of accessible information for learning about tick risk and preventive behaviours, and low consistent adoption of these preventive behaviours.

Public awareness and understanding of connections between tick risk and climate, as well as tick risk and animal health, have been observed to be relatively low compared to equivalent concepts relating to human health. Literature surrounding relative tick risk of dog owners as opposed to non-dog owners is inconclusive<sup>6</sup>; some studies support dog-owners adopting more preventive behaviours surrounding tick

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<sup>6</sup> Aenishaenslin, C., Bouchard, C., Koffi, J. K., & Ogden, N. H. (2017). Exposure and preventive behaviours toward ticks and Lyme disease in Canada: Results from a first national survey. *Ticks and Tick-Borne Diseases, 8*(1), 112–118. <https://doi.org/10.1016/j.ttbdis.2016.10.006>

<sup>7</sup> Agüero-Rosenfeld, M. E., & Wormser, G. P. (2014). Lyme disease: Diagnostic issues and controversies. *Expert Review of Molecular Diagnostics, 15*(1), 1–4. <https://doi.org/10.1586/14737159.2015.989837>

<sup>8</sup> Valois, P., Bouchard, D., Aenishaenslin, C., Talbot, D., Bouchard, C., Briand, S., & Tessier, M. (2020). Development and validation of a behavioral index for adaptation to Lyme disease. *BMC Public Health, 20*(1). <https://doi.org/10.1186/s12889-020-09535-2>

<sup>9</sup> Cameron, L., Rocque, R., Penner, K., & Mauro, I. (2021). Evidence-based communication on Climate Change and Health: Testing videos, text, and maps on climate change and Lyme disease in Manitoba, Canada. *PLOS ONE, 16*(6). <https://doi.org/10.1371/journal.pone.0252952>



risk, however, observed trends did not achieve statistical significance. Owning a dog has similarly been studied as a potential risk factor for contracting Lyme disease without significant results. Despite this, literature supports further investigation of this relationship. Studies focusing on tick risk awareness and climate have found generally low awareness of the proposed connections between the two concepts<sup>9</sup>. Individuals with relatively high pre-existing climate concern were observed to have higher risk awareness and perception of climate change and Lyme disease. Public outreach approaches with a variety of methods in framing the relationship between climate change and Lyme disease were most successful following small focus group studies with varying levels of climate concern<sup>9</sup>.

Connecting animal and environmental health to tick risk and TBD risk may be considered an important element of collective baseline awareness of latter concepts. This further lends opportunity to define a more holistic risk landscape pertaining to ticks and TBDs in accordance with the discussed One Health framework, where sustainable strategies to mitigate risk honours connections between human, animal, and environmental health as opposed to challenging or ignoring them.

## 1.6 Objective

This study, funded by the Public Health Agency of Canada through the Infectious Diseases and Climate Change Fund, will examine perspectives concerning prevention strategies and awareness regarding ticks and tick-borne disease across Canada. Findings from this study will provide baseline data on the level of awareness of ticks and tick-borne illness that affect humans and the animals they may interact with. This will inform future tick awareness campaigns and improve public health outcomes at national and subnational levels.

## 2.0 Methods

To assess baseline awareness of tick-borne diseases impacting human and animal health in Canada, the CVMA and collaborating organizations distributed online surveys to key stakeholder groups with consistent contact with animals. Surveys were designed to suit each group (**Annex A**), which includes veterinarians across Canada, pet owners across Canada, as well as HATs mostly localized to Ontario. All participants of the distributed surveys were asked to complete a consent form, and the surveys were available in French and English.

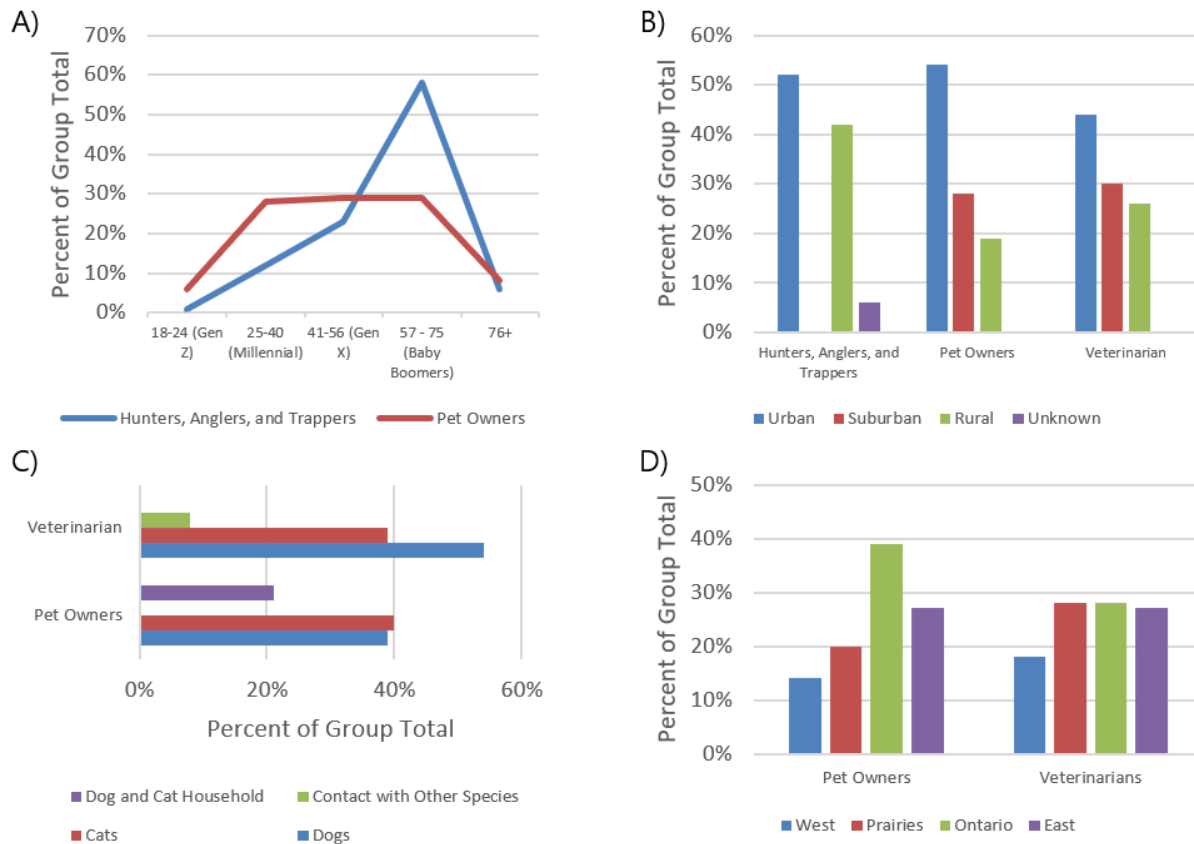
All groups were asked about personal and familial tick risk awareness, perception, and mitigation. They were also asked about tick risk relating to animals they come into regular contact with. Target groups for the veterinarian and pet owner surveys included those that spent at least part of their professional time with or owned dogs and cats, respectively. HATs were asked if they owned a companion dog that accompanied them while hunting, angling, or trapping, but the survey was not limited to this dog-owning group. HATs were also asked about personal contact with the wild game they hunt, angle or trap; species, seasonality, and finding ticks on harvested wild game were included for this group's survey.

Surveys and results for the veterinarian and pet owner groups were distributed online and analyzed by Kynetec Canada Inc. The survey for the HAT group was distributed by the Ontario Federation of Anglers and Hunters (OFAH). Survey results for this group were analyzed by TDV Global Inc.

### 3.0 Survey Results and Discussion

In total, 909 and 1,201,201 completed surveys were received from veterinarian and pet owner groups across Canada, respectively. Two thousand two hundred twenty-six survey responses were received from the HAT group. Their demographics are summarized in **Annex B**. Notable differences between groups include the HAT group having a significantly older respondent population (**Figure 4A**), as well as more respondents indicating they live in a rural setting (**Figure 4B**). Veterinarians have more regular contact with dogs compared to pet owners (**Figure 4C**) and are less concentrated in Ontario with more representation coming from Western provinces and the Prairies (**Figure 4D**). Gender data is unavailable for veterinarian and HAT group, and no age distribution is available for the veterinarian group.

Most veterinarian respondents were general practice veterinarians (82%), with some being locum veterinarians (8%), specialty veterinarians (5%), emergency veterinarians (3%), and mobile veterinarians (2%). Most practiced exclusively on companion animals (82%), with some practicing on predominantly companion animals (12%) and having a mixed practice (9%).

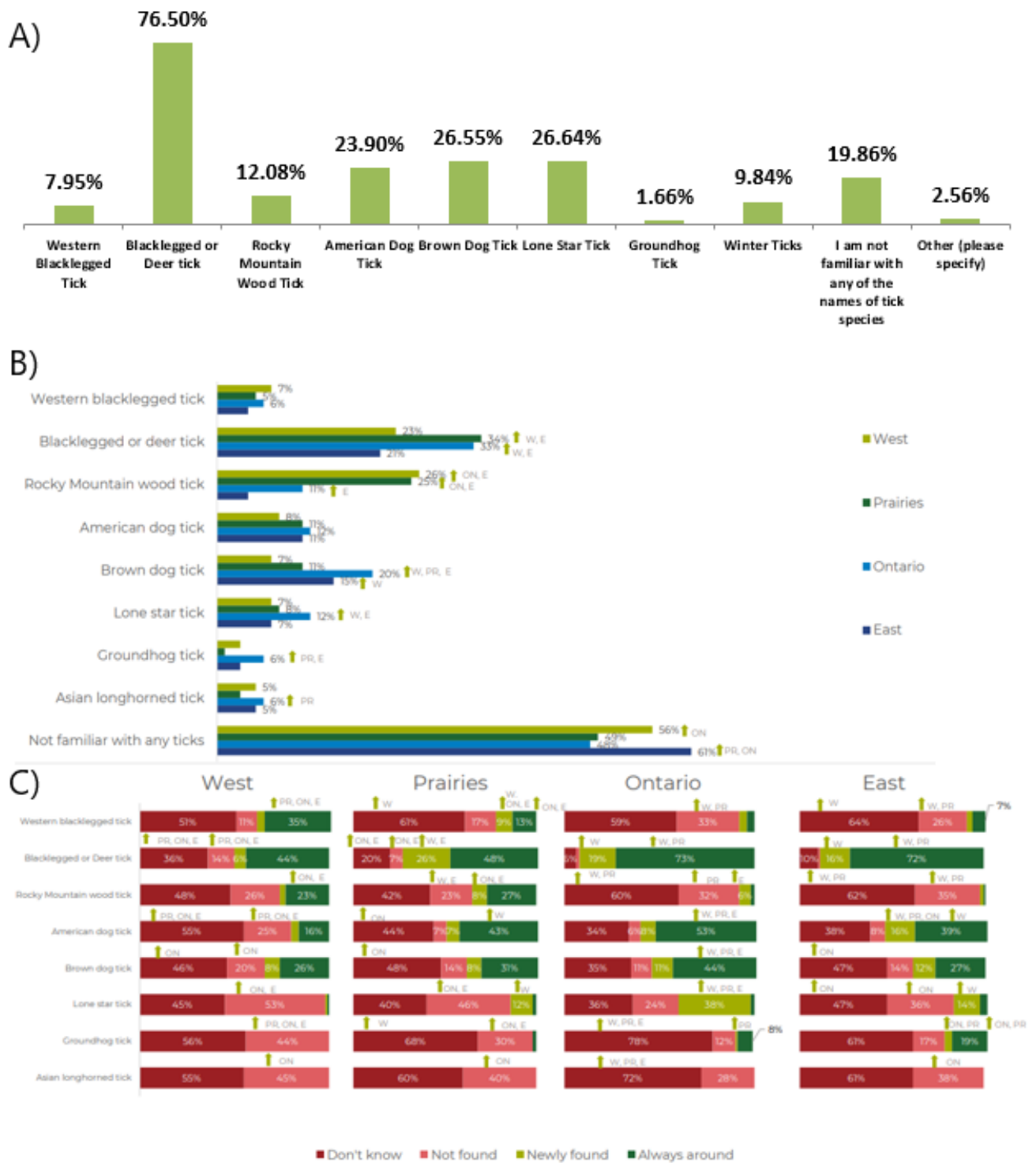


**Figure 4.** Survey respondent demographic differences across pet owner, veterinarian, and hunter, angler, and trapper groups (n = 1201; 909; 2226). A) Age distributions of pet owner and hunter, angler, and trapper groups. B) Distribution of survey respondent groups residing in urban, suburban, and rural areas. C) Distribution of veterinarian and pet owner respondents' contact with and ownership of cats, dogs, both species, or other species. D) Geographic distribution of veterinarian and survey respondents across Canada (West: British Columbia, Prairies: Alberta, Saskatchewan, Manitoba, Eastern Canada: Quebec, New Brunswick, Nova Scotia, Newfoundland, Prince Edward Island)

### 3.1 Tick Awareness

Awareness of ticks and the risks they pose to human and animal health includes the ability to recognize tick species. This may help with risk assessment and passive reporting of emerging tick species in a given region. It was observed that HATs reported greater confidence in being able to identify different tick species compared to the pet owner group (**Figure 5A, 5B**). Only one in five HATs reported unfamiliarity with any of the tick species listed as opposed to over half of pet owners. Blacklegged or Deer ticks were the most familiar species listed, followed by Brown Dog ticks, Lone Star Ticks, American Dog ticks, and Rocky Mountain ticks. HAT respondents listed additional ticks that they knew of in their region by their morphology as opposed to species names.

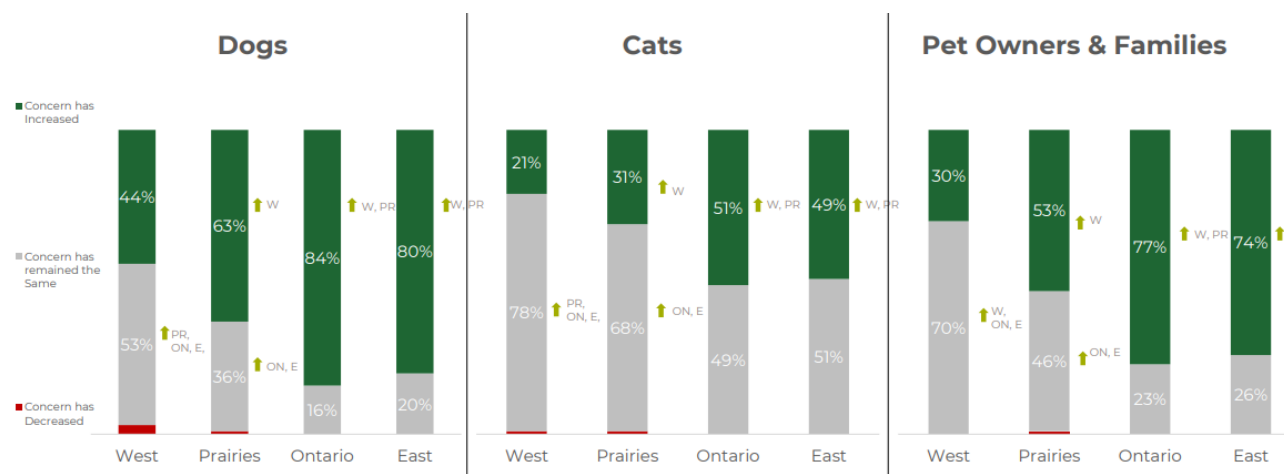
Prevalence of the Blacklegged or Deer tick was similarly reflected in veterinarian responses (**Figure 5C**), with higher familiarity with the Western Blacklegged tick in Western Canada and the American Dog tick and Brown Dog tick across the Prairies, Ontario, and Eastern Canada. These findings also reflect emerging tick species in different regions, where Lone Star ticks have newly emerged in Ontario, and Blacklegged or Deer ticks newly emerging in the Prairies.



**Figure 5. Percent recognition of individual tick species across survey groups. A) Hunters, anglers, and trappers in Ontario (n = 2226). B) Pet owners across Canada (n = 1201 (West = 168, Prairies = 240, Ontario = 468, East = 325)). C) Veterinarians across Canada (n = 909 (West = 160, Prairies = 255, Ontario = 251, East = 486)).**

### 3.2 Tick Risk Perception

Veterinarians report significantly increased concern regarding tick risk for dogs and human health (Figure 6), particularly across Ontario and Eastern Canada. Very few veterinarians report decreased tick risk concern, with most reporting maintained or increased level of concern for human and animal health.



**Figure 6.** Percent of veterinarian respondents expressing maintenance or change in concern regarding ticks and human and animal health across Canada (n = 909 (West = 160, Prairies = 255, Ontario = 251, East = 486)).

Changing risk perception of veterinarians is propelled most by increased incidence of ticks, Lyme disease cases, as well as emerging tick species. Specifically, veterinarians in Western Canada and the Prairies have expressed concern with new tick species appearing in clinical settings despite their practice being in urban centres, and lack of general awareness concerning this trend amongst pet owners. This lack of awareness may result in pet owners not administering adequate tick prevention and practicing appropriate preventive behaviours. Consequently, they may be putting themselves and their animals at risk of serious health concerns including, but not limited to, Lyme disease.

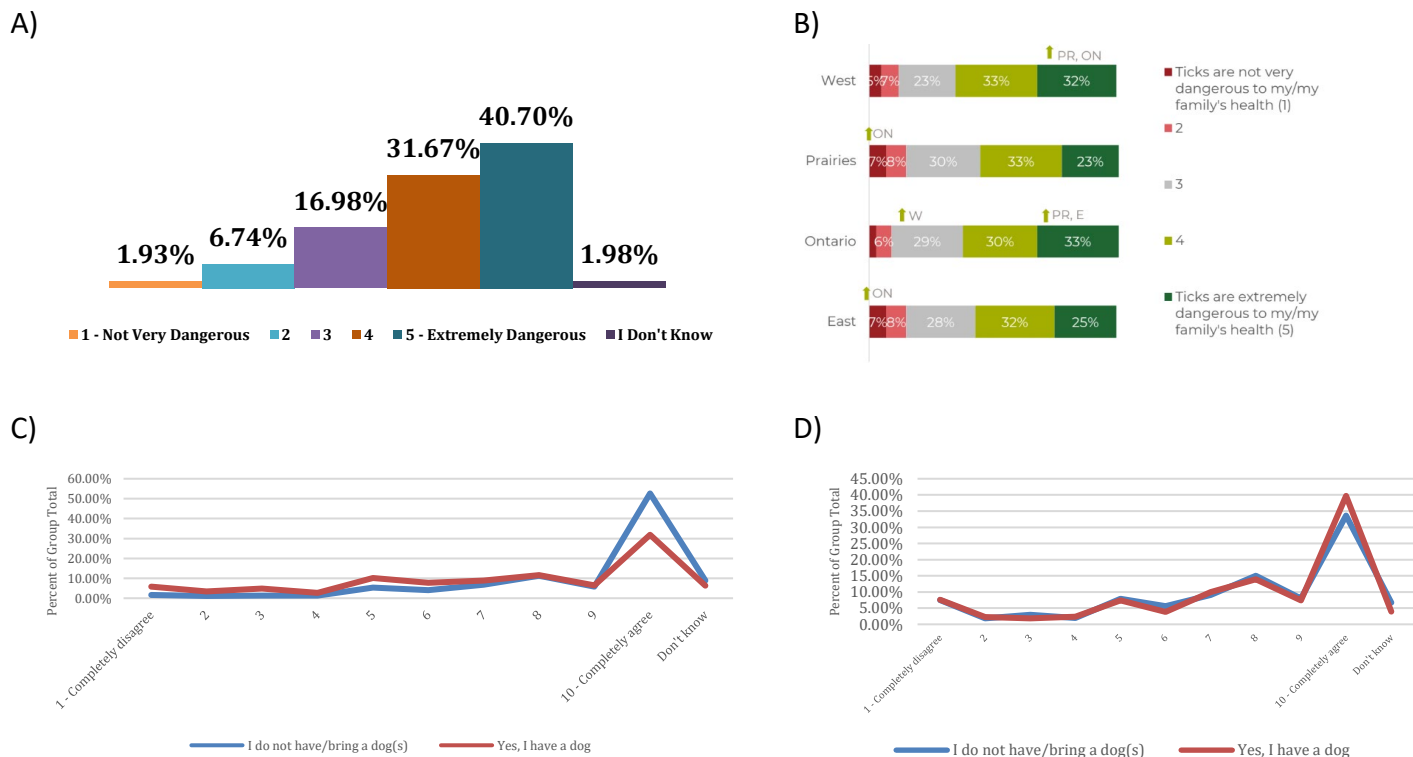
*“Ticks and tick-borne diseases have been endemic here for decades although worsening over the last decade. This has been our largest disease concern in that time, but it has not changed in the last few years. Still a major concern.” -Veterinarian respondent, Eastern Canada*

*“Increase in complications such as Lyme nephritis and increases in other tick-borne diseases. Some pets have multiple exposures. Long term consequences of exposure and infection. Cats – if outdoors then risk of bringing things home as well as lack of data on infections.” -Veterinarian respondent, Ontario*

Results from veterinarian respondents complement perceived tick risk from pet owners and HATs due to a large degree of consensus across groups; respondents consider ticks to be very or extremely dangerous to themselves and their families’ health (Figure 7A, 7B). Pet owner responses have little regional variance except for lower risk perception in the Prairies and Eastern Canada.

When considering tick risk perception and animal ownership or consistent contact, hunters, trappers, and anglers were asked about relative tick risk while owning a dog as well as opinion regarding duration

of tick prevention application throughout the year. When comparing subgroups of HAT respondents with and without dogs, it was observed that significantly more non-dog owners felt companion hunting dogs should receive tick prevention year-round compared to approximately one third of dog owners who felt this way (**Figure 7B**). This may indicate that non-dog owners are sensitive to tick risk posed by hunting companion dogs they may encounter at their camp or in the field. Despite this, there was no perceivable difference between groups concerning relative risk of encountering ticks if one owns a hunting companion dog (**Figure 7D**). This may be due to perceived tick risk from animals being directed towards wild game that this group regularly encounters, as opposed to domestic animals who are more likely to receive tick prevention.



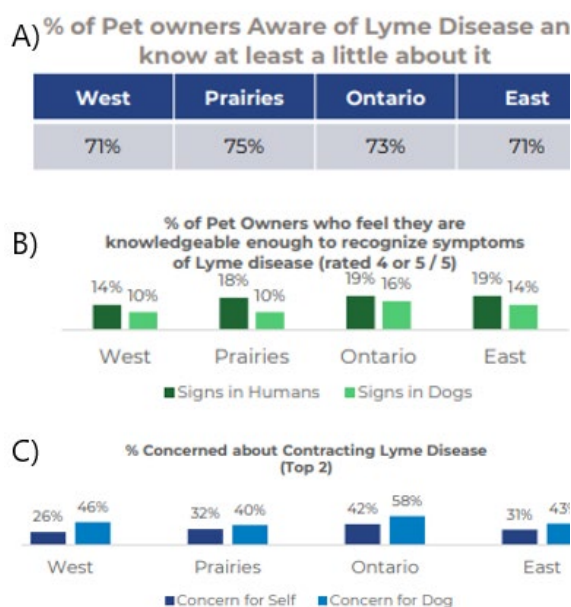
**Figure 7. Relative tick risk perception to human and animal health across pet owner and hunter, angler, and trapper groups. A) Hunter, angler, and trapper perceived tick risk to personal and family health (n = 2226). B) Pet owner perceived tick risk to personal and family health (n = 1201 (West = 168, Prairies = 240, Ontario = 468, East = 325)). C) Percent of hunters, anglers, and trappers indicating that companion hunting dogs should receive tick prevention year-round (dog owners = 816, non-dog owners = 1410). D) Percent of hunters, anglers, and trappers indicating that companion hunting dog owners have a higher risk of encountering ticks than equivalent non-dog owners (dog owners = 816, non-dog owners = 1410).**

### 3.3 Lyme Disease and Other TBD Awareness

Where Lyme disease was reported to be the top-diagnosed TBD in dogs across Ontario and Eastern Canada as reported by veterinarian respondents, it remains a focal point for TBD awareness in the animal health sector. This regional difference is reflected in Lyme disease prevalence maps for human cases in historical data and may inform regional approaches to disease control and risk communication.

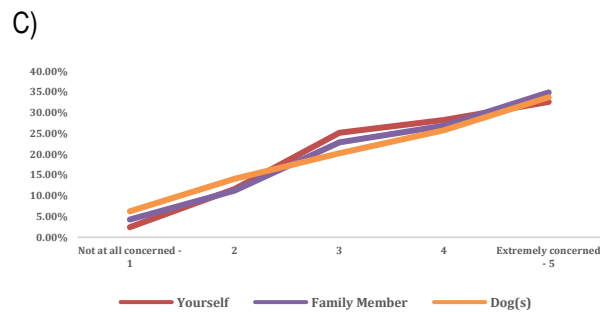
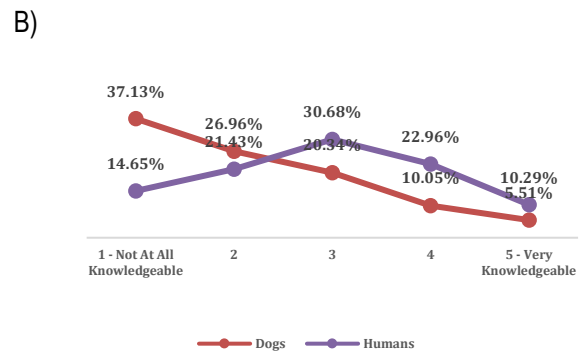
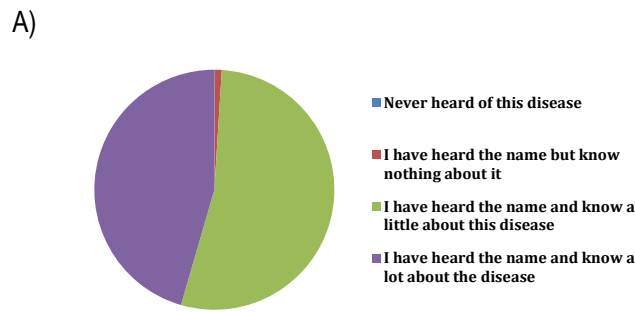
Unfortunately, veterinarian respondents report lower incidence of pet owners in Eastern Canada following through with consistent testing behaviours for their dogs following a tick bite, per their veterinarians' recommendations. Less than half of this group brings ticks into their veterinarians' offices for identification, and just over half preventatively test for tick-borne pathogens despite living in a region identified as having elevated tick risk. Most pet owners across Eastern Canada and Ontario test for Lyme disease if their dog was bitten by a known carrier regardless of the symptoms (82% and 90%, respectively). This is at a greater frequency than pet owners in Western Canada and the Prairies (43% and 60%, respectively). Where most veterinarians in Ontario and Eastern Canada report increasing incidence of Lyme disease cases in animals (87% and 86%, respectively), regular preventative screening and testing procedures are important for controlling animal disease burden. These measures require commitment from both pet owner groups and veterinarians, where the former group must be receptive to the latter group's tick risk communication and recommendations. In turn, veterinarians must adequately communicate risk and control strategies to their clients. Details of this relationship may be a point of intervention in awareness campaigns.

When comparing Lyme disease awareness and risk perception across pet owner and hunter, angler, and trapper groups it may be observed that there is similar awareness and lack of confidence in identifying Lyme disease in dogs (Figure 8B, Figure 9B). HAT respondents express a higher degree of confidence with general Lyme disease awareness (Figure 8A, 9B), and their concern for their companion dog more closely matches concern for themselves and their families compared to the pet owner group (where pet owners are more concerned for their dogs than themselves) (Figure 8C, 9C). As such, both groups would benefit from continued veterinarian support for their animals' and families' health.



**Figure 8.** Percent response of pet owners indicating A) awareness of Lyme disease, B) ability to recognize symptoms of Lyme disease in dogs and humans, and C) concern for self or their dog contracting Lyme disease (n = 1201 (West = 168, Prairies = 240, Ontario = 468, East = 325)).





**Figure 9.** Percent response of hunters, anglers, and trappers, indicating A) awareness of Lyme disease, B) ability to recognize symptoms of Lyme disease in dogs and humans, and C) concern for self or their dog contracting Lyme disease (n = 2226, dog owners = 816).

### 3.4 Preventive Behaviours to Mitigate Tick Risk

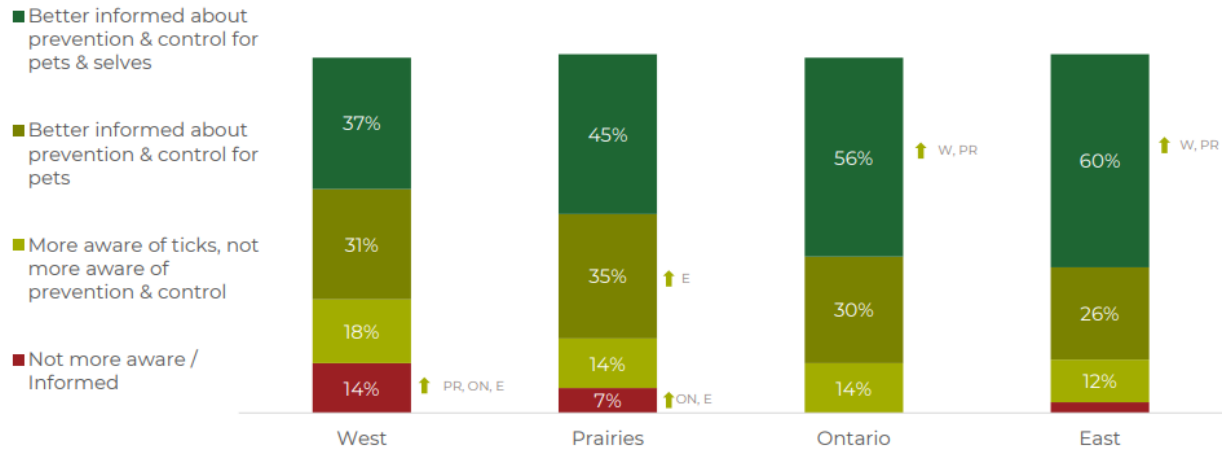
Awareness of ticks and TBDs may be considered an intermediate step in sustainable disease control, where ultimately there is a desire for the general public to sustainably practice preventive behaviours to mitigate tick risk and TBD risk.

Across pet owner and hunter, angler, and trapper groups, behavioural practices such as avoiding areas with perceived high-risk areas (e.g., tall grass) was a popular preventive behaviour across quantitative and qualitative data (**Figure 10A, 10B**). HAT respondents were more likely to consistently perform full body checks on themselves, as well as usually cover exposed skin through clothing choice. HAT survey respondents specifically mentioned permethrin as a tick prevention product which did prompt feedback from respondents concerning accessibility and concerns about safety and efficacy, which likely contributed to lower uptake. Ontario pet owners have been observed to be significantly more likely to administer tick prevention to their pet as a consistent preventive behaviour compared to the rest of the country.



**Figure 10.** Reported frequency of practiced preventive behaviours from A) pet owners across Canada (n = 1201 (West = 168, Prairies = 240, Ontario = 468, East = 325)), and B) hunters, anglers, and trappers in Ontario (n = 2226).

Veterinarian respondents' perception of their clients' awareness of tick prevention and control lends opportunity for increased awareness efforts for preventive behaviours to protect human and animal health alike. Veterinarians in Ontario and Eastern Canada have higher confidence in their clients' recently improved knowledge about protecting themselves and their pets against ticks, with veterinarians from Western Canada and the Prairies indicating a significantly higher proportion of respondents indicating no improvement in client understanding or awareness (Figure 11).



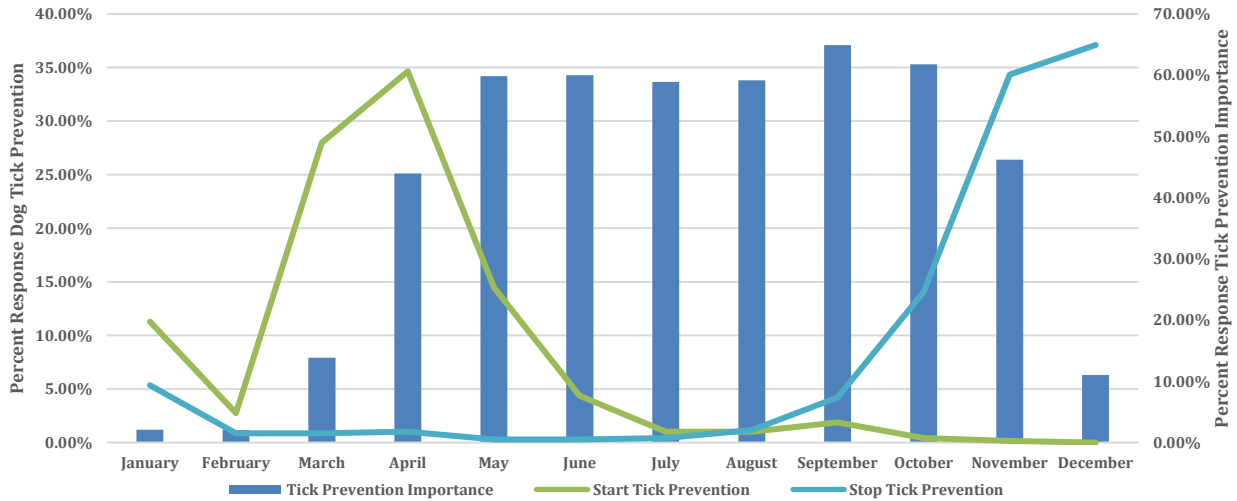
**Figure 11.** Veterinarian respondents indicating level of client knowledge about tick risk, prevention, and control in the last 3-5 years ( $n = 909$  (West = 160, Prairies = 255, Ontario = 251, East = 486)).

### 3.5 Seasonality of Preventive Behaviours

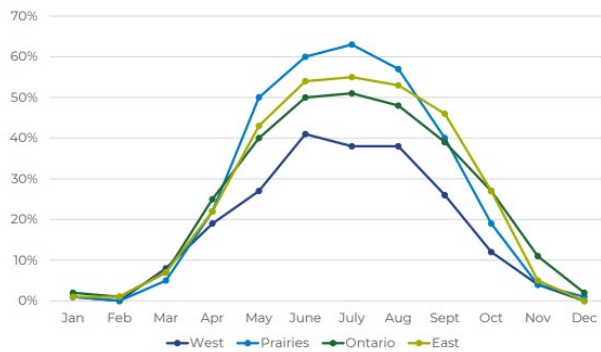
Where tick activity and consequent risk is seasonally dependent, preventive behaviours to protect human and animal health must be examined on a month-to-month basis. Surveys captured the seasonal dependency of perceived tick importance and application of tick prevention to dogs across pet owner and hunter, angler, and trapper groups.

Pet owners (**Figure 13**) and HAT respondents (**Figure 12**) appear to have similar distributions of perceived importance of tick prevention throughout the year, but the latter group perceive slightly more importance in the spring and fall seasons, likely due to corresponding hunting seasons.

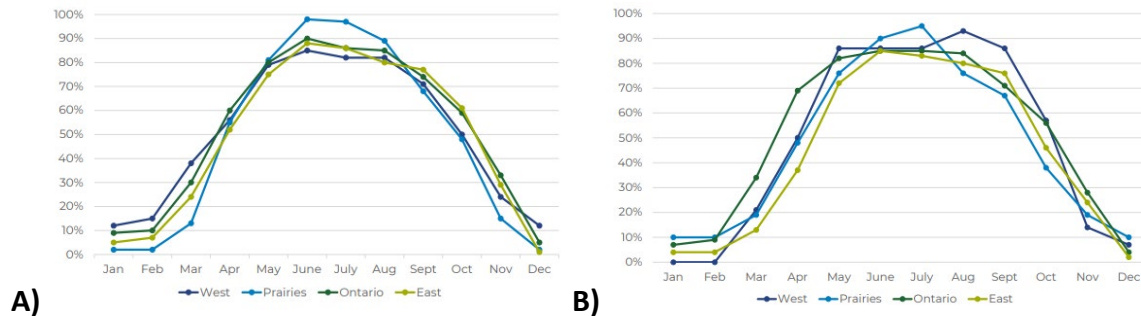
It may be observed that hunters, anglers, and trappers start tick prevention in their dogs earlier than the general pet owner group (**Figure 14A**) except for pet owners from Western Canada. These differences may be due to warmer climate in the early spring in Western Canada, and HATs preparing for the spring hunting season. Pet owners appear to start administering tick prevention to their cats (**Figure 14B**) slightly later in the spring than dogs, but with similar frequency.



**Figure 12.** Percent response of hunters, anglers, and trappers indicating months of importance for tick prevention (blue, n=2226), and dog owners within this group starting and stopping administration of tick prevention for their dogs (green and teal, n = 816 of 2226).



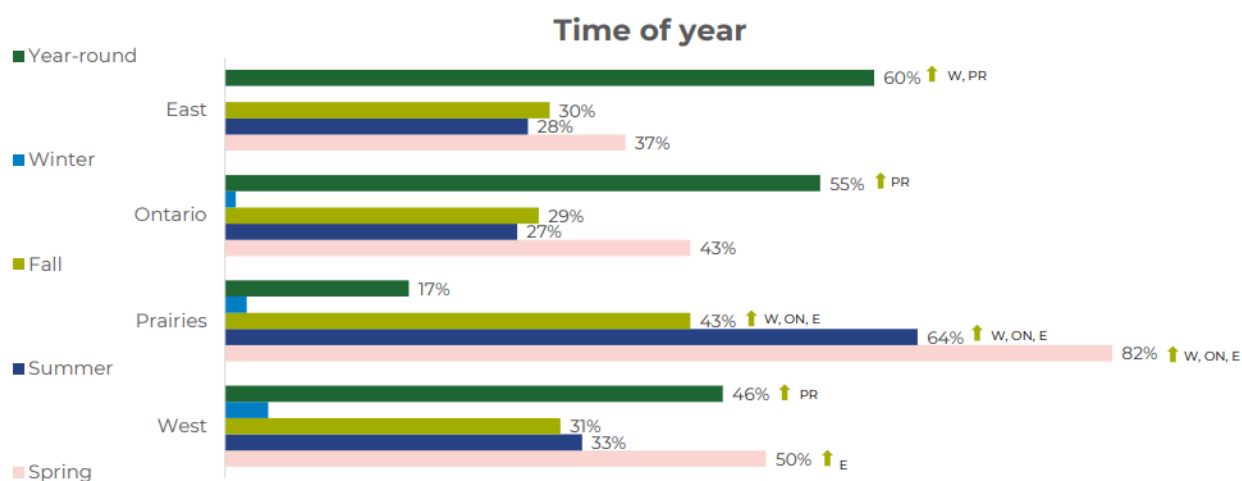
**Figure 13.** Percent response of pet owners indicating months of importance for tick prevention (n = 1201 (West = 168, Prairies = 240, Ontario = 468, East = 325)).



**Figure 14.** Percent of pet owners administering tick prevention across months of the year for their A) dogs and B) cats (n = 1201 (West = 168, Prairies = 240, Ontario = 468, East = 325); (Dog only households = 471, Cat only households = 476, multi-species households = 254)).

The duration of tick prevention application administered by HATs on their companion dogs appears to be similar to that of pet owners, who on average administer tick prevention for six months out of the year. This contrasts with veterinarian survey responses recommending at least seven to 10 months of administered tick prevention out of the year (West = 9 months, Prairies = 7 months, Ontario = 10 months, East = 9 months). This is particularly important as the HATs hunt deer and other large game well into the late fall and early winter. Proper education concerning seasonality of tick prevention administration, particularly in accordance with seasonal outdoor sporting routines, may be beneficial.

Most veterinarians indicated that education surrounding tick risk, prevention, and control is a year-round responsibility, with the highest degrees of agreement coming from Eastern Canada (60%), Ontario (55%), and Western Canada (46%) (Figure 15). In contrast, 31% of HATs felt tick risk, prevention, and control was a year-round responsibility. Attitudes from pet owners were regionally dependent, where those from Western Canada (49%) and Ontario (36%) had more consensus than the Prairies (28%) and Eastern Canada (29%).



**Figure 15.** Veterinarian respondents reporting common times of year for education surrounding tick risk, prevention, and control across Canada (n = 909 (West = 160, Prairies = 255, Ontario = 251, East = 486)).

### 3.6 Veterinary Support for Tick Control

When considering tick risk and TBD risk surrounding companion animal health, veterinarians may be one of the general public’s only accessible experts on the matter. Highlighting their contribution to public awareness and understanding of tick risk and TBD risk as it pertains to individual health and companion animal health may bolster response efforts for regional disease control.

When comparing the nature of conversations that pet owners and HAT respondents have with their veterinarians about tick risk and prevention in Ontario, it appears there are relatively similar amounts of support given. Pet owners report more consistent conversations (Figure 16) than HAT respondents, however it must be considered that the latter group’s report combines risk and prevention with conversations about preventive behaviours to benefit human health (Figure 17). Pet owners in Ontario and Eastern Canada appear to have more regular conversations about tick risk, prevention, and preventive behaviours with their veterinarian compared to other regions in Canada, where almost half and over half of pet owners from Western Canada and the Prairies have never spoken to their veterinarian about preventive behaviours to protect themselves and their family.

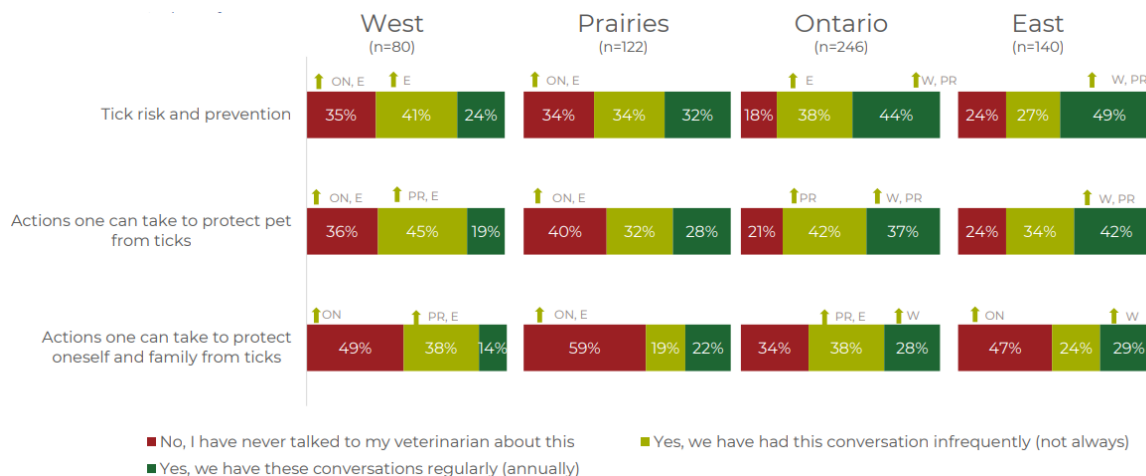
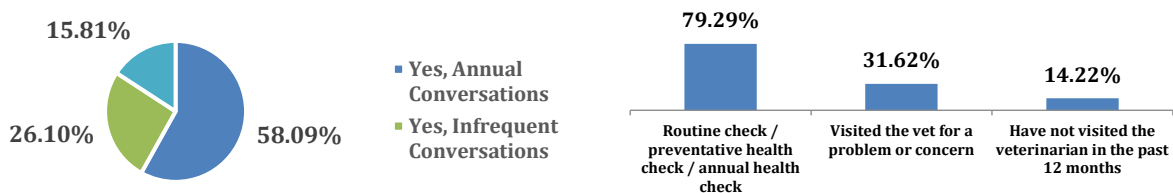


Figure 16. Pet owner reported conversations with their veterinarian about ticks, prevention, and control across Canada (n = 1201 (West = 168, Prairies = 240, Ontario = 468, East = 325)).

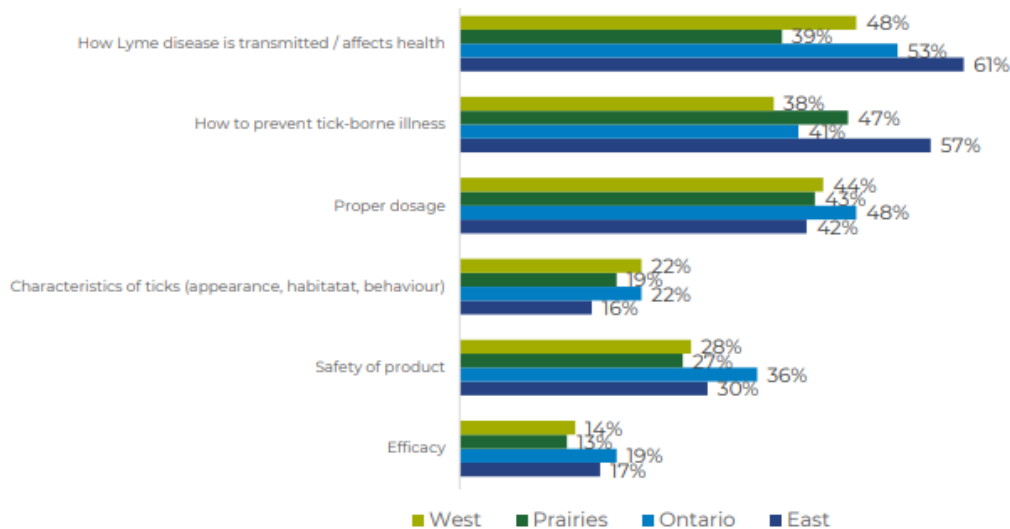


A) During visits to the veterinarian, do you recall having discussions about tick risk and prevention, actions you can take to protect your dog, your family, and yourself from ticks (n = 816)?

B) Describe the nature of your dog(s) visits to the veterinarian clinic in the past 12 months (n = 816).

Figure 17. Veterinary support for tick control in companion dogs as reported by hunter, angler, and trapper respondents in Ontario (n = 816 of 2226).

Veterinarian respondents report the most common questions surrounding ticks, prevention, and control including those about Lyme disease transmission and prevention of TBDs (Figure 18). There appears to be general trust by their clients in the suggested preventions and treatments that veterinarians recommend, but only just over one in five veterinary respondents report receiving questions about the characteristics of ticks. Where awareness of tick characteristics is instrumental to properly implementing preventive behaviours, this may pose as an area of improvement for future awareness campaigns about ticks and TBDs.



**Figure 18.** Percent of veterinary survey respondents indicating experience receiving common questions about ticks, prevention, and control (n = 909 (West = 160, Prairies = 255, Ontario = 251, East = 486)).

Qualitative data from veterinary respondents also indicate that veterinarians steer their clients towards proper tick risk assessment. Many pet owners do not have regular contact with wooded areas or other areas commonly perceived as high risk for ticks and may not understand how their pet could encounter ticks depending on their species or living environment. Veterinarians may also further explain the efficacy and safety of tick prevention products that are available, preventing pet owners from using ineffective measures to prevent ticks or unsafe use of available products. This advice may carry over into directly mitigating human tick risk, where pet owners may feel more comfortable using tick prevention products such as DEET or permethrin on their clothing or gear in place of natural homemade applications or not practicing preventive behaviours at all.

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*“Is there something natural I can use to prevent ticks?” - Question posed to veterinary respondent*

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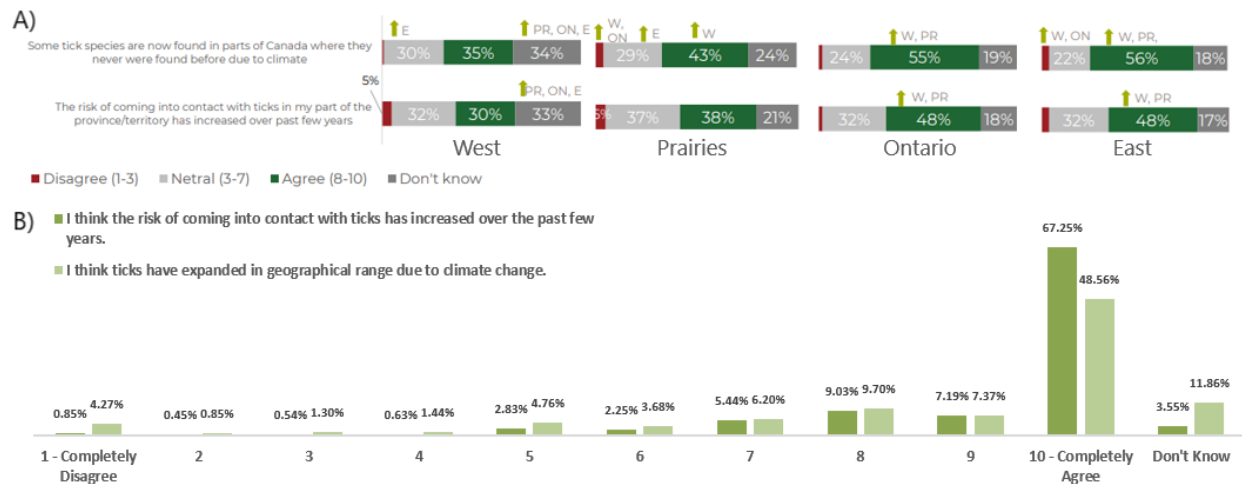
*“But my cat does not go outside – why should I still use preventive tick measure[s]?” - Question posed to veterinary respondent*

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### 3.7 Tick Risk and Climate

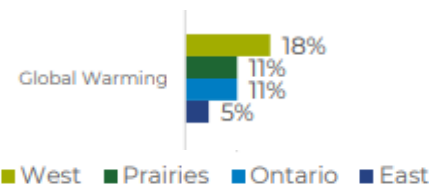
Despite dedicated literature on the subject, understanding public perception of the linkages between tick risk and climate change remains limited. Across pet owner and hunter, angler, and trapper groups, there appears to be good awareness of increasing incidence of ticks and emerging tick species. Pet owners in Ontario and Eastern Canada are of higher collective agreement that their individual tick risk has increased over past years compared to their counterparts in Western Canada and the Prairies (**Figure 19A**). HATs across Ontario hold even higher consensus with over 67% completely agreeing that tick incidence has increased. (**Figure 19B**).



**Figure 19. Respondent attitudes towards tick risk and climate change. A) Tick risk awareness in pet owners across Canada in relation to increasing tick incidence, and emerging tick species and climate change (n = 1201 (West = 168, Prairies = 240, Ontario = 468, East = 325)). B) Tick risk awareness in Ontario hunters, anglers, and trappers regarding increasing tick incidence and climate change (n = 2226).**

Consensus diminishes when attributing increased tick risk to climate change or global warming. Almost half of the hunters, trappers, and anglers group strongly agreed with this proposed relationship, but over 10% were not sure. Over one third of pet owners from Western Canada were not sure about the nature of this relationship, with pet owners from other regions expressing similar lack of knowledge about the subject (Prairies = 24%, Ontario = 19%, Eastern Canada = 18%). Where Ontario and Eastern Canada have higher incidence of ticks and tick-borne disease, this relatively increased confidence about the link between tick risk and climate is an interesting observation.

This is in contrast with regional veterinarian responses, where the greatest consensus of concern was expressed by 18% of veterinarians in Western Canada (**Figure 20**), which is much lower than pet owner and hunter, angler, and trapper groups. With the consideration that veterinarians lend significant support regarding tick risk



**Figure 20. Percent of veterinarian survey respondents with increased concern of increased tick prevalence and global warming (n = 909 (West = 160, Prairies = 255, Ontario = 251, East = 486)).**

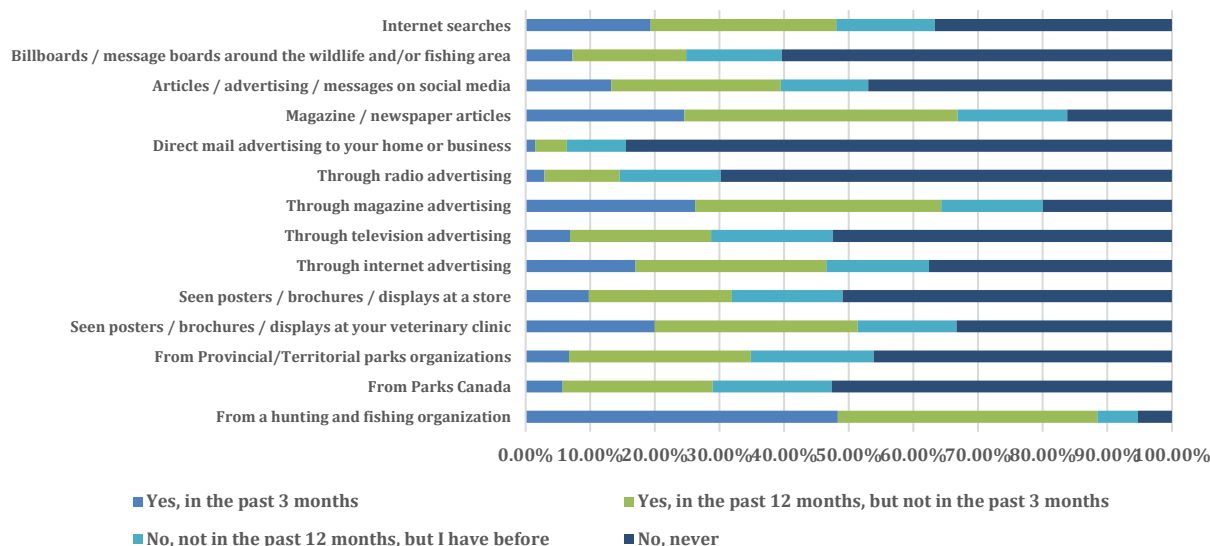


to those owning dogs and other animals that may contract TBDs, further discussions about tick risk and climate in this group may be beneficial.

### 3.8 Future Directions and Opportunity for Outreach

In past studies, strategies to effectively communicate tick risk and TBD risk have been observed to be most successful when varied and targeted to key stakeholder groups. It is critical to understand the needs and experiences of the populations being targeted for risk communication, as each group performs different regular risk assessments when navigating tick risk and TBD risk.

When comparing existing outreach strategies between pet owner and hunter, angler, and trapper groups, it appears that the latter group has significantly more exposure to tick risk communication through various media forms. One of the key features in this difference includes the large proportion of risk communication received by hunting and fishing magazines, targeted media advertising, and community hunting and fishing organizations (**Figure 21**). There is a group-specific culture of responsibility and a desire to learn amongst the HAT group, where they wish to improve their understanding of tick risk and TBD risk to disseminate it to the rest of their community. It must be noted here that HAT respondents may have increased interest in tick risk and TBD risk due to their regular contact with wild animals in addition to potential companion dogs. With the consideration that HATs must regularly interact with provincial governmental authorities, there is opportunity to further develop relationships between these agencies and this community to provide general and specialized education about tick risk and TBD risk.



**Figure 21. Hunter, angler, and trapper respondent percent report of media exposure source relating to ticks and tick prevention heard in past months (n = 2226).**

Across regions, pet owners receive comparatively little exposure to this type of risk communication (**Figure 22**) and may not experience the same opportunity to receive and disseminate information about tick and TBD control. Pet owners receive the most support from their veterinarians, followed by displays and posters where they buy pet care products, as well as information made available by human health clinicians. Types of information provided at veterinarian clinics as reported by pet owners matches

responses from veterinarians when considering print brochures and posters, however there is comparatively little uptake when comparing availability and use of web-based media such as reminder emails, web pages, and take-home printed education materials.



**Figure 22.** Pet owner respondent percent report of media exposure source relating to ticks and tick prevention heard in past months across Canada (n = 1201 (West = 168, Prairies = 240, Ontario = 468, East = 325)).

There is significant opportunity to increase the pet owner group’s exposure to mixed media awareness campaigns for tick risk and TBD risk, as well as communications from public health authorities. Suggested desired materials by veterinarians which may help this group include prevalence maps, social media posts, more in clinic posters, as well as in person conversations. Other interventions to increase general awareness include educational videos, and webinars or seminars with key opinion leaders.

## 4.0 Key Observations

Following analysis of survey results, the following points may be used as important takeaways to inform awareness and outreach strategies across surveyed groups:

- There is generally good awareness of Lyme disease and what risk ticks may pose to human and animal health, but there is lack of knowledge concerning tick prevention, identifying Lyme disease in animals, and preventive behaviours.
- There is a lack of consistency when adhering to preventive behaviours to mitigate tick risk for humans and animals.
- Veterinarians are a central source of information about ticks and TBDs for pet owners and HATs with companion dogs. Veterinarian clients are trusting of advice specific to tick risk and prevention.
- Veterinarians feel their clients are not adequately informed of evolving tick risk in their respective regions, and existing methods of outreach and advocacy have relatively poor uptake. There is a need for discourse-based outreach as opposed to only content-based (e.g., ongoing risk management and discussion with clients).
- HATs experience self-reinforcing risk communication about ticks and TBDs within their community and would greatly benefit from further education provided by animal health experts and public health authorities as ticks and TBDs become more prevalent.
- Pet owners would benefit from a community model of risk communication as exhibited by the HATs group, where risk communication would extend beyond veterinarian visits.

## Annex A: Survey Questions

Tick Awareness and Behaviour Study  
VETERINARY Survey  
November 3, 2021

**Project Specifications:**

- 12-14-minute survey
- Target as many completed surveys as possible
- No incentive payment
- Nationally Representative of Canada
- English and French
- Sample to be provided by CVMA

**E-mail Invitation**

Dear Doctor:

We want to gather your opinion on an important professional matter.

Kynetec Canada, in collaboration with the Canadian Veterinary Medical Association (CVMA) and a team of experts, is conducting a study to examine perspectives of veterinarians concerning prevention and clinical care strategies regarding tick awareness and tick-borne illness.

Findings from this study will provide baseline data on the level of awareness of tick-borne diseases that affect pets and/or humans and be used to inform and develop future tick awareness campaigns and improve public health outcomes.

Your name has been randomly selected from a large database of veterinarians provided by the CVMA. You will never be identified individually in the study and Kynetec will not provide the names of veterinarians who completed the study (or not) to the CVMA or any other organization/individual.

We are interested in surveying practicing veterinarians that spend at least part of their professional time with dogs and cats.

The survey should take only **12 minutes** to complete. Your contribution is vitally important and very much appreciated.

**All respondents will have the opportunity to be entered into a draw for one of 10 \$100 gift cards.**

## Consent Form

### Background

A team from the Canadian Veterinary Medical Association (CVMA) is leading a study to develop baseline data on the level of awareness of tick-borne disease within the following three groupings: 1) veterinarians, 2) pet owners, 3) hunter and anglers. Armed with this new knowledge, Canada's veterinary community will better understand the risks associated with tick-borne diseases, such as Lyme disease, and be empowered to credibly inform high risk stakeholder communities.

This research team consists of Dr. Scott Weese, Dr. Katie Clow, Dr. Shane Renwick, Mr. Michael Ennis, Ms. Lori Ahronson, Ms. Kate Stiefelmeyer and Ms. Leeann Gold. If you have questions regarding the study, please contact Ms. Lori Ahronson at [lahronson@cvma-acmv.org](mailto:lahronson@cvma-acmv.org). The University of Guelph point of contact is Dr. Katie Clow at [kclow@uoguelph.ca](mailto:kclow@uoguelph.ca).

Project funding is provided by the Public Health Agency of Canada through the Infectious Disease and Climate Change Fund. Funds are held and administered by the CVMA. No funding is allocated to members of the research team.

### Consent

Participation in this research study is completely voluntary. You are under no obligation to participate. If you agree to take part, you will be asked to complete a short (no more than 12 to 15 minutes) online survey consisting of multiple choice and short answer questions. Only one member per household should participate. You must be 18 years of age to participate in this survey. There are minimal risks associated with participating. Participation is anonymized, and you can withdraw at any time while completing the survey simply by closing the browser. However, due to anonymity, once the survey has been submitted, responses cannot be removed. Please note that confidentiality cannot be guaranteed while data are in transit over the internet. Data will be retained on a secure drive until publication of results, accessible to only authorized University of Guelph personnel. Responses will be retained by the research team until March 31, 2022 and only summary results will be disseminated through the CVMA website (<https://www.canadianveterinarians.net/>) and/or the Canadian Veterinary Journal. Upon publication, saved data will be destroyed.

At the end of the survey, you will be asked to provide your contact information to be entered into a draw to win a \$100 gift card (odds of winning ~ 1 in 120). Participants will be still be eligible to participate in the draw, even if they choose to withdraw from the survey. This email address will not be linked to your responses, nor will it be used for any other purpose than the draw.

You do not waive any legal rights by agreeing to take part in this study. This project has been reviewed by the Research Ethics Board for compliance with federal guidelines for research involving human participants. If you have questions regarding your rights and welfare as a research participant in this study (REB#20-07-023), please contact: Manager, Research Ethics; University of Guelph; [reb@uoguelph.ca](mailto:reb@uoguelph.ca); (519) 824-4120 (ext. 56606).

By continuing on to the survey, you are indicating your consent to participate in this survey.

Please print a copy of this consent form for your records.

**WELCOME SCREEN**

Thank you for taking the time to participate in our survey. The next few questions are designed to determine if you qualify for this study.

**Please complete the online survey by [INSERT DATE] or sooner.**

Would you like to take this survey in English or French?

**[SINGLE PUNCH]**

English  
French

**INTEGRITY QUESTION**

Honest and thoughtful answers to this survey are vital to the integrity of the research process. We require thoughtful and truthful information in order to make important decisions affecting you and the animal health industry.

Before you begin, please check the box indicating agreement with our survey integrity policy.

- I agree to carefully read and respond as accurately as possible to all questions within this survey.

**[PGR: RESPONDENT MUST CHECK BOX BEFORE MOVING ON TO SURVEY]**

**SCREENING QUESTIONS & QUOTA CLASSIFICATIONS**

SC1. Are you a veterinarian licensed to practice in Canada?

Yes

No [TERMINATE]

[TERMINATE TEXT: We are sorry, we are only interviewing licensed veterinarians for this study. Thank you for your interest.]

SC2. How would you best describe the practice at which you work?

[LIST – DO NOT RANDOMIZE]

Food animal practice (exclusive) [TERMINATE]

Food animal practice (predominant)

Mixed practice (at least 25% companion and 25% food or equine)

Companion animal practice (predominant)

Companion animal practice (exclusive)

Equine practice (predominant) with some companion animal care

Equine practice (exclusive) [TERMINATE]

College or university teaching hospital

Other (Please Specify): [OPEN-ENDED TEXT]

Not applicable [TERMINATE]

[TERMINATE TEXT: We are sorry, we are only interviewing veterinarians working with companion animals for this study. Thank you for your interest.]

SC2A. What per cent of your time is spent treating...

a. Cats	_____ %
b. Dogs	_____ %
c. Other small companion animals	_____ %
d. Equine	_____ %
e. Food animals	_____ %
f. Other animals	_____ %
Total [Programmer: Auto sum]	[MUST =100%]

[IF SUM OF CATS AND DOGS = 0 THEN TERMINATE. TERMINATE TEXT: We are sorry, we are only interviewing veterinarians working with companion animals for this study. Thank you for your interest.]

SC3. Which of the following best describes your current job?

[LIST]

General practice veterinarian  
Specialty veterinarian  
Emergency veterinarian  
Mobile veterinarian  
Locum (relief) veterinarian  
Other [TERMINATE]

[TERMINATE TEXT: We are sorry, we are only interviewing veterinarians working with companion animals for this study. Thank you for your interest.]

SC4. In what province or territory do you currently practice?

**[PROVINCE DROPBOX – SELECT ONE ONLY]**

British Columbia  
Alberta  
Saskatchewan  
Manitoba  
Ontario  
Quebec  
Nova Scotia  
New Brunswick  
Prince Edward Island  
Newfoundland/Labrador  
Northwest Territories  
Nunavut  
Yukon

I am practicing veterinary medicine outside of Canada **[ANCHOR AT BOTTOM - TERMINATE]**

[TERMINATE TEXT: We're sorry, we are only interviewing veterinarians currently practicing in Canada for this study. Thank you for your interest.]

SC5. What are the first three letters of the postal code of your veterinary practice?

Congratulations, you have qualified to participate in our study. All information you provide is kept strictly confidential and is used for research purposes only.

[PAGE BREAK]



## Main Questionnaire Begins

1. Thinking of both your canine and feline patients, please indicate to what extent you are personally concerned about ticks and the risk they pose to your clients and pet owners in your local area.

### [COLUMNS]

Canine patients  
Feline patients  
Pet owners and families

### [ROWS – SINGLE PUNCH]

Very concerned  
Somewhat concerned  
Neither concerned or unconcerned  
Somewhat unconcerned  
Not at all concerned

2. Thinking back over the past 2-3 years, has your concern about ticks in your local area increased, decreased, or remained the same for your feline and canine patients and pet owners?

### [COLUMNS]

Canine Patients  
Feline Patients  
Pet Owners and Families

### [ROWS – SINGLE PUNCH]

Concern has increased  
Concern has remained the same  
Concern has decreased

- 2A. You indicated your concern about ticks for your canine patients has [INSERT RESPONSE FROM Q2:Canine Patients] over the past 2-3 years. Why do you say that? Please be as specific as possible.

### [OPEN-END]

- 2B. You indicated your concern about ticks for your feline patients has [INSERT RESPONSE FROM Q2:Feline Patients] over the past 2-3 years. Why do you say that? Please be as specific as possible.

### [OPEN-END]

- 2C. You indicated your concern about ticks and human health has [INSERT RESPONSE FROM Q2:Pet owners and families] over the past 2-3 years. Why do you say that? Please be as specific as possible.

### [OPEN-END]

3. Have any of the following ‘ticks of concern’ been found in your local area?

**[COLUMNS]**

Have always been in the area

Have been newly found in the area (in the last 2-3 years)

Have not been found in the area

Don't know

**[LIST]**

Western blacklegged tick

Blacklegged or Deer tick

Rocky Mountain wood tick

American dog tick

Brown dog tick

Lone star tick

Groundhog tick

Asian long horned tick

4. Thinking about pet owners, do you feel clients are better informed about tick prevention and control than they were 3-5 years ago?

**[LIST]**

Yes, pet owners are better informed about tick prevention and control for both their pets and themselves

Yes, pet owners are better informed about tick prevention and control for their pets only

Pet owners are more aware of ticks but are no better-informed regarding tick prevention and control

I don't believe pet owners are more aware or better informed regarding tick prevention and control as they were 3-5 years ago

5. What common questions do pet owners ask about ticks, tick prevention, and control? Please be as specific as possible.

**[OPEN-END – SHOW 5 TEXT BOXES]**

6. Do you currently recommend tick protection to at least some of your canine and feline patients?

**[COLUMNS]**

Canine patients

Feline patients

**[LIST]**

Yes

No

**[ASK Q6A ONLY IF SELECTED 'YES' FOR CANINE AND/OR FELINE PATIENTS; SHOW ONLY RELEVANT PATIENT COLUMN]**

6A. In 2021, for a typical (average risk) canine or feline patient, for how many months of the year are you recommending tick protection?

Typical dog patient: **[VALUE RANGE: 0 – 12] months of protection per year**

Typical indoor cat patient: **[VALUE RANGE: 0 – 12] months of protection per year**

Typical outdoor cat patient: **[VALUE RANGE: 0 – 12] months of protection per year**

6B. Approximately what percentage of your clients are administering tick prevention to their pets?

**[VALUE: 0 – 100]% of dog owners are giving their dogs tick prevention**

**[VALUE: 0 – 100]% of cat owners are giving their cats tick prevention**

6C. When do you tend to put the most emphasis on educating clients regarding tick risk, prevention and control? Select all that apply

**[LIST]**

Spring

Summer

Fall

Winter

Year-round when I can **[EXCLUSIVE]**

7. What percentage of your canine clients are you recommending get vaccinated against Lyme disease? I recommend:

**[VALUE: 0 – 100]% of dog owners vaccinate against Lyme disease**

8. Do you discuss tick risk and prevention regularly with pet owners (e.g., have a discussion about its importance, actions to take, treatment etc.)? Please select all that apply

**[COLUMNS]**

Canine Patients

Feline Patients

**[LIST]**

I have a 'tick talk' with all new puppy and/or kitten owners

I discuss ticks whenever there is new information to share or a new risk

I discuss ticks if I know the pet owner and pet are travelling or have been travelling

I have a 'tick talk' with all new pet owners

I have a 'tick talk' at every annual appointment

I only discuss ticks on an as needed basis

I do not feel it is necessary to discuss ticks because they are not a problem in my local area **[EXCLUSIVE]**

Other, please specify: \_\_\_\_\_

9. Do your discussions regarding tick risk, prevention, and control include the following? Please select all that apply.

**[LIST-RANDOMIZE]**

Risks to pets  
Risks to pet owner / family / human health  
Prevention measures for pets  
Prevention measures for pet owners  
Where ticks like to live  
What ticks look like  
How to remove ticks  
Tick-borne illness in pets  
Tick-borne illness in pet owners  
Lyme disease symptoms in pets  
Lyme disease signs in pet owners

10A. Have you diagnosed any of the following tick-borne illnesses in the past 12 months in your canine patients?

**[COLUMNS]**

Yes, in the past 12 months  
Yes, prior to 12 months ago  
No, never

**[LIST – RANDOMIZE]**

Lyme disease  
Anaplasmosis  
Babesiosis  
Rocky mountain spotted fever  
Ehrlichiosis  
Bartonellosis  
Canine Hemotropic Mycoplasma  
Tick paralysis

10B. Have you diagnosed any of the following tick-borne illnesses in the past 12 months in your feline patients?

**[COLUMNS]**

Yes, in the past 12 months  
Yes, prior to 12 months ago  
No, never

**[LIST – RANDOMIZE]**

Anaplasmosis  
Bartonellosis  
Cytauxzoonosis  
Feline Hemotropic Mycoplasma  
Ehrlichiosis

Tick paralysis

11. Is the prevalence of the following tick-borne diseases changing?

**[COLUMNS]**

Prevalence is increasing

Prevalence is decreasing

Prevalence is the same as it was 5 years ago

**[LIST – RANDOMIZE]**

Lyme disease

Anaplasmosis

Babesiosis

Ehrlichiosis

Bartonella

Cytauxzoonosis

Feline Hemotropic Mycoplasma

Canine Hemotropic Mycoplasma

Rocky mountain spotted fever

12. Are clients bringing ticks in to be identified if they find one?

**[LIST]**

Yes, clients bring in ticks for identification

Generally, clients do not bring in ticks

13. Do you test for exposure to tick-borne pathogens as a part of your preventive testing?

**[YES/NO]**

14. If a dog has been bitten by a species of tick known to carry the bacterium that causes Lyme Disease (*Borrelia burgdorferi*) and the dog is not on tick prevention do you recommend a follow up blood test for Lyme Disease exposure to *B. burgdorferi*?

**[LIST]**

Yes

I only test if the dog shows signs of Lyme Disease

I do not test

15. Where do you go to get current, credible information regarding tick risk, prevention, control and tick-borne illnesses? Please select all that apply.

**[LIST]**

Companion Animal Parasite Council

Canadian Veterinary Medical Association

Veterinary Information Network

American College of Veterinary Internal Medicine consensus statement

Public health websites

Textbooks

Professional organizations  
Conferences

16. What types of communication and/or materials do you provide pet owners or display regarding tick awareness, prevention, and control? Please select all that apply.

**[LIST]**

Tick information provided in a newsletter (mailed or emailed) to pet owners

Email reminder regarding tick protection

Educational materials to take home after tick discussions / health checks

Tick prevention messages on practice website

Tick awareness, prevention, and control materials (brochures, posters) displayed in the clinic

Direct pet owners to CVMA's TickTalkCanada.com website for further information

Send out tick information during Tick Awareness month (March)

Other, please specify: \_\_\_\_\_

17. What tools would be helpful to you to better communicate tick risk, prevention, and control to pet owners? Please select all that apply.

**[LIST]**

Prevalence maps

Educational videos

Webinars/seminars with Key Opinion Leaders

Social media posts

In clinic posters

In person conversations

Other, please specify: \_\_\_\_\_

**Survey Close-out**

Those are all the questions we have for you today. On behalf of Kynetec and the CVMA we would like to thank you for participating.

Please enter your name and email address below to enter the draw for:

- 1 of 10 \$100 gift cards.

Please click on the link below if you wish to provide your name and email address to enter the draw.

Please enter your contact information below so we can contact you if you win.

[FIRST NAME]

[LAST NAME]

[TELEPHONE NUMBER]

[E-MAIL]

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**Tick Awareness and Behaviour Study  
PET OWNER Survey  
November 3, 2021**

**Project Specifications:**

- **12-15-minute survey**
- **n=1,200 total surveys**
- **Translate to French**

**Consent Form**

**Background**

A team from the Canadian Veterinary Medical Association (CVMA) is leading a study to develop baseline data on the level of awareness of tick-borne disease within the following three groupings: 1) veterinarians, 2) pet owners, 3) hunter and anglers. Armed with this new knowledge, Canada's veterinary community will better understand the risks associated with tick-borne diseases, such as Lyme disease, and be empowered to credibly inform high risk stakeholder communities.

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**Consent**

Participation in this research study is completely voluntary. You are under no obligation to participate. If you agree to take part, you will be asked to complete a short (no more than 12 to 15 minutes) online survey consisting of multiple choice and short answer questions. Only one member per household should participate. You must be 18 years of age to participate in this survey. There are minimal risks associated with participating. Participation is fully anonymous, and you can withdraw at any time while completing the survey simply by closing the browser. However, due to anonymity, once the survey has been submitted, responses cannot be removed. Please note that confidentiality cannot be guaranteed while data are in transit over the internet. Data will be retained on a secure drive until publication of results. Responses will be retained by the research team until March 31, 2022 and only summary results will be disseminated through the CVMA website (<https://www.canadianveterinarians.net/>) and/or the Canadian Veterinary Journal. Upon publication, saved data will be destroyed



At the end of the survey, you will be asked to provide your contact information to be entered into a draw to win a \$45 e-rewards card (odds of winning ~ 1 in 120). Participants will still be eligible to participate in the draw, even if they choose to withdraw from the survey. This email address will not be linked to your responses, nor will it be used for any other purpose than the draw.

You do not waive any legal rights by agreeing to take part in this study. This project has been reviewed by the Research Ethics Board for compliance with federal guidelines for research involving human participants. If you have questions regarding your rights and welfare as a research participant in this study (REB#20-07-023), please contact: Manager, Research Ethics; University of Guelph; reb@uoguelph.ca; (519) 824-4120 (ext. 56606).

By continuing on to the survey, you are indicating your consent to participate in this survey.

Please print a copy of this consent form for your records.

### WELCOME SCREEN

Thank you for your interest in our web-based survey. We are interested in surveying dog and cat owners about pet care.

Would you like to take this survey in English or French?

#### [SINGLE PUNCH]

English

French

### INTEGRITY QUESTION

Honest and thoughtful answers to this survey are vital to the integrity of the research process. We require thoughtful and truthful information in order to make important decisions affecting you and the animal health industry.

Please take the time necessary to provide thorough and thoughtful answers.

Before you begin, please check the box indicating agreement with our survey integrity policy.

- I agree to carefully read and respond as accurately as possible to all questions within this survey.

[PGR: RESPONDENT MUST CHECK BOX BEFORE MOVING ON TO SURVEY]

### SCREENING QUESTIONS & QUOTA CLASSIFICATIONS

First, there are a few short questions to ensure you qualify for the study.

**QS1.** In which province or territory do you live?

#### [DROPBOX]

British Columbia

Alberta

Saskatchewan

Manitoba  
Ontario  
Quebec  
New Brunswick  
Nova Scotia  
Prince Edward Island  
Newfoundland/Labrador  
Yukon  
Nunavut  
Northwest Territories

I do not currently live in Canada [TERMINATE]

[QUOTAS:

BC/YUKON/NUNAVUT/NORTHWEST TERRITORIES = 14%

PRAIRIES (ALBERTA, SASKATCHEWAN/MANITOBA) = 20%

ONTARIO = 39%

QUEBEC = 22%

ATLANTIC (NEW BRUNSWICK, NOVA SCOTIA, PEI, NEWFOUNDLAND/LABRADOR) = 6%]

QS1B. What are the first three letters of your postal code?

QS2. What is your age?

[YEAR RANGE: 18-99]

[CONVERT INTO THE FOLLOWING AGE RANGES]

18-24

25-40 (Millennials)

41-56 (Gen X)

57-75 (Baby Boomers)

76+

**[TERMINATE IF <18 YEARS OLD]**

QS3. Please record your gender.

[SINGLE PUNCH]

Female

Male

Non-Binary

Prefer to self-describe: \_\_\_\_\_

Prefer not to answer

QS4. Does anyone in your household (yourself or anyone else) work as the following?

*(Please check one per row)*

**[ROWS] [INSERT RADIO BUTTONS; ONLY ALLOW ONE SELECTION PER ROW]**

Veterinarian

Veterinary technician

[COLUMNS]

Yes **[IF YES TO ANY, THANK AND TERMINATE]**

No **[IF NO TO ALL CONTINUE]**

**Q55.** Do you own any of the following pets? Please select all that apply.

**[MULTI PUNCH]**

Dog

Cat

Other type of pet

There are no pets in my household **[EXCLUSIVE]**

**[TERMINATE IF DOG OR CAT IS NOT SELECTED]**

**[IF Q55 = DOG, ASK Q55A]**

Q55A. How many dogs do you currently own? Select one answer.

- (\_1) 1
- (\_2) 2
- (\_3) 3
- (\_4) 4
- (\_5) 5 or more

**[IF Q55 = CAT, ASK Q55B]**

Q55B. How many cats do you currently own? Select one answer.

- (\_1) 1
- (\_2) 2
- (\_3) 3
- (\_4) 4
- (\_5) 5 or more

**[IF Q55 EQUALS DOG (AND NO CAT), CLASSIFY AS DOG ONLY;  
IF Q55 EQUALS CAT (AND NO DOG), CLASSIFY AS CAT ONLY;  
IF Q55 EQUALS DOG AND CAT, CLASSIFY AS MULTISPECIES]**

**Invitation:**

**[IF RESPONDENT QUALIFIES, SHOW:]**

Thank you for taking a few minutes to answer our questions! You are eligible to participate in our study. Would you like to continue?

Yes, I would like to participate and continue to the survey now **[CONTINUE]**

No thank you, I have decided that I do NOT wish to participate **[TERMINATE: THANK YOU]**

*If you need to leave the survey for any reason, you can return to where you left off by re-clicking on the survey link in your email invite.*

**Termination text:**

**[IF RESPONDENT SCREENS OUT ON ANY QUESTION, ASIDE FROM Q54, SHOW:]**

Unfortunately, you do not fit into one of the groups of pet owners we are currently seeking to take part in this study. However, your opinions are important to us, so we hope you will be able to participate in a future study. Thank you again and have a good day!

**[IF RESPONDENT SCREENS OUT ON QS4, SHOW ONLY IF VETERINARIAN SELECTED IN SQ4:]**

Unfortunately, you do not fit into one of the groups of pet owners we are currently seeking to take part in this study.

However, we are also conducting a survey on this same subject with licensed Canadian veterinarians. Would you be interested in taking the survey from a professional point of view?

**YES [ASK QS6 BELOW]**

NO **[THANK AND TERMINATE]**: Thank you very much for your time today. We hope you will be able to participate in another study with us soon. Have a good day!

**[ENSURE FOLLOWING QUOTAS ARE FILLED]**

N=1,200 Total

- Minimum n=400 Dog Respondents / Minimum n=400 Cat Respondents
- 600 females / 600 males
- Age breaks:
  - 18-38: 35%
  - 39-54: 25%
  - 55 – 74: 25%
  - 75+: 15%
- Regional quotas
  - BC/YUKON/NUNAVUT/NORTHWEST TERRITORIES = 14%
  - PRAIRIES (ALBERTA, SASKATCHEWAN/MANITOBA) = 20%
  - ONTARIO = 39%
  - QUEBEC = 22%
  - ATLANTIC (NEW BRUNSWICK, NOVA SCOTIA, PEI, NEWFOUNDLAND/LABRADOR) = 6%

**SURVEY QUESTIONS**

Let’s get started. This survey will take you about 15 minutes to complete.

**PARASITE AWARENESS AND RISK PERCEPTION**

Q1. What parasites come to mind when thinking of your pets and trying to keep them safe? Please list as many as you can think of.

**[OPEN-END]**

None / Don’t Know

Q1B. How familiar are you with the following pet parasites?

<u>RANDOMIZE</u>	1.Never heard of this parasite	<u>2.Have heard of this parasite but know nothing about it</u>	3.Have heard of this parasite and know a little about it	4.Have heard of this of this parasite and know a lot about it
Fleas				
<u>Ticks</u>				
Lice				
Roundworms				
Tapeworms				
Heartworm				
Mites				
Lungworm				

**[ASK Q2/Q3 FOR ANY RESPONDENT WITH DOGS – EITHER DOG ONLY HH OR MULTISPECIES HH]**

Q2. **[INCLUDE FOLLOWING TEXT FOR MULTISPECIES HH]** For the following two questions we want you to only think about your dogs.

Please indicate the degree to which you feel your dogs are at risk of coming into contact with each of the following parasites in your local area using the scale provided.

<u>RANDOMIZE – ASK ONLY THOSE SELECTED 2,3 OR 4 IN Q1B</u>	Low-Risk <u>-1</u>	<u>2</u>	<u>3</u>	<u>4</u>	High-Risk <u>-5</u>

Q3. Please indicate the degree to which you consider each parasite listed below to be potentially harmful or dangerous for your **dogs**, using the scale provided.

[SHOW ONLY THOSE SELECTED IN Q2 FOR CODE 1-5]

<u>RANDOMIZE</u>	Not Very Dangerous - <u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	Extremely Dangerous - <u>5</u>
<u>SAME LIST AS Q2</u>					

[ASK Q2B/Q3B FOR ANY RESPONDENT WITH CATS – EITHER CAT ONLY HH OR MULTISPECIES HH]

Q2B. [INCLUDE FOLLOWING TEXT FOR MULTISPECIES HH] For the following two questions we want you to only think about your **cats**.

Please indicate the degree to which you feel your **cats** are at risk of coming into contact with each of the following parasites in your local area using the scale provided.

<u>RANDOMIZE</u>	Low-Risk - <u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	High-Risk - <u>5</u>
<u>RANDOMIZE – ASK ONLY THOSE SELECTED 2,3 OR 4 IN Q1B</u>					

Q3B. Please indicate the degree to which you consider each parasite listed below to be potentially harmful or dangerous for your **cats**, using the scale provided.

[SHOW ONLY THOSE SELECTED IN Q2B FOR CODE 1-5]

<u>RANDOMIZE</u>	Not Very Dangerous - <u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	Extremely Dangerous - <u>5</u>
<u>SAME LIST AS Q2</u>					

Q4. Have you, another family member, or veterinarian ever found any ticks on your [DOGS/CATS/DOGS OR CATS] or yourself or any family members?

[SHOW COLUMNS APPROPRIATE TO RESPONDENT: DOG, CAT OR BOTH]

	<u>DOGS</u>	<u>CATS</u>	<u>Yourself</u>	<u>Other Members of your Household</u>
<u>Yes</u>				
<u>No</u>				

[ASK Q5 ONLY IF THEY ANSWER YES TO ANYTHING IN Q4]

Q5. In the past two years are you seeing more, the same, or less ticks (outside in general, on yourself, family members or dogs/cats)?

[LIST]

More  
The same

Less

Q6. Please indicate the degree to which you consider ticks to be potentially harmful or dangerous to you or your family members, using the scale provided.

**[SCALE]**

- 1- Ticks are not very dangerous to my / my family's health
- 2
- 3
- 4
- 5 – Ticks are extremely dangerous to my / my family's health

Q7. Are you familiar with any of the names of tick species? Please select all of the tick species you have heard of prior to today.

**[LIST – RANDOMIZE]**

- Western blacklegged tick
- Blacklegged or deer tick
- Rocky Mountain wood tick
- American dog tick
- Brown dog tick
- Lone star tick
- Groundhog tick
- Asian longhorned tick
- Other: Please specify:
- Not familiar with the names of any tick species **[EXCLUSIVE]**

**Tick Prevention and Treatment**

Q8. Below is a list of different types of media or ways to see/hear messages about ticks and tick prevention. Please indicate if you have recently seen or heard messages about ticks and tick prevention in the past in the following ways:

**[LIST-RANDOMIZE]**

- Posters / brochures / displays at your veterinary clinic
- Posters / brochures / displays at a store
- Posters / brochures / displays at your doctor's office
- Internet advertising
- Television advertising
- Magazine advertising
- Radio advertising
- Direct mail advertising to your home or business
- Magazine / newspaper articles
- Social media articles / advertising / messages
- Billboards / message boards around the city
- Emails / information from your veterinary clinic
- Internet searches

**[COLUMNS]**

Yes, in the past 3 months  
Yes, in the past 12 months, but not in the past 3 months  
No, not in the past 12 months, but I have before  
No, never

Q9. How knowledgeable do you think you are about protecting yourself and your pets against ticks?

**[COLUMNS]**

Protecting myself / family  
Protecting my pets

**[SCALE]**

1- Not at all knowledgeable  
2  
3  
4  
5 – Very Knowledgeable

Q10. What steps or actions can you take to reduce the risk of yourself or your pet being bitten by a tick?  
Please list anything you do or could do to minimize the risk.

**[OPEN-END]**

Q11. Below are steps or actions you can take to reduce the risk of yourself or your pet being bitten by a tick. How often do you do the following in order to minimize the risk?

**[SCALE]**

Always  
Often  
Rarely  
Never (but I did know this would mitigate my / my pet's risk)  
I didn't know this would mitigate my / my pet's risk

**[LIST - RANDOMIZE]**

Conduct a full body tick check on your pet after it has been outside, especially if in wooded areas or tall grasses (including in and around ears, legs and paws, under collar, tail and base of tail)  
Conduct a full body tick check on yourself after going for a hike/walk with or without your pet  
Stay on trails when hiking / walking to avoid areas where ticks may be active  
Cover up / wear long pants, long sleeves, and closed footwear to avoid exposure  
Tuck pants into socks when hiking / walking  
Wear light coloured clothing to easily spot ticks when going out to hike / walk  
Use an insect repellent that contains DEET on yourself when going out to hike / walk  
Give my pet a veterinary-prescribed tick preventive  
Give my pet a tick preventive purchased online or at a retail store



Q12. Why do you rarely or never do these actions? Select one.

[COLUMNS - SHOW ONLY THOSE SELECTED IN Q11 FOR CODE RARELY, NEVER]

[LIST]

As far as I know we do not have ticks in the area

The risk is too low

Not worth the time and effort

I don't think this would prevent ticks

Other, please specify: \_\_\_\_\_

Q12A. Prior to today, were you aware of the following? Some tick species...

[COLUMNS]

Yes

No

[LIST - RANDOMIZE]

can be active during the winter.

can be found in heavily wooded areas / forest canopy with a high moisture environment.

can be found in areas with long grasses with a dry environment.

can be found in urban/suburban parks and green spaces.

are commonly found in leaf litter.

can be active anytime the temperature is above freezing.

Now we'd like to ask you some questions about your experience and interactions with your veterinarian.

Q13. We would like to understand the nature of your pet(s) visits to the veterinary clinic in the past 12 months. Which of the following best describes your visits to the veterinarian in the past 12 months? Please select all that apply.

[SHOW COLUMNS APPROPRIATE TO RESPONDENT: DOG, CAT OR BOTH]

	<u>DOGS</u>	<u>CATS</u>
1. <u>Routine check / preventive health check / annual health check</u>		
2. <u>Visited the vet for a problem or concern</u>		
3. <u>Have not visited the veterinarian in the past 12 months [EXCLUSIVE]</u>		

[ASK Q14 IF SELECTED 1 OR 2 FOR DOGS IN Q13]

Q14. During visits to the veterinarian, do you recall having discussions about the following?

[LIST]

Tick risk and prevention

Actions you can take to protect your pet from ticks  
Actions you can take to protect yourself and family from ticks

**[SCALE]**

Yes, we have these conversations regularly (annually)  
Yes, we have had this conversation infrequently (not always)  
No, I have never talked to my veterinarian about this

**[ASK Q15 IF SELECTED 1 OR 2 OR 3 FOR CATS IN Q13]**

Q15. During visits to the veterinarian, do you recall having discussions about the following?

**[LIST]**

Tick risk and prevention  
Actions you can take to protect your pet from ticks  
Actions you can take to protect yourself and family from ticks

**[SCALE]**

Yes, we have these conversations regularly (annually)  
Yes, we have had this conversation infrequently (not always)  
No, I have never talked to my veterinarian about this

Q16. In the past 12 months have you purchased tick prevention for your [DOGS/CATS/DOGS AND CATS]?  
(e.g., an oral medication, a topical application, spray etc. that controls for ticks)

**[SHOW COLUMNS APPROPRIATE TO RESPONDENT: DOG, CAT OR BOTH]**

	<u>DOGS</u>	<u>CATS</u>
<u>Yes</u>		
<u>No</u>		
<u>I purchased a parasite prevention product but cannot recall if it covers ticks</u>		
<u>Unsure / Don't Know</u>		

Q17. Where did you most recently purchase your tick prevention?

**[SHOW ONLY Q17 FOR THOSE SELECTED 'YES' OR 'PURCHASED BUT CANNOT RECALL' FOR DOGS OR CATS IN Q16]**

**[SHOW COLUMNS APPROPRIATE TO RESPONDENT: DOG, CAT OR BOTH]**

**[LIST-RANDOMIZE]**

Veterinary Clinic  
Pet specialty store (PetSmart, PetValu, Mondou, etc.)  
Costco

Walmart  
Canadian Tire  
Grocery store  
Amazon  
Online retailer (other than Amazon), please specify: \_\_\_\_\_  
Home improvement type store / Hardware store  
Other (please specify) \_\_\_\_\_

Q18. In your area, in which months is tick prevention important? Check all that apply.

January  
February  
March  
April  
May  
June  
July  
August  
September  
October  
November  
December  
Tick prevention is important year-round [EXCLUSIVE]

Q19A. In which months do you typically start administering tick prevention and stop administering tick prevention to your dogs?

[SHOW ONLY Q19 FOR THOSE SELECTED 'YES' OR 'PURCHASED BUT CANOT RECALL' FOR DOGS]

[COLUMNS – SELECT ONE PER COLUMN – MONTH SELECTED FOR 'FINISH' MUST COME AFTER MONTH SELECTED FOR 'START']

Start tick treatment  
Finish tick treatment

[LIST]

January  
February  
March  
April  
May  
June  
July  
August  
September  
October  
November  
December

I administer tick prevention year-round **[EXCLUSIVE]**

Q19B. In which months do you typically start administering tick prevention and stop administering tick prevention to your cats?

**[SHOW ONLY Q19 FOR THOSE SELECTED 'YES' OR 'PURCHASED BUT CANOT RECALL' FOR CATS]**

**[COLUMNS – SELECT ONE PER COLUMN – MONTH SELECTED FOR 'FINISH' MUST COME AFTER MONTH SELECTED FOR 'START']**

Start tick treatment

Finish tick treatment

**[LIST]**

January

February

March

April

May

June

July

August

September

October

November

December

I administer tick prevention year-round **[EXCLUSIVE]**

This next set of questions asks about your awareness and understanding of tick-borne illnesses.

Q20. First, can you name any tick-borne illnesses that you or your pet could contract from coming in contact with or being bitten by ticks?

**[OPEN-END]**

I cannot recall any tick-borne illnesses

Q21. The main tick-borne disease of concern in Canada is Lyme disease. Lyme disease is an infectious disease caused by a bacterium transmitted through tick bites. Have you heard of Lyme disease prior to today?

**[LIST]**

Never heard of this disease

I have heard the name but know nothing about it

I have heard the name and know a little about this disease

I have heard the name and know a lot about the disease

Q22. Do you know which ticks can carry and spread the bacteria that causes Lyme disease? Please select all that apply.

**[LIST]**

All ticks can spread Lyme disease **[EXCLUSIVE]**

Western blacklegged tick

Blacklegged or deer tick

Rocky Mountain wood tick

American dog tick

Brown dog tick

Lone star tick

Groundhog tick

Asian longhorned tick

I don't know which ticks spread Lyme disease **[EXCLUSIVE]**

Q23. Please indicate the degree to which you are concerned that you and your pets could contract Lyme disease, using the scale provided.

	Not at all concerned - <u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	Extremely Concerned - <u>5</u>
<u>Yourself</u>					
<u>Your dog(s) [SHOW IF DOG RESPONDENT]</u>					

Q24. How knowledgeable do you think you are about knowing/recognizing the symptoms of Lyme disease?

**[COLUMNS]**

Symptoms of Lyme disease in humans

Signs of Lyme disease in pets

**[SCALE]**

1- Not at all knowledgeable

2

3

4

5 – Very Knowledgeable

Q25. Ticks can also spread other types of disease. How familiar are you with the following tick-borne illnesses?

**[COLUMNS]**

Never heard of this disease

I have heard the name but know nothing about it

I have heard the name and know a little about this disease

I have heard the name and know a lot about the disease

**[LIST-RANDOMIZE]**

Anaplasmosis  
Ehrlichiosis  
Babesiosis  
Powassan encephalitis  
Rocky mountain spotted fever  
Feline Hemotropic Mycoplasma  
Canine Hemotropic Mycoplasma  
Cyttauzoonosis  
Tick paralysis

Q26. Please indicate your agreement with each of the following statements using the scale provided:

**[SCALE]**

10 – Completely Agree

9

8

7

6

5

4

3

2

1 – Completely Disagree

Don't Know

**[STATEMENTS - RANDOMIZE]**

Pets should be protected with tick prevention year-round

Tick protection in the summer is crucial to reduce the risk of tick bites and therefore exposure to tick-borne illnesses

Dogs and cats living in urban areas need tick protection

Indoor only pets don't tick protection

Dog owners are at a higher risk of coming in contact with ticks than non-dog and cat owners

Some tick species are now found in parts of Canada where they never were found before due to climate change

The risk of coming into contact with ticks in my part of the province / territory has increased over the past few years

## DEMOGRAPHICS AND PET OWNER BEHAVIOUR

We have a few final demographic questions.

**D1.** What role do you play in decisions related to the health care of your pet(s)? Would you say that you...?

**[SINGLE PUNCH]**

1. Are primarily responsible for healthcare decisions
2. Share responsibility for healthcare decisions
3. Have less than half the responsibility for healthcare decisions
4. Have little or no involvement in healthcare decisions

**D2.** Which of the following best describes where you live?

**[LIST]**

- I live in a large urban area (city over 1 million)
- I live in a suburb outside a large urban area
- I live in a medium size urban area (500,000 – 1 million)
- I live in a suburb outside a medium size urban area
- I live in a small city (100,000 – 500,000)
- I live in a rural area

**D3.** Are there children under 18 years old living in your household?

**[LIST]**

- Yes, there are children under 18 years old in the household
- No, there are no children under 18 years old in the household

**D4.** Which statement below describes how often your [DOGS/CATS/DOGS AND CATS] are outside?

**[SHOW COLUMNS APPROPRIATE TO RESPONDENT: DOG, CAT OR BOTH]**

<b>[LIST – SINGLE PUNCH. DON'T RANDOMIZE]</b>	<b><u>DOGS</u></b>	<b><u>CATS</u></b>
Always indoor, never goes outside		
Almost always indoor, only goes outside on walks via leash and/or to ride in the car		
Primarily indoor, but goes outside occasionally on own and is always contained when outside		
Primarily indoor, but goes outside occasionally on own and roams freely when outside		
Primarily outdoor		
<b><u>Always outdoor</u></b>		
<b><u>Other, please specify:</u></b>		

**[ASK OF DOG RESPONDENTS ONLY]**

D5. When walking your dog(s), where do you typically walk? Select all that apply.

**[LIST-RANDOMIZE]**

Throughout town, city – remaining on sidewalks and city parks

We go hiking on trails

We go hiking off-trail

We often go camping, taking our dog with us

The dog roams free on our property

D6. How many years have you been a pet owner?

**[LIST]**

0 – 2 years

3 – 5 years

6 – 9 years

10+ years

D7. Please indicate your highest level of education.

**[LIST]**

Less than high school

High school

Some college or university

College or university degree

Graduate degree

D8. Please indicate your annual household income before taxes.

**[LIST]**

Less than \$50,000

\$50,000 - \$99,999

\$100,000 - \$149,999

\$150,000 - \$199,999

\$200,000+

Prefer not to answer

Those are all the questions we have for you today. Thank you for your input!



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**National Tick Awareness and Behaviour Study  
Hunters, Trappers and Anglers Questionnaire  
November 3, 2021**

**Project Specifications:**

- 12-14-minute survey
- Target as many completed surveys as possible
- No incentive payment
- Nationally Representative of Canada
- English and French

**E-mail Invitation**

Hello:

We want to gather your opinion on an important public health matter for hunters, anglers and trappers.

The Canadian Veterinary Medical Association (CVMA) and a team of experts, in collaboration with the Ontario Federation of Anglers and Hunters (OFAH), is conducting a study to examine perspectives of hunters, anglers and trappers concerning prevention strategies and awareness regarding ticks and tick-borne illness.

Findings from this study will provide baseline data on the level of awareness of tick-borne diseases that affect humans and/or hunting dogs and be used to inform and develop future tick awareness campaigns and improve public health outcomes.

Your name has been randomly selected from a large database of members and newsletter subscribers provided by the OFAH. You will never be identified individually in the study and the OFAH will not provide the names of members and/or newsletter subscribers who completed the study (or not) to the CVMA or any other organization/individual.

We are interested in surveying active hunters, anglers and/or trappers.

The survey should take only **12 minutes** to complete. Your contribution is important and very much appreciated.

## Consent Form

### Background

A team from the Canadian Veterinary Medical Association (CVMA) is leading a study to develop baseline data on the level of awareness of tick-borne disease within the following three groupings: 1) veterinarians, 2) pet owners, 3) hunter, anglers and trappers. Armed with this new knowledge, Canada's veterinary and public health community will better understand the risks associated with tick-borne diseases, such as Lyme disease, and be empowered to credibly inform high risk stakeholder communities.

This research team consists of Dr. Scott Weese, Dr. Katie Clow, Dr. Shane Renwick, Mr. Michael Ennis, Ms. Lori Ahronson, Ms. Kate Stiefelmeyer and Ms. Leeann Gold. If you have questions regarding the study, please contact Ms. Lori Ahronson at [lahronson@cvma-acmv.org](mailto:lahronson@cvma-acmv.org). The University of Guelph point of contact is Dr. Katie Clow at [kclow@uoguelph.ca](mailto:kclow@uoguelph.ca).

Project funding is provided by the Public Health Agency of Canada through the Infectious Disease and Climate Change Fund. Funds are held and administered by the CVMA. No funding is allocated to members of the research team.

### Consent

Participation in this research study is completely voluntary. You are under no obligation to participate. If you agree to take part, you will be asked to complete a short (no more than 12 to 15 minutes) online survey consisting of multiple choice and short answer questions. Only one member per household should participate. You must be 18 years of age to participate in this survey. There are minimal risks associated with participating. Participation is anonymized, and you can withdraw at any time while completing the survey simply by closing the browser. However, due to anonymity, once the survey has been submitted, responses cannot be removed. Please note that confidentiality cannot be guaranteed while data are in transit over the internet. Data will be retained on a secure drive until publication of results, accessible to only authorized University of Guelph personnel. Responses will be retained by the research team until March 31, 2022 and only summary results will be disseminated through the CVMA website (<https://www.canadianveterinarians.net/>) and/or the Canadian Veterinary Journal. Upon publication, saved data will be destroyed

You do not waive any legal rights by agreeing to take part in this study. This project has been reviewed by the Research Ethics Board for compliance with federal guidelines for research involving human participants. If you have questions regarding your rights and welfare as a research participant in this study (REB#20-07-023), please contact: Manager, Research Ethics; University of Guelph; [reb@uoguelph.ca](mailto:reb@uoguelph.ca); (519) 824-4120 (ext. 56606).

By continuing on to the survey, you are indicating your consent to participate in this research study.

Please print a copy of this consent form for your records.

## Welcome Screen

Thank you for your interest in our web-based national survey. We are interested in surveying **Hunters, Trappers and Anglers** to examine their perspectives concerning prevention strategies regarding tick awareness and tick-borne illness

Would you like to take this national survey in English or French?

### [SINGLE PUNCH]

English  
French

## INTEGRITY QUESTION

Honest and thoughtful answers to this national survey are vital to the integrity of the research process. We require thoughtful and truthful information in order to make important decisions affecting you and the animal health industry.

Please take the time necessary to provide thorough and thoughtful answers.

Before you begin, please check the box indicating agreement with our survey integrity policy.

- I agree to carefully read and respond as accurately as possible to all questions within this national survey.

**[PGR: RESPONDENT MUST CHECK BOX BEFORE MOVING ON TO SURVEY]**

## SCREENING QUESTIONS

Q1. Are you an active hunter, angler and/or trapper?

[SINGLE PUNCH]

No **[IF NO, THANK AND TERMINATE]**

Yes **[IF YES CONTINUE]**

Q2. In which province or territory do you hunt, fish or trap? Select all that apply.

[DROPBOX]

British Columbia  
Alberta  
Saskatchewan  
Manitoba  
Ontario  
Quebec  
New Brunswick  
Nova Scotia  
Prince Edward Island  
Newfoundland/Labrador  
Yukon

Nunavut

Northwest Territories

I do not currently hunt, fish or trap in Canada [TERMINATE]

**QS3.** What is your age?

[YEAR RANGE: 0-99]

[CONVERT INTO THE FOLLOWING AGE RANGES]

<18 YEARS OLD

18-24

25-40 (Millennials)

41-56 (Gen X)

57-75 (Baby Boomers)

76+

**[TERMINATE IF <18 YEARS OLD]**

**QS4.** What are the first three letters of your postal code?

(Please enter without a space) -----

Skip **[Exclusive]**

Invitation:

[IF RESPONDENT QUALIFIES, SHOW:]

**QS5.** Thank you for taking a few minutes to answer our questions! You are eligible to participate in our study. Would you like to continue?

Yes, I would like to participate and continue to the survey now **[CONTINUE]**

No thank you, I have decided that I do NOT wish to participate **[TERMINATE: THANK YOU]**

*If you need to leave the survey for any reason, you can return to where you left off by re-clicking on the survey link in your email invite.*

Termination text:

[IF RESPONDENT SCREENS OUT ON ANY QUESTION, ASIDE FROM QS3, SHOW:]

Unfortunately, you do not fit into one of the groups of hunters, anglers or trappers that we are currently seeking to take part in this study. However, your opinions are important to us, so we hope you will be able to participate in a future study. Thank you again and have a good day!

**YES [ASK Q1 BELOW]**

**NO [THANK AND TERMINATE]:** Thank you very much for your time today. We hope you will be able to participate in another study with us in the near future. Have a good day!

## NATIONAL SURVEY QUESTIONS

**Q1.** Are you a member of any of the following organizations? Select all that apply.

**[MULTI PUNCH]**

- Ontario Federation of Anglers and Hunters
- Manitoba Wildlife Federation
- Saskatchewan Wildlife Federation
- Alberta Fish & Game Association
- BC Wildlife Federation
- Fédération Québécoise des Chasseurs et Pêcheurs
- Nova Scotia Federation of Anglers & Hunters
- Newfoundland & Labrador Wildlife Federation
- Prince Edward Island Wildlife Federation
- New-Brunswick Wildlife Federation
- Yukon Fish & Game Association
- Northwest Territories Wildlife Federation
- I am not a member of any of the above organizations

**Q2.** Are you a hunter, angler and/or trapper? Select all that apply.

**[MULTI PUNCH]**

- Hunter (**SKIP TO Q3 IF HUNTER SELECTED, OTHERWISE SKIP TO Q4**)
- Angler
- Trapper

**Q3.** In a typical year, which of the following types of game do you hunt in each season? Select all that apply. [Multi punch check box for each option]

[List Columns]

- Small game (e.g., Grouse, Rabbit, Turkey, Big Horn Sheep, etc.)
- Big Game (e.g., Bison, Polar Bear, Seals, Deer, Moose, etc.)
- Migratory Waterfowls (e.g., Ducks, Geese, etc.)
- Predators (e.g., Grizzly/Black/Polar Bear, Wolves, Cougars, Coyotes, etc.)

Season	Winter	Spring	Summer	Fall
Big Game				
Small Game				
Migratory Waterfowl				
Predators				
Other:				

**Q4.** In which province or territory do you live?

**[DROPBOX]**

- British Columbia
- Alberta
- Saskatchewan
- Manitoba
- Ontario

Quebec  
New Brunswick  
Nova Scotia  
Prince Edward Island  
Newfoundland/Labrador  
Yukon  
Nunavut  
Northwest Territories

**Q5.**

Does a dog typically accompany you for any of the below activities?

**[MULTI PUNCH]**

Big game hunting  
Small game hunting  
Waterfowl hunting  
Predator hunting  
Fishing  
Trapping  
I do not have/bring a dog  
Other [ open ended]

**PARASITE AWARENESS/RISK PERCEPTION**

**Q6.** What parasites, that could affect you or your dog, come to mind when thinking of when out hunting, trapping and/or fishing? Please list as many as you can think of.

**[OPEN-END]**

None / Don't Know

**Q7.** Please indicate the degree to which you feel you are at risk of coming into contact with a tick while hunting, trapping, or fishing using the scale provided.

	Low-Risk <u>-1</u>	<u>2</u>	<u>3</u>	<u>4</u>	High-Risk <u>-5</u>	Never heard of this parasite
<u>Ticks</u>						

**Q8.** Please indicate the degree to which you consider ticks to be potentially harmful or dangerous to you or your family members, using the scale provided.

**[SCALE]**

- 1- Ticks are not very dangerous to my / my family's health
- 2
- 3
- 4
- 5 – Ticks are extremely dangerous to my / my family's health

**Q9.** Have you ever found a tick on yourself or another member of your household (excluding your pets)?  
Select all that apply.

**LIST**

I have found a tick on myself

I have found a tick on a member of my household / A member of my household has found a tick on themselves

No one in my household, including me, has ever found a tick on themselves

**Q10.** Have you ever found a tick on any harvested game species?

**[SCALE]**

Always

Often

Rarely

Never

**Q11.** Are you familiar with any of the names of tick species? Please select all the tick species you have heard of prior to today.

**[LIST – RANDOMIZE]**

Western blacklegged tick

Blacklegged or deer tick

Rocky Mountain wood tick

American dog tick

Brown dog tick

Lone star tick

Groundhog tick

Winter ticks

Other: Please specify:

**[ASK Q12 TO Q15 FOR ANY RESPONDENT WHO DID NOT SELECT “I DO NOT HAVE/TRING A DOG” IN Q5]**

**Q12. [INCLUDE FOLLOWING TEXT FOR MULTISPECIES HH]** For the following two questions we want you to only think about the dogs you bring hunting, trapping, and/or fishing.

Please indicate the degree to which you feel your **dogs** are at risk of coming into contact with each of the following parasites in your local area using the scale provided.

<b><u>RANDOMIZE</u></b>	Low-Risk <b><u>-1</u></b>	<b><u>2</u></b>	<b><u>3</u></b>	<b><u>4</u></b>	High-Risk <b><u>-5</u></b>	Never heard of this parasite
Fleas						
Ticks						
Lice						



Roundworms						
Tapeworms						
Heartworm						
Mites						
Lungworms						

**Q13.** Please indicate the degree to which you consider each parasite listed below to be potentially harmful or dangerous for your **dog(s)**, using the scale provided.

**[SHOW ONLY THOSE SELECTED IN Q16 FOR CODE 1-5]**

<u>RANDOMIZE</u>	Not Very Dangerous - <u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	Extremely Dangerous - <u>5</u>
<u>SAME LIST AS Q16</u>					

**Q14.** What season do you usually train your dog? Select all that apply.

**[MULTI PUNCH]**

- Spring
- Summer
- Fall
- Winter
- I do not specifically train my dog for outdoor activities

**Q15.** Have you ever found a tick on your dog? Select all that apply.

**[SINGLE PUNCH]**

- Yes
- No

**TICK PREVENTION**

**Q16.** Below is a list of different types of media or ways to see/hear messages about ticks and tick prevention. Please indicate if you have recently seen or heard messages about ticks and tick prevention in the past months in the following ways:

**[LIST-RANDOMIZE]**

- From a hunting and fishing organization
- From Parks Canada
- From Provincial/Territorial parks organizations
- Seen posters / brochures / displays at your veterinary clinic
- Seen posters / brochures / displays at a store
- Through internet advertising
- Through television advertising
- Through magazine advertising
- Through radio advertising
- Direct mail advertising to your home or business
- Magazine / newspaper articles
- Articles / advertising / messages on social media

Billboards / message boards around the wildlife and/or fishing area  
Internet searches

**[COLUMNS]**

Yes, in the past 3 months

Yes, in the past 12 months, but not in the past 3 months

No, not in the past 12 months, but I have before

No, never

**Q17.** How knowledgeable do you think you are about protecting yourself against ticks?

**[SCALE]**

1- Not at all knowledgeable

2

3

4

5 – Very Knowledgeable

**Q18.** What steps or actions can you take to reduce the risk of yourself being bitten by a tick? Please list anything you do or could do minimize the risk.

**[MULTI PUNCH]**

Treat clothing and gear with products containing permethrin

Purchase clothing and gear that is treated with permethrin

Use an insect repellent containing DEET on clothes and on all uncovered skin

Wear light coloured clothing,

Tuck your top into your pants, and tuck your pants into your boots or socks

Check yourself regularly for ticks

Other **[OPEN-END]**

**[ASK Q19 to Q24 FOR ANY RESPONDENT WHO DID NOT SELECT “I DO NOT HAVE/BRING A DOG” IN Q5]**

**Q19.** How knowledgeable do you think you are about protecting your hunting dog against ticks?

**[SCALE]**

1- Not at all knowledgeable

2

3

4

5 – Very Knowledgeable

**Q20.** What steps or actions can you take to reduce the risk of your hunting dog being bitten by a tick? Please list anything you do or could do minimize the risk.

**[MULTI PUNCH]**

Use tick prevention product/medication for your dog

Check your dog regularly for ticks

Other **[OPEN-END]**

**Q21.** We would like to understand the nature of your hunting dog(s) visits to the veterinary clinic in the past 12 months. Which of the following best describes your visits to the veterinarian in the past 12 months? Please select all that apply.

	Hunting Dog
Routine check / preventative health check / annual health check	
Visited the vet for a problem or concern	
Have not visited the veterinarian in the past 12 months [EXCLUSIVE]	

**Q22.** During visits to the veterinarian, do you recall having discussions about the following?

**[LIST]**

- Tick risk and prevention
- Actions you can take to protect your hunting dog from ticks
- Actions you can take to protect yourself and family from ticks

**[SCALE]**

- Yes, we have these conversations regularly (annually)
- Yes, we have had this conversation infrequently (not always)
- No, I have never talked to my veterinarian about this

**Q23.** In the past 12 months have you purchased tick prevention for your hunting dog(s)? (e.g., an oral medication, a topical application, spray etc. that controls for ticks)

**[MULTI PUNCH]**

- Yes
- No
- I purchased a parasite prevention product but cannot recall if it covers ticks
- Unsure / Don't Know

**Q24.** Where did you most recently purchase your tick prevention?

**[SHOW ONLY Q24 FOR THOSE SELECTED 'YES' OR 'PURCHASED BUT CANNOT RECALL' IN Q23]**

**[LIST-RANDOMIZE]**

- Veterinary Clinic
- Pet specialty store (PetSmart, PetValu, Mondou, etc.)
- Costco
- Walmart
- Canadian Tire
- Grocery store
- Amazon
- Online retailer (other than Amazon), please specify: \_\_\_\_\_
- Home improvement type store / Hardware store
- Other (please specify) \_\_\_\_\_

**Q25.** In which months do you typically start administering tick prevention and stop administering tick prevention to your dogs?

[SHOW ONLY Q23 FOR THOSE SELECTED 'YES' OR 'PURCHASED BUT CANNOT RECALL' FOR HUNTING DOGS]

[COLUMNS – SELECT ONE PER COLUMN – MONTH SELECTED FOR 'FINISH' MUST COME AFTER MONTH SELECTED FOR 'START']

Start tick treatment

Finish tick treatment

[LIST]

January

February

March

April

May

June

July

August

September

October

November

December

**CONTINUE**

**Q26.** Below are listed steps or actions that you could take to mitigate tick risk for yourself. How often do you do the following in order to mitigate tick risk?

[SCALE]

Always

Often

Rarely

Never (but I did know this would mitigate my risk)

I didn't know this would mitigate my risk

[LIST - RANDOMIZE]

Conduct a full body tick check on yourself after hunting, trapping and/or fishing especially if in wooded areas or tall grasses

Stay on trails when walking to avoid areas where ticks may be active

Cover up / Wear long pants, long sleeves, and closed footwear to avoid exposure

Tuck pants into socks when walking

Wear light coloured clothing to easily spot ticks when hunting, trapping and/or fishing

Use an insect repellent that contains DEET when going out hunting, trapping and/or fishing

Use clothes and gear treated with permethrin

Put clothes and gear in a dryer at the hottest setting after hunting, trapping, and/or fishing

**Q27.** In the area where you hunt, fish, and/or trap, in which months is tick prevention important? Check all that apply.

- January
- February
- March
- April
- May
- June
- July
- August
- September
- October
- November
- December
- Tick prevention is important year-round [EXCLUSIVE]

**Q28.** The main tick-borne disease of concern in Canada is Lyme disease. Lyme disease is an infectious disease caused by a bacterium transmitted through the bite of a tick. Have you heard of Lyme disease prior to today?

**[LIST]**

- Never heard of this disease
- I have heard the name but know nothing about it
- I have heard the name and know a little about this disease
- I have heard the name and know a lot about the disease

**Q29.** Do you know which ticks can carry and spread Lyme disease? Please select all that apply.

**[LIST]**

- All ticks can spread Lyme disease [EXCLUSIVE]
- Western blacklegged tick
- Blacklegged or Deer tick
- Rocky Mountain wood tick
- American Dog tick
- Brown Dog tick
- Lone Star tick
- Winter tick
- I don't know which ticks spread Lyme disease [EXCLUSIVE]

**Q30.** Please indicate the degree to which you are concerned about contracting Lyme disease, using the scale provided.

	Not at all concerned- <u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	Extremely Concerned <u>5</u>
<u>Yourself contracting Lyme disease</u>					

<u>A family member contracting Lyme disease</u>					
<u>Your dog(s) [SHOW IF HUNTING DOG RESPONDENT]</u>					

**Q31.** How knowledgeable do you think you are about knowing/recognizing the symptoms of Lyme disease?

**[COLUMNS]**

Symptoms of Lyme disease in humans

Symptoms of Lyme disease in dogs [SHOW IF HUNTING DOG RESPONDENT]

**[SCALE]**

- 1- Not at all knowledgeable
- 2
- 3
- 4
- 5 – Very Knowledgeable

**Q32.** Ticks can also spread other types of disease. How familiar are you with the following tick-borne illnesses?

**[COLUMNS]**

Never heard of this disease

I have heard the name but know nothing about it

I have heard the name and know a little about this disease

I have heard the name and know a lot about the disease

**[LIST-RANDOMIZE]**

- Anaplasmosis
- Ehrlichiosis
- Babesiosis
- Powassan encephalitis
- Rocky mountain spotted fever
- Canine Hemotropic Mycoplasma
- Cytauxzoonosis
- Tick paralysis

**Q33.** Please indicate your agreement with each of the following statements using the scale provided:

**[SCALE]**

- 10 – Completely Agree
- 9
- 8
- 7
- 6
- 5

- 4
- 3
- 2
- 1 – Completely Disagree
- Don't Know

**[STATEMENTS - RANDOMIZE]**

Spring and summer are the most important months for tick prevention  
Tick control is important in the spring even though it might feel too cold for parasites to be active  
Tick protection in the summer is crucial to reduce the risk of ticks and exposure to tick borne illnesses  
Hunting dog owners are at a higher risk of coming in contact with ticks than non-dog owners  
Dogs should be protected with tick prevention year-round  
Ticks have expanded in geographical range due to climate change  
The risk of coming into contact with ticks has increased over the past few years

Those are all the questions we have for you today. Thank you for your input!

## Annex B: Survey Respondent Demographics

	<b>Pet Owners (n = 1201)</b>	<b>Veterinarians (n = 909)</b>	<b>Hunters, Anglers, and Trappers (n = 2226)</b>
<b>Gender</b>	51% Women		
	49% Men		
<b>Age Distribution</b>	6% 18-24 (Gen Z)		1% 18-24 (Gen Z)
	28% 25-40 (Millennials)		12% 25-40 (Millennials)
	29% 41-56 (Gen X)		23% 41-56 (Gen X)
	29% 57-75 (Baby Boomers)		58% 57-75 (Baby Boomers)
	8% 76+		6% 76+
<b>Type of Residence</b>	54% Urban	44% Urban	52% Urban
	28% Suburban	30% Suburban	6% Unknown
	19% Rural	26% Rural	42% Rural
<b>Geographic Region</b>	14% West (BC, Nunavut, Territories)	18% West (BC, Nunavut, Territories)	
	20% Prairies (Alberta, Saskatchewan, Manitoba)	28% Prairies (Alberta, Saskatchewan, Manitoba)	
	39% Ontario	28% Ontario	99% Ontario
	27% East (Quebec, New Brunswick, Nova Scotia, PEI, Newfoundland)	27% East (Quebec, New Brunswick, Nova Scotia, PEI, Newfoundland)	
<b>Contact with Dogs, Cats, or Both</b>	39% Dog Only Households	54% Time Spent with Dogs	37% Own or Bring a Companion Dog
	40% Cat Only Households	39% Time Spent with Cats	
	21% Multi-Species Households	8% Time Spent with Other Species	