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CASE 13

Preparing for the Tickpocalypse

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Zachary Smith, the Manager of the Safe Water, Rabies Prevention & Control, & Vector-Borne Disease team at the Realike Health Unit's (RLHU) Environmental Health Department, is checking his work emails on an early March morning, when suddenly his office phone rings. The call is from Chris Howard, an epidemiologist for Public Health Ontario (PHO), who informs Zachary about the increased incidence of Lyme disease in the Realike region. Chris cautions Zachary that the Realike region is now an endemic Lyme disease risk area and that he should be prepared for an increase in case incidence and for a potential disease outbreak. Lyme disease is a vector-borne disease caused by bites from blacklegged ticks, also known as *Ixodes scapularis* or deer ticks, that are infected with *Borrelia burgdorferi* (O'Connell, 2014). Blacklegged ticks typically inhabit wooded, grassy, and bushy areas in temperate regions (Nadelman & Wormser, 1998). Historically, Lyme disease has not been prevalent in Canada, although it has been endemic in the United States, Europe, and parts of Asia (Stone et al., 2017). However, over the past two decades, Lyme disease cases in Ontario have increased as the blacklegged tick population carrying *B. burgdorferi* bacteria has expanded and migrated into new endemic areas in the province (Clow et al., 2017).

Since 2007, Lyme disease has been found to be the most prevalent vector-borne disease in Ontario (Johnson, 2018). The emergence of new endemic Lyme disease areas is the result of many factors such as changes in rainfall, temperature, soil composition, and vector migration, all of which are influenced by climate change (Leighton et al., 2012). From 1948 until 2016, Canada's average annual temperature increased by 1.7°C, which is approximately double the global rate, and this is expected to increase even faster in the future (Government of Canada, 2019). Additionally, the average annual temperature increases are even greater as you move up to the northern regions, with northern Canada experiencing a rise triple that of the global rate (Government of Canada, 2019). This warming pattern correlates with the rapid northern migration and expansion of blacklegged ticks. The 2000 to 2015 period has been the warmest in Canadian history and has correlated with the increased incidence of Lyme disease cases in the country. Lyme disease is now a significant public health threat to the province of Ontario, with certain regions such as the Realike region being more at risk than other areas due to its southern latitude.

After Zachary ends his phone call with Chris, he reflects on the current prevention and control measures the RLHU is taking as per the best practice guidelines set out by PHO (PHO, 2016). Because the RLHU has been keeping up with the recommended passive and active tick surveillance measures, and because the information collected has been used to produce Lyme disease trend reports, Zachary knows that the Realike region was not an endemic Lyme disease area in the past. This is the main reason that the RLHU has not allocated resources to

creating a Lyme disease outbreak preparedness plan. In fact, instead of focusing on emergency preparedness planning, most health units across Canada focus on prevention and control measures by prioritizing surveillance data collection and the identification of endemic Lyme disease risk areas (Johnson, 2018). However, Zachary is now alarmed by Chris's phone call and news of the rapid emergence of Lyme disease cases within the Realike region. Therefore, he wants to ensure the safety of the Realike community by being prepared for any potential Lyme disease outbreaks within the region and by mitigating any risks that may arise.

BACKGROUND

Lyme Disease

Ontario's Lyme disease incidence has been increasing steadily since it became a reportable vector-borne disease in 1988 (PHO, 2016). Incidence is the number of new disease cases that occur in at-risk people in a specified population during a particular time (Speechley, 2018). The Centers for Disease Control and Prevention (CDC) defines an endemic area as a geographic region with a constant presence of disease in the population (CDC, 2012). When Lyme disease became endemic in parts of Ontario, it was designated "a disease of public health significance" under Ontario regulation 135/18 of the *Health Protection and Promotion Act* (Government of Ontario, 1990a). Under the Act, physicians and practitioners have a duty to report any cases of Lyme disease to the local health unit. Depending on the geographic location, Lyme disease can be caused by various species of the *Borrelia* bacterium and can be spread by different species of *Ixodes* tick vectors (Murray & Shapiro, 2010). In Ontario, Lyme disease is contracted via a bite from a blacklegged tick (*Ixodes scapularis*) infected with the *B. burgdorferi* bacterium (Nelder et al., 2018). Because Lyme disease is an emerging infectious disease, especially in the Realike region, and since it presents with nonspecific symptoms, it can be difficult to identify (Murray & Shapiro, 2010). An emerging infectious disease is a disease that either presents in a new population for the first time or is one that has previously existed within a population but has recently increased in incidence or geographic region (National Collaborating Centre for Infectious Diseases, n.d.). In the case of the Realike region, the latter applies because cases of Lyme disease were present previously; however, the recent PHO epidemiological trends indicate an increase in disease incidence and an expansion of the disease's geographic area. What makes the disease even more challenging to diagnose is that the identifiable erythema migrans, or "bull's-eye" rash, is not present in every case (Heymann, 2008).

Lyme disease has three main clinical stages: early localized, early disseminated, and late disseminated Lyme disease, all of which are associated with different symptoms (Johnson, 2018). The early localized stage mostly manifests with the bull's-eye rash, the early disseminated stage causes neurological symptoms, and the late disseminated stage commonly presents with arthritis (Johnson, 2018). The identification and diagnosis of the disease is not standardized because of the low specificity and sensitivity of the *B. burgdorferi* antibody test (Nadelman & Wormser, 1998; Heymann, 2008). Specificity and sensitivity are measures used to evaluate the accuracy of a diagnostic testing procedure (Parikh et al., 2008). The reliability of the test is reduced even further in the earlier stages of the disease because the *B. burgdorferi* antibodies are below detectable levels (Murray & Shapiro, 2010). Although all stages are essentially curable via antibiotic treatment, the treatment is most effective if the disease is treated in its earlier stages (Ogden et al., 2009). This signifies the importance of public, physician, and veterinarian education and awareness of Lyme disease and its symptoms. It also emphasizes the need for an emergency preparedness plan for Lyme disease to be in place so that outbreaks are identified and controlled in their earliest stages.

Blacklegged ticks (the Lyme disease vectors) go through a two-year life cycle that consists of four life stages—egg, larva, nymph, and adult (Exhibit 1) (CDC, 2019). The tick requires a blood

meal at each life stage to survive and its hosts typically include mammals, birds, reptiles, and amphibians (CDC, 2019). Ticks in the nymph stage prefer to feed on small mammals, whereas the adult ticks mate and prefer to retrieve their blood meal from deer; humans are an accidental tick host (TickEncounter, n.d.). Identification of the tick's life stage is an important element of the testing procedure because it provides information on the establishment of the tick population. Adult ticks are the size of a sesame seed, whereas the nymph-stage ticks are the size of a poppy seed. As a result, it is often more difficult to identify the attachment of a tick in the nymph stage (CDC, 2020). In addition, the nymphs are most active in the spring and summer when they are more likely to be in contact with human hosts (CDC, 2020). Public Health Ontario keeps all this information in mind when developing Lyme disease surveillance and trend maps to identify possible Lyme disease risk areas more accurately. Because the life cycle of a tick is two years, identifying a tick's current life stage helps identify and predict future Lyme disease trends and outbreaks. This is an important component of the environmental scan and aids in establishing a needs assessment of future prevention and control measures.

Climate Change

Nationally and globally, climate change is thought to be responsible for many unpredictable direct and indirect effects on the environment and the economy, and on the health of individuals. The World Health Organization (WHO) has published frameworks and policies that aim to address climate change impacts on health, and it has released plans on how to support adaptation through risk assessment and mitigation (WHO, n.d.a). In response, the province of Ontario has also assessed the climate changes impacting the province and has developed its own climate change adaptation frameworks and guidelines (Ministry of Health and Long-Term Care [MOHLTC], 2016; MOHLTC, 2018b). The RLHU also identifies climate change as a potential significant health hazard within its community. In 2015, the unit had published a report that assessed the health impacts and vulnerabilities caused by climate change within the Realike region and identifies recommendations to address these vulnerabilities and build regional adaptive capacity.

Climate change affects many processes in the environment, including precipitation frequency, fluctuations in weather and temperature patterns, soil and water quality, and animal and disease migration patterns. These changes give rise to many direct and indirect population impacts, with the increase in average global temperature being the most detectable and obvious direct effect. Historically, the typical spring and summer in the Realike region consisted of seasonal rainstorms, extreme weather events with heavy winter snowfalls, and snowstorms or rain flooding in the late winter and early spring. However, as a result of the general warming temperature patterns over the past two decades, the summers have been drier, with significant decreases in the amount of rainfall observed from June to September, and the winters have been warmer, with reduced snowfalls and increased rainfall experienced from October to January.

The increase in global temperatures also leads to the emergence and re-emergence of noncommunicable and communicable diseases globally. Lyme disease is one example of the many emerging vector-borne diseases in the Realike region that can be attributed to the warming climate. The increasing regional temperatures and humidity have allowed blacklegged ticks to thrive and spread because they are developing faster and have shorter life cycles, reduced mortality, and increased activity (Ogden & Lindsay, 2016). Therefore, the effects of climate change have contributed to the range expansion of the tick population and the subsequent Lyme disease risk area expansion northward into Ontario from the United States (Berry et al., 2014). Climate change has also resulted in an increase of suitable habitats and regions for many animals, which has altered the migration patterns of certain bird and animal

tick hosts, contributing further to the increased tick range expansion (MOHLTC, 2018c). The effects of the changing climate bring a lot of uncertainty and unpredictability, which highlights the need for interdisciplinary sector and stakeholder collaboration to facilitate effective understanding and management of its associated health risks while supporting optimal public health adaptation (MOHLTC, 2016).

The Realike County

The RLHU is located in a mid-sized city in southern Ontario serving a catchment area of slightly under a half-million people. This city is divided into 5 urban and 2 rural municipalities all of which are surrounded by many trees, green spaces, and hiking trails.

According to PHO's Lyme disease map (Exhibit 2), many regions within southern Ontario are now part of the estimated risk area (PHO, 2018a). These regions have been estimated to carry potential risks of people coming into contact with *B. burgdorferi*-infected blacklegged ticks. Over the past 10 years, the Realike region has been experiencing relatively increasing temperatures and changing weather patterns. This has contributed to the establishment and expansion of the blacklegged tick population and to the increase in tick activity. As Lyme disease is an emerging disease in the region, the misdiagnosis of the disease is common as a result of the lack of widespread clinician and public awareness. The nonspecific symptoms of Lyme disease also make it challenging to accurately and effectively identify and diagnose (Murray & Shapiro, 2010).

The Realike Health Unit

The RLHU is one of the many publicly funded health units in Ontario and is responsible for the public health of individuals residing in the Realike region. The RLHU delivers programs and services within its community as per the *Health Protection and Promotion Act* and in compliance with the regulations outlined in the *Ontario Public Health Standards* (MOHLTC, 2018). The mission of the RLHU is to promote and contribute to the health of its population while providing a safe and healthy living and working environment. This is achieved by identifying community needs and potential risks, collaborating with various sectors and stakeholders, promoting health and communication, and increasing public awareness and education.

The RLHU uses surveillance measures to identify the potential health risks to the community posed by vector-borne illnesses such as Lyme disease. The provincial case definitions and protocols for public health management are listed in the MOHLTC's Infectious Disease Protocols (MOHLTC, 2019a; MOHLTC, 2019b). The health unit conforms to the provincial best practice, evidence-based guidelines for Lyme disease surveillance, control, and prevention measures set by PHO (PHO, 2019). Based on these guidelines, public health units are to participate in both tick population and human Lyme disease surveillance. The RLHU uses both suggested tick surveillance measures—passive and active—to aid in the identification and monitoring of tick populations and possible Lyme disease risk areas (PHO, 2016). Passive surveillance consists of tick collection from the public, where a tick is submitted to the public health unit either by the individual to whom it was attached or by a medical professional who found the tick on their patient (MLHU, 2019). Whereas active surveillance, the recommended practice known as “dragging” (Exhibit 3, MLHU, 2019), consists of identifying blacklegged ticks through the process of dragging a specialized white cloth around grassy areas (PHO, 2016). Since Lyme disease is a reportable disease in Ontario, burdens of illness and disease trends are obtained through clinical reports (PHO, 2016). The testing and surveillance processes require the RLHU to work in collaboration with the provincial and national testing labs to identify positive Lyme disease cases. The two main teams at the RLHU that are responsible for the mitigation and control of Lyme disease risks in the Realike region are the Safe Water, Rabies Prevention & Control team and the Vector-Borne Disease team. In addition to working together

within the health unit, they also undertake extensive collaborative and interdisciplinary Lyme disease prevention and response work with partners outside the health unit.

EMERGENCY PREPAREDNESS AND RESPONSE

Emergency preparedness is defined as the “actions taken in anticipation of an emergency to facilitate rapid, effective, and appropriate response to the situation” (WHO, n.d.b). Emergencies and disasters can occur at any time and impact environmental, economic, and population health. The *Emergency Management and Civil Protection Act* states that all municipalities need to develop an emergency management program to be prepared for emergencies such as disease outbreaks or natural disasters (Government of Ontario, 1990b). As health hazards in Ontario arise and increase due to unpredictable events induced by things such as climate change, the field of public health in the province has undergone a cultural shift toward the understanding of the importance of emergency preparedness plans. In response, the latest amendment of the province’s public health standards includes the addition of emergency management as one of the four foundational standards (MOHLTC, 2018a). Public health programs and services delivered by Ontario public health units are encouraged to incorporate all four of these foundational standards. The province’s public health standards emphasize that emergency management plays a critical role in public health programming because it enables boards of health to ensure that they possess the capacity to respond to emerging and re-emerging threats within the community (MOHLTC, 2018a). Compliance with the standards also ensures that health units maintain adaptability and are resilient during times of high stress and in the presence of disruption.

Ontario has specific provincial guidelines that exist for the monitoring and surveillance of certain vector-borne diseases such as Lyme disease (Berry et al., 2014). These practices are vital in the tracking of trends and outbreaks and therefore aid in adaptability and preparing for potential emergencies (Berry et al., 2014). Because Lyme disease was previously not a public health threat in Ontario, the province currently does not have an emergency preparedness plan in place to deal with this disease. Public health plays a crucial role in helping communities effectively assess risks and work with appropriate stakeholders to respond to these risks while aiming to control and mitigate them.

PUBLIC HEALTH ROLE

Public health is a broad field that requires its workforce to possess a wide range of skills. In order to be a well-rounded public health professional, an individual in this field is required to be familiar with various roles and competencies. Because emergency management is now listed as a foundational standard in the *Ontario Public Health Standards*, it is necessary for all public health professionals to develop specific skills and competencies in this area (MOHLTC, 2018a). Although there are specialized emergency managers in the workforce, having public health professionals possess emergency management competencies ensures that health interventions support community preparedness and resiliency.

The Association of Schools and Programs of Public Health has worked with the CDC to create a Public Health Preparedness and Response Competency Model that identifies the core competencies a public health professional should possess to be part of the preparedness and response workforce (Gebbie et al., 2013). The core competencies are divided into four main domains: Model Leadership, Communicate and Manage Information, Plan for and Improve Practice, and Protect Worker Health and Safety (Gebbie et al., 2013). The core competencies are split among these four domains and are categorized as follows (Public Health Foundation, n.d.):

1. Model Leadership

- 1.1 Solve problems under emergency conditions.
- 1.2 Manage behaviors associated with emotional responses in self and others.
- 1.3 Facilitate collaboration with internal and external emergency response partners.
- 1.4 Maintain situational awareness.
- 1.5 Demonstrate respect for all persons and cultures.
- 1.6 Act within the scope of one's legal authority.

2. Communicate and Manage Information

- 2.1 Manage information related to an emergency.
- 2.2 Use principles of crisis and risk communication.
- 2.3 Report information potentially relevant to the identification and control of an emergency through the chain of command.
- 2.4 Collect data according to protocol.
- 2.5 Manage the recording and/or transcription of data according to protocol.

3. Plan for and Improve Practice

- 3.1 Contribute expertise to a community hazard vulnerability analysis.
- 3.2 Contribute expertise to the development of emergency plans.
- 3.3 Participate in improving the organization's capacities (including but not limited to programs, plans, policies, laws, and workforce training).
- 3.4 Refer matters outside of one's scope of legal authority through the chain of command.

4. Protect Worker Health and Safety

- 4.1 Maintain personal/family emergency preparedness plans.
- 4.2 Employ protective behaviors according to changing conditions, personal limitations, and threats.
- 4.3 Report unresolved threats to physical and mental health through the chain of command.

COMPONENTS OF EMERGENCY MANAGEMENT

Emergency management is the management of the responsibilities and resources required to deal with an emergency. It is a process that aims to effectively reduce risks and help stakeholders respond to emergencies. There are five main interconnected components of emergency management (Ministry of the Solicitor General, 2016):

1. Prevention
2. Mitigation
3. Preparedness
4. Response
5. Recovery

Prevention involves actions taken to prevent potential emergencies before they occur (Ministry of the Solicitor General, 2016). Mitigation refers to the measures taken to reduce or eliminate the effects of an emergency. These measures are taken before, during, and even after an emergency has occurred (Ministry of the Solicitor General, 2016). Preparedness refers to actions taken before an emergency to prepare for an effective response (Ministry of the Solicitor General, 2016). Response consists of practices taken to respond to the emergency, and this consists of both short-term and long-term effects (Ministry of the Solicitor General, 2016). Recovery comprises the actions taken to recover from an emergency and bring all processes back to normal functioning (Ministry of the Solicitor General, 2016).

The inclusion of emergency management within the *Ontario Public Health Standards* supports the cultural shift toward the identification of the importance of incorporating emergency management into organizational practice in the province. According to the standards, emergency management “is a critical role in strengthening the overall resilience of boards of health and the broader health system” (MOHLTC, 2018a). Public health programs in Ontario use a risk management approach that concentrates on risks and hazards and their consequences (Ministry of the Solicitor General, 2016). The same risk management approach applies in the emergency program planning that aims to identify and address the causes of risks rather than focus on the emergency itself (Ministry of the Solicitor General, 2016). Furthermore, as per Ontario’s *Emergency Management and Civil Protection Act*, emergency management programs need to consist of (Government of Ontario, 1990b):

- (a) an emergency plan as required by Section 6;
- (b) training programs and exercises for employees of the municipality and other persons with respect to the provision of necessary services and the procedures to be followed in emergency response and recovery activities;
- (c) public education on risks to public safety and on public preparedness for emergencies; and (d) any other element required by the standards for emergency management programs set under section 14. 2002, c. 14, s. 7; 2006, c. 35, Sched. C, s. 32 (3).

RISK MANAGEMENT APPROACH

As previously stated, Ontario’s emergency management programs take a risk management approach that concentrates on risks and hazards and their consequences (Ministry of the Solicitor General, 2016). This approach focuses on emergency preparedness because it aims to identify and address the causes of risks rather than focus on the emergency itself (Ministry of the Solicitor General, 2016). This allows for an upstream approach to be taken, which can help prevent emergencies before they occur or mitigate the risks if the emergency does take place.

A risk assessment process that also incorporates the identification of hazards is the Hazard Identification and Risk Assessment (HIRA) process. This process is an important tool in emergency preparedness and response planning as it allows hazards to be identified and ranked in order of potential impact and probability of occurrence. The development of a HIRA consists of the following four main steps (Emergency Management Ontario, 2012):

1. Hazard Identification: Establishing the context
2. Risk Assessment: Identifying the potential hazards
3. Risk Analysis: Determining the risks of those hazards
4. Monitor and Review: Continuously monitoring the evolving hazards and plotting the potential hazards on a risk assessment plot

Alternatively, another risk assessment process that may be applied to this case is the driving forces, pressures, state, exposures, health effects, and actions (DPSEEA) framework. This model looks at the link between humans and their environment, and how exposure to certain pathways impact human health (Schirnding, 2002). The framework aims to develop environmental health indicators by identifying driving forces (D) or activities that lead to pressures (P) on the environment that create the state (S) of the environment. The state of the environment exposes (E) humans to potential hazards that could subsequently have human health effects (E). Certain actions (A) are then taken to respond to and mitigate the exposures that have contributed to the adverse health effects. The actions can be implemented at various levels of the framework (Schirnding, 2002). Changes in emergence and contraction of Lyme

disease can be attributed to various factors such as increasing temperatures affecting tick activity, climate patterns altering deer migration, and environmental factors influencing human behavior and interaction with Lyme-infected tick areas. Thus, the DPSEEA framework may be applied to this case because it allows for a broad snapshot of determining factors or indicators to be identified and addressed while aiming to prevent and contain the identified health hazards.

An evaluation of past emergencies indicated the need for a standardized approach to respond to emergencies because this allows the same language to be used across the province, thereby reducing confusion during times of high stress while enhancing the emergency response and providing consistency throughout the emergency (Emergency Management Ontario, 2008a). Although many emergency response frameworks are used to mitigate risks during an emergency, Ontario utilizes the Incident Management System (IMS) as the standardized approach to emergency management. The system is efficient and flexible because it can be applied to fit multiple emergencies based on the need and nature of the incident (Ministry of the Solicitor General, 2016). The system uses a “toolbox” approach, which ensures adaptability by allowing only the incident-specific structures and tasks to be carried out at the appropriate scale and based on the complexity of the incident (Ministry of the Solicitor General, 2016). The IMS consists of the following five core management functions that must be applied to every incident regardless of the extent of the incident (Emergency Management Ontario, 2008a):

1. Command
2. Operations
3. Planning
4. Logistics
5. Finance and Administration

Each of the five management functions has a team manager who makes decisions and delegates tasks to staff members within their team. They also liaise with the other team managers (Exhibit 4). Command is a management function that consists of people or teams who are responsible for the management of the responses to an incident, which encompasses tasks such as controlling, directing, and ordering. Every incident has an Incident Commander (IC), which is—either an individual or an organization—who first responds to an incident (Emergency Management Ontario, 2008a). The IC is responsible for many tasks, including approving an Incident Action Plan (IAP). This IAP is required for every incident and outlines the incident objectives, goals, and strategies. The Operations manager is responsible for implementing the IAP and managing all incident control responsibilities (Wellington-Dufferin-Guelph Public Health, n.d). Planning is a management function that consists of the planning-associated tasks for an incident. Logistics is the fourth management function and involves managing the allocation of all resources within an incident and managing the implementation of the action plan (Wellington-Dufferin-Guelph Public Health, n.d). The final management function, Finance and Administration, consists of activities associated with the management of all financial and human resources.

CONCLUSION

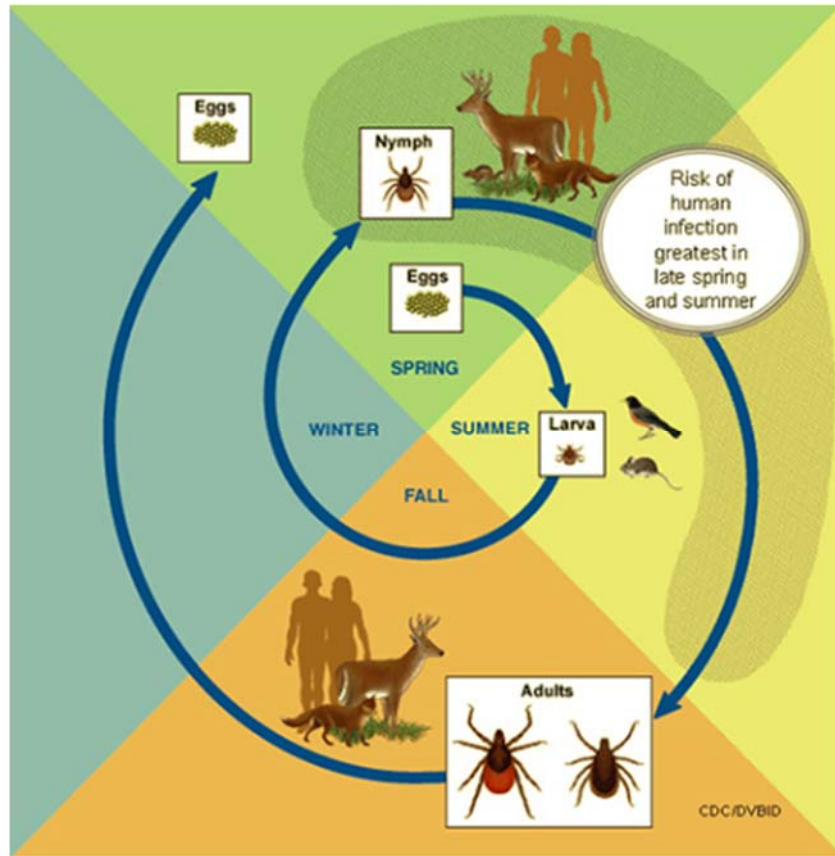
Zachary conducts some online research and learns that, although the Government of Ontario and the MOHLTC have both established guidelines for control and prevention measures for Lyme disease, there is no outbreak emergency preparedness plan in place. Although Zachary did come across preparedness and response guidelines for highly infectious diseases such as Ebola and Zika, the nature and biology of Lyme disease make it unlikely that he can apply these guidelines to this emerging illness. Therefore, if a Lyme disease outbreak were to occur, the RLHU would not have any guiding information on how to tackle and contain the outbreak.

Preparing for the Tickpocalypse

Zachary recognizes the importance of such a plan and knows that to ensure the safety of the people of the Realike region, the RLHU must invest in such a plan.

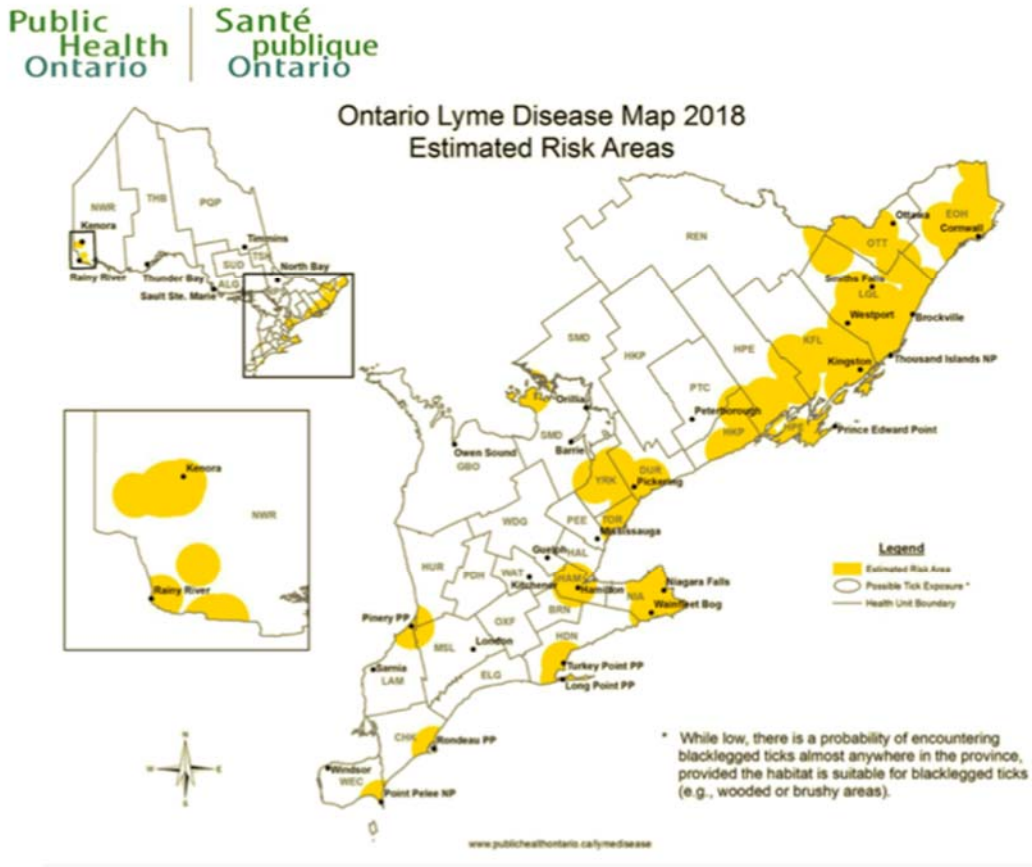
Because Ontario does not have any guidelines or emergency plans for Lyme disease, Zachary will now have to research the best framework for creating an emergency preparedness plan. As the manager of his team at the health unit, he decides to take the initiative and sets a goal to create a Lyme disease preparedness plan specific to the Realike region. Zachary first utilizes the Public Health Preparedness and Response Competency Model to identify the skills he requires to develop the preparedness plan. Although he knows about the risk management approach Ontario takes in emergency planning, he is unfamiliar with emergency management concepts that can be applied to this situation. Since a Lyme disease outbreak is expected to occur this season, Zachary is also faced with the challenge of developing an effective emergency plan quickly. Zachary's main goal is to make residents of the Realike region aware of the increased threat that Lyme disease poses. He wonders what the best course of action for creating this emergency preparedness plan is and where he should start. Which stakeholders should be part of the plan development and are there any specific skills that are required to develop an emergency plan? Should he first research more about how and why Lyme disease spreads and try to invest more in prevention and control measures? Should he conduct a literature search to learn about the emergency preparedness measures taken globally and nationally to respond to Lyme disease outbreaks and apply them to the Realike region? Should the emergency preparedness plan tackle one element or take a multilevel approach? Is this a wicked problem that has no real solution other than trying to address or "fix" climate change?

EXHIBIT 1
The Life Cycle of a Tick



Source: Centers for Disease Control and Prevention, 2020.

EXHIBIT 2
Ontario Lyme Disease Map 2018 Estimated Risk Areas



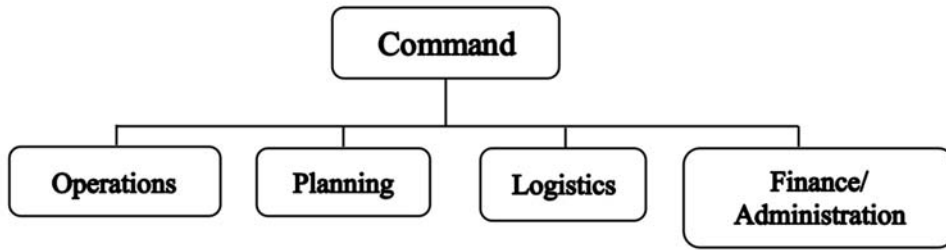
Source: Public Health Ontario, 2018a.

EXHIBIT 3
Active Surveillance Dragging



Source: Middlesex-London Health Unit, 2019.

EXHIBIT 4



Source: Emergency Management Ontario. (2008b).

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INSTRUCTOR GUIDANCE

Preparing for the Tickpocalypse

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BACKGROUND

The blacklegged tick population is increasing within the Realike region, and this has been associated with the emergence and increase of Lyme disease cases in the area. Zachary Smith, the Manager of the Safe Water and Rabies Prevention & Control, and Vector-Borne Disease team at the Realike Health Unit's Environmental Health Department, has been notified by Public Health Ontario of a potential Lyme disease outbreak in the area. Lyme disease is a vector-borne disease caused by bites from blacklegged ticks, also known as deer ticks, that are infected with *Borrelia burgdorferi* bacteria. The disease was once mostly endemic to the United States, Europe, and parts of Asia. However, due to the uncertainty and negative impacts induced by climate change, the Realike region is now an endemic Lyme disease risk area. As per Ontario's *Emergency Management and Civil Protection Act*, all municipalities should be prepared for emergencies such as disease outbreaks and, therefore should develop an emergency management program (Government of Ontario, 1990b). Further, the latest amendment of the *Ontario Public Health Standards* includes the addition of emergency management as one of the four foundational standards (MOHLTC, 2018a). This mandates that public health programs and services delivered by Ontario public health units incorporate all four of these foundational standards. The province's public health standards state that emergency management plays a critical role in public health programming as it enables boards of health to ensure that they possess the capacity to respond to emerging and re-emerging threats within the community. Compliance with the standards also ensures that health units maintain adaptability and are resilient during times of high stress and in the presence of disruption. Currently, Ontario does not have any guidelines or emergency management plans for Lyme disease. Zachary must consider all elements of the problem and apply a systems-thinking approach to develop an efficient emergency preparedness plan for Lyme disease. This plan will provide a safe and healthy environment for the residents of the Realike region by ensuring that they are aware of the increased level of Lyme disease within the region.

OBJECTIVES

1. Devise an emergency preparedness management strategy that can be applied in the event of a vector-borne disease outbreak.
2. Understand the importance of standardized approaches yet recognize that there is no "one-size-fits-all" approach and that concepts must be applied to a specific situation.
3. Identify how climate change may contribute to emerging public health concerns and impact vector-borne diseases such as Lyme disease.
4. Understand the importance of adaptability and resilience in the decision-making for unpredictable and rapidly changing situations.

Preparing for the Tickpocalypse

5. Apply a systems-thinking approach to understanding the problem and to finding a solution.

DISCUSSION QUESTIONS

1. Explain the importance of the four domains of the Public Health Preparedness and Response Competency Model and apply each of them to the case.
2. List the five emergency management components and apply each one within the context of the case. Do they all apply to the case? Why or why not?
3. What is an Incident Management System and what are its main benefits?
4. In the context of this system, what are the roles that must be carried out during every incident? Describe each one in one sentence.
5. According to the *Emergency Management and Civil Protection Act*, what are the main components of an emergency management program?

KEYWORDS

Climate change; decision-making; disaster response; emergency management; emergency preparedness; Incident Management System; leadership; risk assessment; risk management; vector-borne disease; stakeholder engagement; Lyme Disease; Ticks