CASE 6: A Rapid Risk Assessment Tool: Determining the Risk of New/Emerging/Re-Emerging Infectious Diseases in Canada

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CASE 6

A Rapid Risk Assessment Tool: Determining the Risk of New/Emerging/Re-Emerging Infectious Diseases in Canada[1]

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It is an early Monday morning in January, and Dr. Anna Moreno is preparing to lead the monthly meeting for the Public Health Risk Sciences Department at the Public Health Agency of Canada (PHAC). Her role as the Department Manager includes managing weekly meetings and advising colleagues and upper management when to use a Rapid Risk Assessment (RRA) tool to respond to any emerging infectious diseases that are relevant to Canadians both domestically and abroad. Not much has been reported at recent meetings regarding new, emerging, or re-emerging infectious diseases posing an urgent or immediate threat to Canadians. Anna decides to open her email one last time before the meeting to check her news feed and gasps when she reads the first headline. In response to outbreaks of severe respiratory and gastrointestinal symptoms within the Americas, and the more than 100 associated deaths over the past month, the World Health Organization (WHO) has declared an unknown infectious disease a Public Health Emergency of International Concern (PHEIC).

Statement from the WHO: On January 6, 2020, the Director-General of the WHO, on the advice of the International Health Regulation Emergency Committee, declared an unknown emerging infectious respiratory and/or gastrointestinal disease a Public Health Emergency of International Concern (PHEIC). The Emergency Committee has made the recommendation to declare a PHEIC due to significant increases in morbidity and mortality related to respiratory and/or gastrointestinal distress in certain regions of the Americas over a one-month period, with evidence of high person-to-person transmission. The Director-General advises surrounding countries to begin surveillance of respiratory and gastrointestinal symptoms and subsequently implement emergency preparedness responses (see Exhibit 1 for a detailed infectious disease description).

BACKGROUND

The PHAC is responsible for promoting and protecting the health of Canadians through leadership, partnership, innovation, and action in public health. The Public Health Risk Sciences Department focuses specifically on new, emerging, and re-emerging infectious diseases. As Department Manager, Anna is tasked with responding to global cases of disease emergence relevant to Canadians and developing an evidence-informed public health response, while being mindful of available resources, time constraints, and research knowledge gaps. To minimize the impact of time and resource constraints, it is essential to proactively evaluate and analyze the risk an infectious disease may pose to society, systems, and individuals. To evaluate this risk,

[1] *This case uses fictitious identities, department names, and case information.*

the Public Health Risk Sciences Department has created an RRA tool that describes risk in terms of likelihood and impact. This tool is currently in the preliminary stages of development and is being tested and refined; however, it is used internally to assess disease risk. This tool helps estimate risk, reveal the risk drivers, and identify knowledge or data gaps, and it provides a scientific basis for discussion to help its users gain a shared understanding of the issue. With the recent PHEIC declaration, it will be Anna's responsibility to recruit an RRA working group from her department to contribute to the PHAC's public health response to the outbreak.

In addition to managing the Public Health Risk Sciences Department at the PHAC, Anna is the lead of the RRA working group. She is an epidemiologist with experience in infectious disease management and emergency preparedness. Anna played a large role in the initial development of the RRA tool over 5 years ago and has since been refining and adapting the tool as necessary. The RRA working group meets monthly to discuss and monitor new, emerging, or re-emerging infectious diseases that potentially pose a risk to Canadians. The overall goal of the working group is to practise a consistent approach to using standardized public health RRA tools for assessing infectious disease events. The working group functions at the federal level; therefore, the scope of the project includes infectious diseases relevant to all Canadians domestically and abroad. The working group aims to produce two possible risk measurements: the risk to Canadians travelling to countries that have an infectious disease event, and the risk within Canada after an infectious disease is introduced.

Anna read the WHO statement over and over again. She was aware there had been unusual increases in respiratory and gastrointestinal illness within the Americas; however, the magnitude of disease spread and high mortality rate were unexpected. The update included recommendations to Canada and surrounding countries to increase surveillance and implement or prepare an appropriate public health response. Anna's meeting with the working group is in the next hour, and she will need to have a plan ready to assign tasks and present background research on the likelihood and impact of such an infectious disease outbreak in Canada. She will then have to communicate these findings to upper management and the public.

RISK ASSESSMENT

The prevalence of emerging infectious diseases continues to increase with time, remaining a significant public health challenge exacerbated by changing environmental factors, most notably by globalization and the climate crisis (Ogden et al., 2017). This upward trend emphasizes the importance of building our capacity to recognize and respond to identified pathogens to successfully manage disease occurrence. In the case of an outbreak, time sensitivity makes it essential to effectively manage and assess this constant influx of information and assess case reports of infectious diseases that may pose a larger threat to other species (Morgan et al., 2009).

The European Centre for Disease Prevention and Control defines risk as a combination of the consequences (impact) of an event or incident (hazard/threat) and the associated likelihood (probability) of a harmful effect to individuals or populations (European Centre for Disease Prevention and Control, 2011). There are three main steps to analyzing a risk: hazard identification, risk assessment, and risk management. These steps are undertaken while maintaining risk communication throughout the process. Firstly, hazard identification involves determining the capacity of an agent to cause increases in morbidity and mortality. The second step—risk assessment—can determine how prepared a region will be for risk management, emphasizing why it is important to conduct this step promptly and effectively. Lastly, risk management refers to the decision-making process at the political, social, and economic levels.

The PHAC defines public health risk assessment more specifically as “the systematic process of evaluating the potential risk associated with a particular event or issue of health concern, and the factors that influence it” (Ahmad et al., 2019). This public health risk assessment includes two main elements: exposure assessment and hazard characterization. Exposure assessment is designed to quantify the likelihood component of a risk assessment, estimating the chances of the event occurring within Canada. Hazard characterization is designed to quantify the severity component of risk assessment, estimating the impact of an event when it occurs. These outcomes are collectively integrated to arrive at a risk characterization that considers both the likelihood and severity of the infectious disease in question.

A standard, comprehensive risk assessment can take years to complete. These types of risk assessments are typically heavily based on existing research and typically completed externally by academic institutions. A challenge that arises from a standard public health risk assessment is that the unknown or under-researched diseases will not be assessed in a situation of limited or low-quality evidence; therefore, the potential risk of new or emerging diseases will not be captured. Adding the “rapid” component is extremely significant when implementing an RRA and determining how this risk assessment will function to support and inform public health decisions and responses.

THE RAPID RISK ASSESSMENT TOOL

The RRA is a core public health function, critical to emergency preparedness and evidence-informed decision-making within the early stages of an infectious disease event. The RRA tool serves to estimate the likelihood that an infectious disease will be introduced to Canada and to estimate the potential impact of this introduction to domestic and travelling Canadians. How rapid does a rapid risk assessment need to be? Typically, this RRA is conducted in the first 24 to 48 hours of a domestic or international public health event (Ahmad et al., 2019). The outcome of the RRA can help determine whether a response is indicated, the urgency and magnitude of this response, and the design of critical measures. Finally, it can help inform further approaches to managing the event. This ultimately helps reveal the risk drivers, identify public health priorities, and inform appropriate control measures. There are some clear limitations with any RRA, including the rapid turnover of evidence and evolving circumstances that may cause the assessment to become quickly outdated. Additionally, although the RRA commonly captures re-emergences of infectious diseases, it may also identify novel diseases that are widely unknown to science, which introduces difficultly when scientific knowledge is limited. In the case of limited existing research, the PHAC’s RRA tool relies heavily on obtainable observational data and/or expert knowledge.

The RRA tool separates risk into international traveller risk and domestic risk, as well as assesses the likelihood and impact criteria for defining risk within these categories. Below is a short description of the categories used to assess risk; however, a more detailed version of the algorithm used is referenced in Exhibits 2 and 3 (Ahmad et al., 2019).

Canadian Traveller Risk (Exhibit 2)

- Likelihood: is exposure abroad likely and are travellers susceptible?
- Impact: is there significant potential for the disease to become severe and widespread among travellers?

Domestic Canadian Risk (Exhibit 3)

- Likelihood: is introduction into Canada likely and do conditions exist to support transmission in Canada?
- Impact: is there significant potential for the disease to become severe and widespread among Canadians?

Once the RRA is completed by Anna's team, the Public Health Risk Sciences Department will communicate the findings to upper management, who will be responsible for disseminating the information to the public. In this stage of risk communication, it is crucial that public health representatives minimize panic within the public but also ensure the safety of Canadians.

CASE STUDY: ZIKA VIRUS

This case study is based on real world events.

The need to refine and adapt the RRA was revealed at the PHAC after the re-emergence of Zika virus disease in Canada in 2016. Zika virus disease was first identified in 1947 when scientists in Uganda isolated the virus in samples taken from a sentinel rhesus monkey during routine surveillance for yellow fever in the Zika forest (WHO, 2019). The first human cases were detected in Uganda and Tanzania five years later; however, the virus was not considered a significant threat to human health.

Infectious Agent

Zika virus disease is a mosquito-associated flaviviral disease caused by Zika virus. It is related to other *Flaviviridae* viruses, including those that cause Japanese encephalitis, West Nile fever, yellow fever, St. Louis encephalitis, and dengue fever. *Aedes aegypti* mosquitoes are the primary vectors of Zika virus; however, they are largely restricted to tropical and subtropical regions (PHAC, 2019b). Although other *Aedes* species, specifically *Ae. albopictus*, are capable of transmitting Zika virus, these mosquito species do not live in Canada (Infection Prevention and Control Canada, 2020).

Clinical Presentation

Many people infected with Zika virus are asymptomatic, and severe disease and case fatality rates are low. Common symptoms of a mild infection are fever, rash, arthralgia, and conjunctivitis. Cases of Guillain-Barré syndrome, a rare neurological autoimmune disorder that may lead to nerve damage, have been reported in patients after Zika virus infection. Additionally, Zika virus is a confirmed cause of microcephaly (having a small head with abnormal brain development) and other severe fetal neurological complications (PHAC, 2019b).

Outbreaks

Sporadic cases of Zika virus disease in Africa persisted until the first large outbreak was reported on Yap Island in 2007, with four other islands in the Pacific also reporting disease outbreaks in 2013 and 2014 (WHO, 2019). Until this time, only 14 cases of Zika virus disease were documented worldwide, whereas now there are thousands of cases. In 2015, the Pan American Health Organization (PAHO) published an epidemiological update titled "Neurological Syndrome, Congenital Malformations, and Zika Virus Infection" that highlighted recent increases in Guillain-Barré syndrome in several countries of the Americas (PAHO/WHO, 2015). Canada began surveillance for Zika virus disease in 2015 but only reported 19 cases that year. As of January 21, 2016, Brazil had reported 3,893 microcephaly cases and 49 deaths associated with the virus (Kindhauser, et al, 2016). Zika virus disease was declared a PHEIC in February 2016 in response to the significant increase in neurological disorders reported in Brazil, which was mirroring the

previous outbreak in the Pacific Islands (PAHO/WHO, 2016). In 2016, Canadian cases spiked to 468, compared with the 19 cases reported in 2015. Because pregnancy outcomes are not reported to public health authorities in Canada, pregnancy and fetal outcomes of Zika-infected mothers linked to this outbreak are not generally known (PHAC, 2019b).

Transmission

In addition to vector-borne transmission, vertical disease transmission from mother to baby was established as a route for virus passage after cases of children with microcephaly were born to Zika-infected mothers in the Americas. There have been no reported cases of transmission. A new form of transmission was identified in a laboratory-confirmed case in the United States shortly after Zika virus disease was declared a PHEIC. Zika virus disease was diagnosed in someone who had no history of travel to regions with Zika virus circulation and who lived in a region where meteorological conditions could not support such mosquito activity (PAHO/WHO, 2016). This case was confirmed to be sexually transmitted. By the middle of 2016, locally acquired cases were confirmed by more than 20 countries in the Americas (PAHO/WHO, 2016).

The Rapid Risk Assessment

Given the rapidly evolving Zika virus epidemic, it was clear the efficacy of the RRA needed to be re-evaluated for future use. When first used for Zika, the tool indicated that the risk to Canadians was low. However, with an apparent rise in cases in Canada in 2016 and information regarding sexual transmission, it was clear the risk assessment needed to be repeated. This case depicts the importance of conducting several RRAs over the course of an epidemic when information and public health circumstances are evolving rapidly. When comparing the outcomes of the RRA for Zika virus disease in 2015 with the outcomes in 2016, it is clear how research discovery and evolving worldwide epidemics can influence the potential risk of emerging diseases to Canadians. Exposure likelihood and disease impacts must also be reconsidered and re-evaluated over time. For example, during the Summer Olympic Games in Brazil in 2016, the number of Canadian travellers visiting regions with Zika virus circulation were predicted to be much higher compared with the same period in 2015, thereby increasing risk exposure. It is clear that changing environments, evolving circumstances, and novel research are all dynamic components that will impact the risk of infectious diseases to Canadians and alter the outcome of risk assessments. This case study emphasizes the importance of completing multiple risk assessments after the initial RRA to capture the complexities of evolving information and circumstances.

THE MEETING

Anna spends the remainder of her morning researching the unknown disease, finding limited academic evidence and few literature reports about it. With this scarcity of scientific information, she understands she will need to defer to the expert knowledge of her team members. She worries that the results of conducting the RRA will mirror the performance of the tool's assessment of the Zika virus, which did not indicate a high disease risk to Canadians before the outbreak in 2016. The working group consists of two epidemiologists, one medical doctor, one nurse, and one zoonotic disease specialist. Anna notes that when deferring to expert knowledge, she may encounter difficulties with potential biases associated with their expert opinions. Anna knows she will have to facilitate a seamless meeting while filtering out the biases and balancing the perspectives of the experts at the table. With the information currently available on this unknown emerging infectious disease, how will Anna prioritize expert opinions on the missing information? Once the assessment is complete, how will Anna communicate these findings to upper management? How will Anna then advise upper management about disseminating the findings to the public, given that they are working with limited evidence?

CONCLUSION

Despite the past performance of the algorithm and current knowledge gaps about the disease of interest, Anna and the RRA working group know they have limited time to begin the assessment of the new outbreak. The next 24 to 48 hours will be crucial to setting the landscape of PHAC's response to the PHEIC and will further contribute to shaping public risk perceptions about an unknown emerging infectious disease.

NEXT STEPS

Based on the case information, complete the domestic and international risk assessment tools in Exhibits 2 and 3, using Exhibit 1 for guidance. If information is missing, use the internet to source scientific evidence to fill the knowledge gaps. Draft a statement that you will communicate to the public regarding your RRA findings.

EXHIBIT 1
Unknown Emerging Infectious Disease Profile

Statement from the WHO: On January 6, 2020, the Director-General of the WHO, on the advice of the International Health Regulation Emergency Committee, declared an unknown emerging infectious respiratory and/or gastrointestinal disease a Public Health Emergency of International Concern (PHEIC). The Emergency Committee has made the recommendation to declare a PHEIC because of significant increases in morbidity and mortality related to respiratory and/or gastrointestinal distress in certain regions of the Americas over a one-month period, with evidence of high person-to-person transmission. The Director-General advises surrounding countries to begin surveillance of respiratory and gastrointestinal symptoms and subsequently implement emergency preparedness responses

Case Information in the Americas

- The first case was reported in Brazil on November 30, 2019. A middle-aged woman reported severe influenza-like symptoms and respiratory distress. In the past seven days, she ate at the local mall and visited a friend who had two illegal pet birds in her home.
- As of January 6, 2020:
    - Case count: 687
    - Deaths: 117

Infectious Agent
The infectious agent is thought to be an avian influenza subtype A virus. Although avian viruses do not normally infect humans, subtypes such as H5N1, H9N2, and H5N6 have caused serious illnesses in people. The origin of this virus is not known; however, the outbreak began in Brazil in a person who had been in the house of a friend who had two illegally adopted pet birds.

Transmission Modes

1. Vector-borne: Although the primary vector has not been identified, other avian influenza viruses have been transmitted from unprotected contact with infected birds or contaminated surfaces.
2. Airborne/droplet: Human infections with bird flu viruses may occur if the virus enters the eyes, nose, mouth, or airway. This can commonly occur through droplet transmission.
3. Person-to-person: The person-to-person spread of avian influenza viruses has been rare. The current cases in Brazil are located within the same region, and a number of cases have been linked to a potential exposure from an infected member of the same household.

Clinical Presentation
So far, reported illnesses have ranged from mild to severe. Insufficient testing has been done to identify asymptomatic cases because the infective agent is speculated to be an avian virus but has yet to be confirmed. Almost all affected people have experienced at least one influenza-like or respiratory symptom. Symptoms include influenza-like illness (e.g., fever, cough, sore throat, muscle aches) that is sometimes accompanied by nausea, abdominal pain, diarrhea, vomiting, and/or severe respiratory illness (e.g., shortness of breath, difficulty breathing, pneumonia, acute respiratory distress, viral pneumonia, respiratory failure), neurological changes (altered mental status, seizures), and the involvement of other organ systems (Centers for Disease Control and Prevention, 2017). Some people fully recover without severe or long-lasting complications; however, others have long-term respiratory complications or die. Approximately

40% of cases have been categorized as severe and 60% categorized as mild. Severe and fatal cases are more common in people aged 60 or older or in people who have underlying health conditions.

Prevention
The best way to prevent infection with avian influenza A viruses is to avoid sources of exposure, such as direct or close contact with infected poultry or surfaces that may be contaminated. Antiviral drugs may be able to reduce the severity and length of illness, if taken early enough. To prevent being exposed to any avian influenza virus, the PHAC (2019a) recommends:

- Avoiding contact with birds (alive or dead), including chickens, ducks, and wild birds, and avoiding high-risk areas such as poultry farms and live animal markets, including areas where poultry may be slaughtered, when you are travelling to an area where avian influenza is a concern.
- Using alcohol-based hand sanitizer and washing your hands frequently with soap and warm water for at least 20 seconds.
- Practising proper cough and sneeze etiquette, such as covering your mouth and nose.
- Monitoring your health regularly; if you develop influenza-like symptoms and you may have come into contact with the avian virus while travelling, tell border services or a quarantine officer.

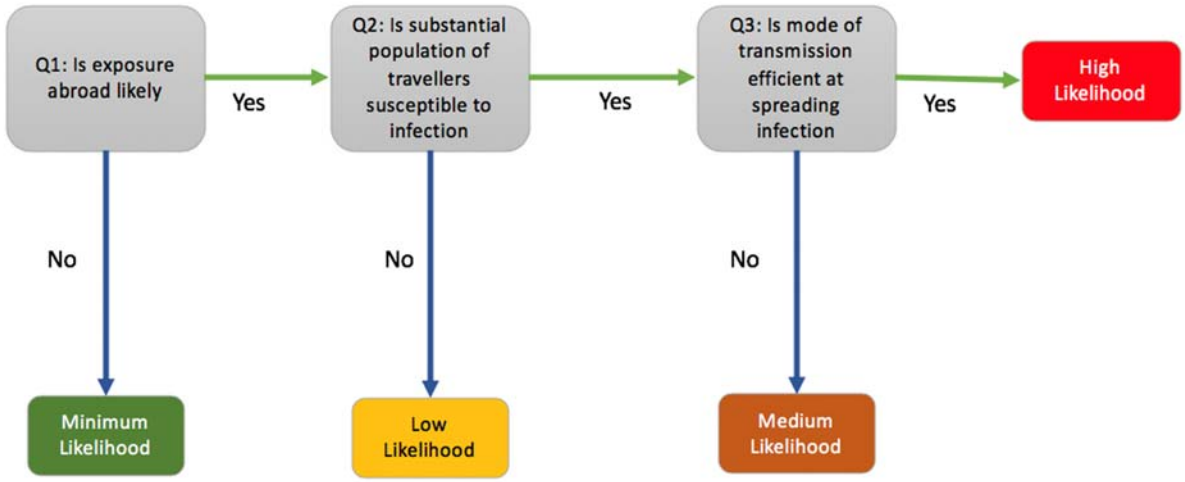
Treatment
Broad spectrum antiviral drugs and supportive therapies have been the gold standard treatment method so far in Brazil.

Travel
Travel volumes to the Americas are high—Canadians make an estimated 7.3 million annual visits to the Caribbean, Mexico, and Central and South America. The average age of travellers is estimated to be between 50 and 60 years of age.

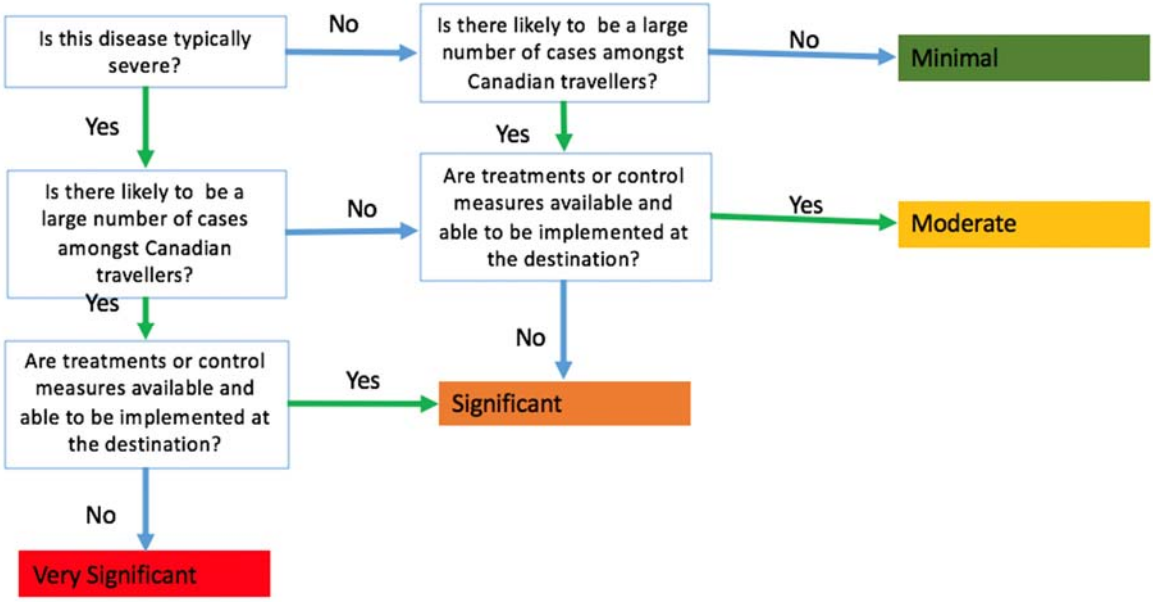
Source: author created

EXHIBIT 2
Rapid Risk Assessment Tool: Travellers

Algorithm 1: Likelihood of transmission abroad.



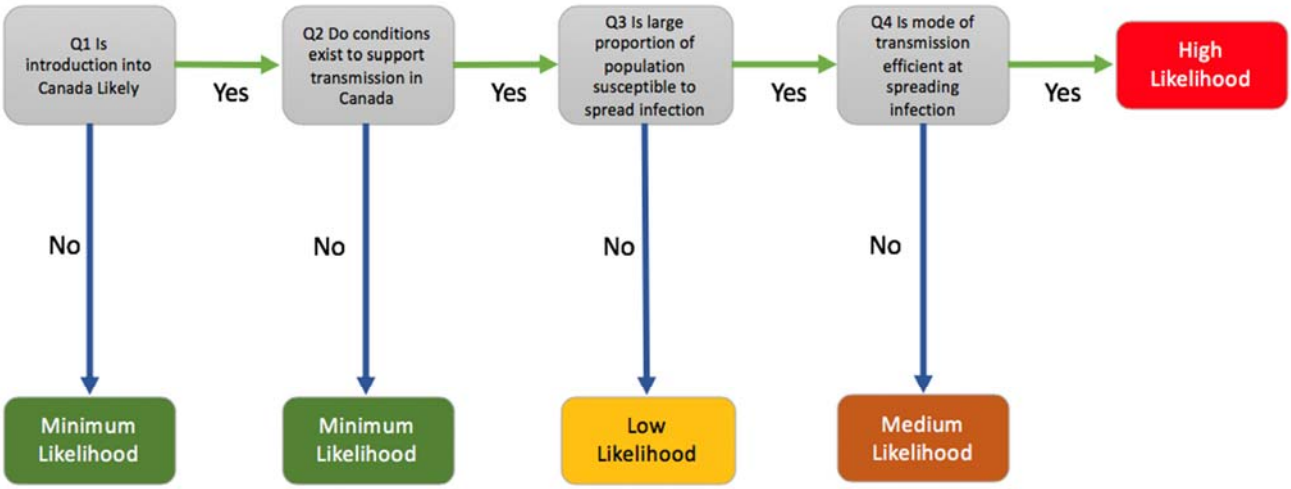
Algorithm 2: Impact for Canadian travellers.



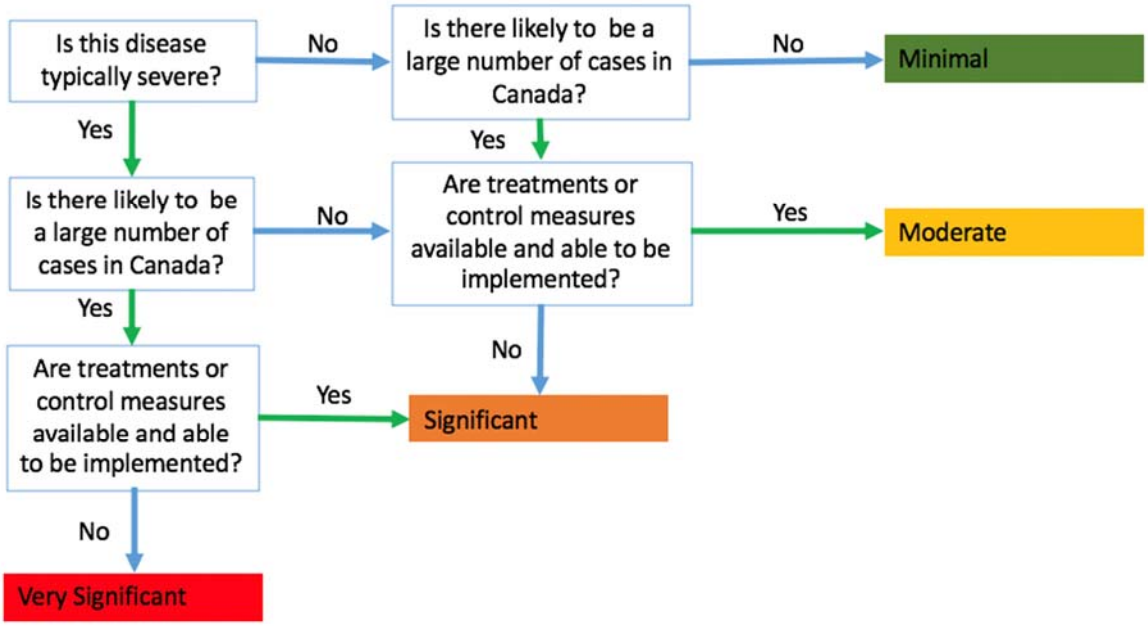
These algorithms are in the preliminary stages of development and continue to be revised because they are currently only used internally at the Public Health Agency of Canada (Vrbova, 2020).

EXHIBIT 3
Rapid Risk Assessment Tool: Domestic

Algorithm 1: Likelihood of transmission in Canada.



Algorithm 2: Impact for Canadian populations and subgroups.



These algorithms are in the preliminary stages of development and continue to be revised because they are currently only used internally at the Public Health Agency of Canada (Vrbova, 2020.)

REFERENCES

1. Ahmad, R., Deilgat, M., & Thériault. (2019). *Public Health Risk Assessment and Management.* Internal Public Health Agency of Report. Unpublished.
2. Centers for Disease Control and Prevention. (2017). Avian influenza A virus infections in humans. Retrieved from https://www.cdc.gov/flu/avianflu/avian-in-humans.htm
3. European Centre for Disease Prevention and Control. (2011). Operational guidance on rapid risk assessment methodology. https://doi.org/10.2900/57509
4. Infection Prevention and Control Canada. (2020). Information about Zika virus. Retrieved from https://ipac-canada.org/zika-virus-resources.php
5. Kindhauser, M. K., Allen, T., Frank, V., Santhana, R. S., & Dye, C. (2016). Zika: the origin and spread of a mosquito-borne virus. *Bull World Health Organ*, *94*(9), 675–686C. https://doi.org/10.2471/BLT.16.171082
6. Morgan, D., Kirkbride, H., Hewitt, K., Said, B., & Walsh, A. L. (2009). Assessing the risk from emerging infections. *Epidemiology & Infection, 137*(11), 1521–1530. https://doi.org/10.1017/S0950268809990227
7. Ogden, N. H., AbdelMalik, P., & Pulliam, J. R. C. (2017). Emerging infectious diseases: prediction and detection. *Can Commun Dis Rep, 43*(10), 206–2
8. Pan American Health Organization/World Health Organization. (2015). Neurological syndrome, congenital malformations, and Zika virus infection. Implications for public health in the Americas. Retrieved from https://www.paho.org/hq/dmdocuments/2015/2015-dec-1-cha-epi-alert-zika-neuro-syndrome.pdf
9. Pan American Health Organization/World Health Organization. (2016). Timeline of emergence of Zika virus in the Americas. Retrieved from https://www.paho.org/hq/index.php?option=com_content&view=article&id=11959:timeline-of-emergence-of-zika-virus-in-the-americas&Itemid=41711&lang=en
10. Public Health Agency of Canada. (2019a). Avian influenza. Retrieved from https://travel.gc.ca/travelling/health-safety/diseases/avian-influenza
11. Public Health Agency of Canada. (2019b). Zika virus: for health professionals. Retrieved from https://www.canada.ca/en/public-health/services/diseases/zika-virus/health-professionals.html
12. Vrbova, L. (2020). *Domestic Rapid Risk Assessment Coronavirus disease (COVID-19).* Internal Public Health Agency of Canada Report. Unpublished.
13. World Health Organization. (2019). The history of Zika virus. Retrieved from http://www.who.int/emergencies/zika-virus/timeline/en/

Schulich MEDICINE & DENTISTRY

INSTRUCTOR GUIDANCE

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BACKGROUND

The protagonist, Dr. Anna Moreno, is an epidemiologist at the Public Health Agency of Canada (PHAC), where she manages the Public Health Risk Sciences Department. Her role includes managing monthly meetings and advising when it is necessary to use the Rapid Risk Assessment (RRA) tool to conduct an analysis of any emerging infectious disease relevant to Canada. The case presents a fictitious situation in which a series of outbreaks of an influenza-like infectious disease have occurred in certain regions of the Americas. In response to outbreaks of severe respiratory and influenza-like symptoms within the Americas and the more than 100 associated deaths over the past month, the World Health Organization has declared the unknown infectious disease a Public Health Emergency of International Concern (PHEIC). Anna has a meeting that morning, and she will need to prepare an approach to create a working group responsible for conducting an RRA for this unknown disease. Challenges arise because the existing scientific evidence and literature about the disease is limited and Anna will need to defer to the expert knowledge of her team while minimizing expert opinion bias. Given the general standards of RRAs, the assessment should be conducted within the next 24 to 48 hours. Knowing that the outcomes of the risk assessment will set the landscape for the PHAC's response to the PHEIC, Anna and her team will need to ensure the assessment is conducted in a timely and efficient manner. The results of the RRA will be presented to upper management before being disseminated to the general public. Finally, the case includes a case study, based on true events, of the initial application of the tool to the 2015 Zika virus disease outbreak. Although the initial assessment led to the conclusion that Canadians were at minimal risk, unexpected subsequent Zika outbreaks in 2016 revealed the need to refine and adapt the RRA tool. This case study emphasizes the importance of completing a risk assessment at multiple time points throughout the course of a disease to capture the complexities of evolving information and circumstances.

The pedagogical value of presenting this case is rooted in presenting a real-world situation and exposing students to the complexities of translating foundational public health practices to social contexts that do not allow for typical solutions. Although it is necessary to learn concrete knowledge in a classroom environment, this information serves as a foundation to build on through experience within the public health field. Being immersed in real-world situations is imperative for enabling students to visualize how this knowledge may not translate perfectly during a public health event. This case will complement the focus on emergency preparedness and monitoring and managerial control mechanisms emphasized in the course MPH 9010-Managing Health Services. This level of public health response provides direction and

Western

recommendations for all sectors in the face of urgent events, such as infectious disease outbreaks.

OBJECTIVES

Primary Objectives

After reading the case, students should be able to:

1. Explain the need and importance of a rapid risk assessment.
2. Discuss the evolution of infectious disease outbreaks and the impact of research development on rapid risk assessment.
3. Understand how tools are used to estimate the likelihood of a disease being introduced to Canada and the potential impact it might have on Canadians.

Secondary Objectives

1. Apply the outcomes of the risk assessment to inform future public health strategies and risk communication.
2. Develop the ability to suggest improvements for the rapid risk assessment tool and reflect on challenges faced during its utilization.

DISCUSSION QUESTIONS

Before Class

1. In what situations are rapid risk assessments, compared with standard risk assessments, most important?
2. What is the main purpose of a rapid risk assessment?
3. What are some limitations to rapid risk assessments?
4. What are some factors that may impact the outcomes of a rapid risk assessment over time?

During Class

1. Review of the Case Study: Zika Virus Disease
   - Discuss and brainstorm external factors that are likely to affect risk assessment over time. An example spider map is provided in the teaching note.

2. Future Challenges for Anna
   - Create a bullet point list to outline the challenges and a strategy to overcome them. An example list is also provided in the teaching note.

3. Risk Communication Class Activity
   - Assign one representative from each learning team to present the findings from the rapid risk assessment and make a statement to the Canadian public who has been waiting to hear from public health.

4. Debrief/Wrap-Up
   - Were there any challenges faced when using the tool?
   - Were there any weaknesses to the algorithms?
   - Is there anything not included in the algorithm that you believe should be considered?

KEYWORDS

Emergency preparedness; infectious disease; outbreak management; rapid risk assessment; risk assessment; rapid risk assessment tools; risk communication; Zika virus disease