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Western Public Health Casebook 2020

Cases from the Schulich Interfaculty Program in Public Health

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Photos on front cover are graduates from MPH Class of 2019.

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PREFACE

INTRODUCTION

The Master of Public Health Program (MPH) at Western University is a 12-month full-time program that incorporates a 12-week practicum. The MPH Program curriculum includes innovations such as case-method learning, Brown Bag seminars, Integrative Workshops, field trips and career counselling. The Brown Bag seminars allow the students to hear from and interact and network with practitioners from the field. The faculty of the MPH Program are drawn from various Faculties across campus, and represent a broad range of disciplines pertinent to public health.

TEACHING CASES

Western's MPH Program relies extensively on the case-based/experiential method of learning. The Program aims to deliver 60% of pedagogic material using the case-based approach – a unique feature not found to a similar extent in other MPH Programs worldwide. The case method of learning is not about the traditional lecture-style classroom setting, but is about the student being an active part of the learning experience, which means learning by doing. It introduces complex and often ambiguous real-world scenarios into the classroom, forcing students to think and make decisions, often with incomplete and inaccurate data.

The case method is a three-stage process that builds on each subsequent step. It starts with individual case preparation, followed by a small group discussion, concluding with a large group discussion (in the classroom) so that the learning objectives are met. To facilitate this process, all students are placed in a learning team of 5-6 members from Day 1 of their journey in the Program. The learning team forms the 'home' of the student for the academic year, and is the basis for peer-support, group, and case work.

We view the case method as a vehicle to develop transformational learning, along with the students' leadership skills, teamwork ability, critical thinking capacity, and knowledge of disciplinary perspectives. Case-based pedagogy has been predominantly focused on business cases, which are often not directly suitable for a public health curriculum. In addition, existing health related cases often do not reflect the reality of Canadian and international health systems. While case repositories have a growing number of teaching cases that can be used by programs such as ours, there remains an opportunity for Western's faculty and practitioner colleagues to develop de novo cases by building on their research and practice experiences.

Along with faculty developed cases, Western has adopted an innovative model of building a catalogue of teaching cases in public health authored by students. As part of the MPH Program's Integrative Learning Experience (capstone course), the overall final deliverable for students is a teaching case and teaching note that is based on their Applied Practice Experience (practicum). Faculty members select the best cases, and work with the students to publish them in the annual *Western Public Health Casebook*. Our faculty have actively incorporated these student cases in the curriculum, and we often involve the students (now alumni) in co-teaching these cases.

WESTERN PUBLIC HEALTH CASEBOOK 2020

It is my pleasure to welcome you to this year's *Western Public Health Casebook*. Herein you will find teaching cases authored by students, faculty members, and community partners. Cases are also available for download at https://www.schulich.uwo.ca/publichealth/cases/. Our goal is

to create a searchable database of freely available public health cases on our website, for use by any program across the world. We welcome feedback and comments on these cases. To do this, please be in touch via the program's email: publichealth@schulich.uwo.ca.

–Dr. Amardeep Thind, Director
Schulich Interfaculty Program in Public Health

ACKNOWLEDGEMENTS

The 2020 Western Public Health Casebook reflects the diversity in, and challenges of public health practice. Each case offers a unique take on a complex public health issue. Our cases go beyond describing the problem; the cases present a narrative around decision makers and stakeholders who are experiencing these challenges firsthand. Readers are encouraged to 'step into the shoes' of the protagonist (be they an individual or a group), and think critically about the complexity and nuances inherent in public health practice. There are no right or wrong answers to each case. In fact, we believe it is the best cases that leave you with more questions than answers. We hope these cases make you think about challenges and better yet, allow you the opportunity to brainstorm meaningful solutions to today's most challenging issues.

We would like to express our gratitude to the following organizations (and the preceptors/supervisors) who supported the training of our students and the development of the cases in this Casebook: Lambton Public Health, ASEAN Institute for Health Development (Mahidol University), Diabetes Alliance Team (Western University), Windsor-Essex County Health Unit, Canadian Red Cross, Lawson Health Research Institute (St. Joseph's Health Care), Human Environments Analysis Lab (HEAL, Western University), Immigration, Refugees and Citizenship Canada (Public Health Liaison Unit, Migrant Health Branch), Public Health Agency of Canada, Moyo Health & Community Services, Public Health Ontario, and the Centre for Addiction and Mental Health (CAMH).

The cases that appear in this book are the hard work and dedication of a team we are so proud to be a part of. In particular, thank you to our case authors: you are supporting the pedagogy of public health and providing essential material to help the next generation of public health leaders grow. The final polished look of this book would not be possible without our copy editors and the careful eye of the MPH Program staff. As editors, it is our privilege to provide this book as a tool to further the learning, the thinking, and the progress of helping the world's population recognize the goals of public health.

– *Gerald McKinley and Mark Speechley*

INTRODUCTION
TO THE CASEBOOK

Public Health in the Midst of a Pandemic

Printed on the classroom wall of the Schulich Interfaculty Program in Public Health is a partial quote describing the mission of public health: **"…fulfilling society's interest in assuring conditions in which people can be healthy"** (Institute of Medicine, 1988). The public health workers who lead this mission represent possibly the most multidisciplinary of all professions - one comprised of virologists and immunologists, public health dentists, nurses and physicians, epidemiologists and biostatisticians, behavioural scientists, anthropologists, health economists, psychologists, communication and policy experts, and program managers, planners, and evaluators. This highly diverse skillset is needed, for the health challenges facing every population are myriad and interwoven.

People apply these diverse skillsets every day making the decisions that enable the conditions in which people can be healthy. Public health decision-making often requires deciding on a course of action using information that is imperfect, incomplete, and rapidly evolving. You will see in the cases in this volume a reflection of the philosophy "public health is a team sport", which our students encounter through the strong emphasis our program places on team-based learning, which in turn requires a high level of team functioning. Some people take more naturally than others to any collective effort – to putting the 'we' before the 'me'. We strongly believe the ability to work cooperatively and effectively with people from diverse backgrounds and interests is a skill that can be learned. It is not easy but learning life's most important skills rarely is.

The cases in this book were written by students from our Master of Public Health (MPH) Class of 2019. Because this was the last cohort to complete the program before the COVID-19 pandemic, these cases are a valuable snapshot of public health practice before the world was faced with the largest infectious disease threat in several generations. The cases cover an interesting array of public health issues; while some are about infectious disease, like vaccine hesitancy for Ebola virus, and testing for tuberculosis, most are not. This sampling of issues is typical of public health before COVID-19.

Nothing brings home the reality that humans live in a highly interconnected and interdependent world more so than a major crisis. Famines and droughts, earthquakes and tsunamis, hurricanes, tornadoes, floods, wildfires and volcanoes seem to be occurring with increasing frequency and severity. Most of these crises are local or regional in scope and of relatively short duration, making it possible for unaffected areas to respond quickly with international cooperation, aid and professional expertise. By contrast, the COVID-19 pandemic quickly became global in scope and will be with us much longer than the typical disaster. The ability of people to realize our interdependence varies among individuals, as does the ease with which they can work in a diverse team for the common good.

An MPH education exposes students to several frameworks they can use as graduate professionals to approach emerging public health problems, even ones as major as a novel virus pandemic. Systems Thinking allows us to map out the complex cause-effect relationships among dozens of health-related factors ranging from macro to micro in scale. For example,

early in the pandemic there were concerns about the stability of the U.S. meat supply because of localized outbreaks of COVID-19 among workers in meat packing plants. The multiple connections among international travel, commerce, a globalized economy, complex just-in-time supply chains, industrial-scale farming heavily reliant on imported labour, and the concentration of meat packing into a small number of enormous plants have implications for employment opportunities and job markets, food safety and security of supply, and the potential for occupational spread of illness among workers in precarious low-skilled jobs with few legal protections. Later in the spring, outbreaks of COVID-19 among migrant farm workers in Ontario brought to light the heavy dependency of industrial farming on imported labour, and the crowded living conditions that allows the virus to spread. In this way, a single factor – a virus – can affect the livelihood of Ontario farmers, the food prices paid by Ontario consumers, and the economic health of families in Mexico and Jamaica whose income depends on remittances received from their fathers and sons working in far-off Ontario.

The Determinants of Health is a framework that helps us understand many aspects of the pandemic. As with virtually all other causes of morbidity and mortality, the risk of COVID-19 infection is unevenly distributed among groups in society defined by their age, gender, race/ethnicity and socioeconomic position. Early in the pandemic the data from New York State clearly showed that people of colour, Hispanics and the poor were disproportionately affected, as were members of the Navajo Nation in the Southwest. Not only is initial infection risk unevenly distributed across social groups - all downstream effects are too: being able to afford, or access, medical care, receiving that care, surviving the hospitalization, and having a family, home and job to return to. People with middle-class occupations are often more able to do their work remotely, and to afford high-speed internet and up-to-date computers. By contrast, people with low wage jobs are usually required to be physically present in the workplace. These jobs often require using one's hands to touch multiple surfaces, often in close proximity to other workers and to clients. Many people in low wage jobs require more than one job at a time to afford food and housing. When people such as Personal Support Workers are employed in several long-term care facilities, the risk of viral transmission among themselves and to older highly vulnerable clients is increased. Often people with limited incomes rely on public transportation to get to work; many live in high-rise buildings with elevators and narrow stairwells that increase infection risk when maintaining physical distances in these closed spaces eventually proves impossible.

Another explanatory framework in public health is Epidemiology, a relatively new science born amidst outbreaks of bacterial diseases such as cholera in the growing industrial cities of the late 19th century. It is the framework that gave us the epidemic curve and the concept of 'herd immunity'. Infectious disease epidemiologists used early incomplete data from the Diamond Princess cruise ship to estimate R0 (R naught), the basic Reproductive number which quantifies the contagiousness of a virus like SARS-CoV19 (Zhang, 2020). Epidemiologists also used contact tracing to determine which types of person-to-person exposures were capable of disease transmission, and the time between exposure and onset of symptoms (Cheng, 2020). Based on these very early studies, experts were able to recommend preventive strategies like maintaining physical distances between people, frequent thorough hand washing, and not touching one's face. Similarly, identification of the British variant with a higher R0 in the late Fall led the UK to implement a second national lockdown.

Biostatistics provides us with the framework of probability theory as a means of evaluating practices and behaviours by directly estimating and comparing risks (risk = probability) from various exposures. The importance of this framework can be seen when we recognize the limitations of the common human habit of rapid simplistic binary thinking. Binary thinking leads

to either/or causal statements like "wearing facemasks work/don't work" to prevent spread of the virus. In reality, for any exposure condition (mask on, mask off), the risk of becoming infected, or of infecting another, ranges from zero percent *to* 100 percent. Unfortunately, binary thinking constrains our options to zero percent *or* 100 percent. It completely discards all useful risk information between one and 99 percent. For example, the highly prized 'N95' masks are so-called because they filter 95 (not 100) percent of small virion-sized particles. Based on evidence at the beginning of the pandemic, it was thought that wearing cloth masks would not reduce infection risk relative to not wearing one because they would fit incorrectly, be worn improperly, and would cause people to touch their faces with contaminated hands while adjusting the masks. Experience with the novel virus quickly showed that cloth masks did reduce the risk of transmission, which resulted in a change in public health recommendation to reflect the changing evidence.

The behavioural sciences provide another major explanatory framework in public health. Indeed, there is no better example than a major crisis to show how much public health has become a behavioural science. We can start by observing that all public health issues that existed before the pandemic were still there the day it started. Most public health problems will exist after it has subsided, and some will be worse. Some prevalent health conditions such as generalized anxiety disorder were exacerbated by the fear and uncertainty posed by a novel virus. The problem was compounded when physical distancing requirements resulted in cancellations of group-based therapies. The psychological study of defense mechanisms and personality types provides a framework that helps us understand different individual responses to fear caused by external threats. For example, people with mature defense mechanisms tend to respond to crises with things like humour, or altruism. As the pandemic unfolded, humour was evident in comics, satirical writing and the astounding creative brilliance of dozens of TikTok dances and memes. Altruism was seen with the outpouring of support for front-line healthcare workers, and by people sewing protective masks or volunteering at food banks. Risk perception and communication is another vital explanatory framework in public health. Through it we are reminded that effective messaging by public health professionals requires compassion towards those who lack formal education in logic and reasoning, who feel threatened by those with expert knowledge, who cannot make or understand decisions made amidst uncertainty, and whose false beliefs about a devoutly apolitical virus are shaped by those with ulterior political motives.

Public health needs virological frameworks to understand the properties of a virus, clinical medicine frameworks to understand individual responses to treatment, and behavioural health frameworks to help us understand the behaviours of people. There are many threats to public health and safety at any moment, and people grow weary, fearful, and angry from the stress of dealing with each new problem. To counteract living with constant worry, humans have adopted a cyclical crisis-response-complacency-crisis behaviour. We must eventually relax our responses to each crisis if we are to have quality of life, but we cannot let our guard down so far that we are unprepared for the next crisis. Despite the many criticisms of public health and its professionals, it is important to remember that our current infrastructure is much stronger than it would have been had we not recently faced Ebola, SARS, and H1N1. As the link between the public's health and society's investment in the profession of public health grows clearer every day, so do our choices for the future.

We hope that the cases in this book will provide much food for thought and enhance the learning of the next generation of public health practitioners.

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CASES

CASE 1

Policy Change and Public Health: Obstacles to Advocating for Public Health Interventions

Sulaiman Alhalbouni, BMSc (Hons), MPH (Class of 2019)
Erin Courtney, EdD, RN (Professor, Lambton College)
Mark Speechley, PhD (Professor, Western University)

Robin Scherbatsky, a public health nurse at Lambton Public Health (LPH), frequently performs advocacy work at a local level in the County of Lambton, Ontario. She presents to other nurses and general practitioners on the proper way of testing, interpreting, and treating latent tuberculosis infection (LTBI). LTBI develops when the immune system of infected individuals contains the tuberculosis infection and forces it to dormancy. Robin maintains a working relationship with health professionals throughout the county as a result of her daily interactions with them. She is planning to advocate for public funding of a relatively new test for LTBI that is more accurate than the current test covered under the Ontario Health Insurance Program (OHIP). One afternoon after educating nurses about LTBI in Petrolia, Ontario, Robin is listening to the news on the radio as she is driving into a newly formed thunderstorm. Lightning strikes nearby just as the announcer reported that the Ontario government intends to amalgamate public health units and decrease their funding. She stops and parks the car for a moment as she feels a sudden uneasiness. She is not sure how to react to what just happened—should she laugh at the comical mix of unwelcome news and thunder or be worried about how the news would affect her future advocacy plans? And, if her plans were affected, the question then is: what is the best way to advocate for her issues?

BACKGROUND

Lambton Public Health serves 126,000 residents in the County of Lambton, Ontario. LPH falls under the jurisdiction of the municipal government in the County of Lambton, where major decisions related to the organization's structure and service delivery are made. The main site is located in Point Edward, Ontario and it offers services mandated by the *Health Protection and Promotion Act* (Government of Ontario, 2019). These services include public health inspections, health promotion programs, clinical services, harm reduction programs, infectious disease protection, and many more.

Tuberculosis programming is one of the critical clinical services offered by LPH alongside sexual health, immunization, and dental clinics. Such regional programs are implemented to reduce the risks of diseases such as tuberculosis and improve the overall health and wellbeing of Canadians. Tuberculosis continues to be a global problem that mainly affects developing countries; however, developed countries such as Canada are not without risk (World Health Organization, 2018). Canada's goal to eliminate tuberculosis in all provinces and territories depends on its ability to prevent the occurrence of new cases. Most cases in high-income countries, including Canada, are caused by people who were infected while touring or working in a tuberculosis-endemic country. The infection often stays dormant in these individuals and

they have no evidence of clinically active tuberculosis even though their immune system has mounted a response to the infection; this condition is called LTBI. However, people with LTBI are at a higher risk of developing tuberculosis disease (active cases) compared with the uninfected Canadian population, especially if their immune system weakens because of age, sexually transmitted diseases, environmental pressures leading to stress and anxiety, and other factors (Public Health Agency of Canada, 2014).

Detecting cases of LTBI through screening is an essential public health activity. Currently, LPH primarily uses the tuberculin skin test (TST), which was developed at the beginning of the 20th century. The TST requires two visits from the patient. At the first visit, a dose of tuberculin is injected under his or her skin. Then, typically within 48 to 72 hours, a health care professional observes the injection site and measures the size of the induration created by the body's reaction to the injected agent. If the size is past a certain threshold (i.e., >5 mm or >10 mm), then a positive test result is declared. Further testing by a respirologist is required to confirm the result, such as chest X-rays and culture tests.

LPH also uses another method to test for LTBIs called the interferon-gamma release assay (IGRA), which requires the patient's blood be drawn and sent to the Dynacare laboratory in London, Ontario. The IGRA is a relatively new, more technologically advanced test that was developed to address the TST's shortcomings, such as its decreased accuracy at detecting LTBI in people who were previously exposed to bacille Calmette-Guerin (BCG) vaccination. Because it requires only one visit for the blood draw, IGRA testing is an attractive option. However, it suffers from its high cost, complex laboratory method, and lack of accessibility because the site where blood is drawn is often far from the laboratory where blood samples are tested. For these reasons, IGRAs are used as supplementary tests to confirm that people with a TST-positive result do have LTBI (Public Health Agency of Canada, 2014).

SPECIFIC AREA OF INTEREST

At present, IGRA testing costs $90 and is not funded through OHIP, whereas the TST is covered by OHIP when certain criteria are met. LPH is advocating to change this policy so that people who are unable to pay $90 for an IGRA test are eligible for coverage. This policy change would have major benefits both for the patient and the government. Because the IGRA is more accurate than the TST, the results of an IGRA can prevent people from receiving unnecessary and costly medication if their TST result is a false positive. Supplementary testing using the IGRA showed that 50% of LPH patients were initially diagnosed with LTBI because of false positive TSTs (Jessica Wood, personal communication, July 25, 2019). These people were subsequently prescribed nine months of daily medication they did not need. Patients who decide not to follow up the TST with IGRA testing because of its cost are at risk of possible side effects from taking unnecessary medication. In addition, the government of Ontario incurs unnecessary medication costs. The added cost of the IGRA test is significantly offset by the cost of wasted medication and the potential cost of adverse drug side effects; thus, covering IGRA testing through OHIP would be preferable.

However, the current context of the Ontario government not only hinders LPH's advocacy work, but it hinders all advocacy activities aimed at promoting public health approaches to various problems such as harm reduction programs and infectious disease prevention. The purpose of these interventions, simply put, is to save the payer (i.e., government) money by preventing complex and large-scale health events, such as disease outbreaks, which are expensive to resolve. Every advocacy campaign or activity should consider three factors within Ontario's

current context—the political climate, the evidence for the presence of the problem and its solution, and the way the advocacy should be framed.

ONTARIO'S POLITICAL CLIMATE
The Progressive Conservative Party of Ontario won the 2018 election and will form the government until 2022. Initially, the new government's main goal has been to solve the deficit that is crippling Ontario economically, and this has meant systematically cutting funds from "non-essential" services. The problem is manifested in defining what is non-essential. Robin felt that the Conservatives viewed public health interventions that require money to be spent in the short term to be non-essential. They consider interventions such as the Ontario Harm Reduction Program to be a waste of funds as opposed to interventions that show immediate results, she mused.

Her feelings? were based on one of the first steps the Ontario government took, through Bill 74, the dissolution of 14 Local Health Integrated Networks (LHINs) into one entity called Ontario Health (Legislative Assembly of Ontario, 2019). The reason given for this dissolution was the inefficiencies LHINs introduced to the health system as a result of too many administrative bodies. Although this reasoning may be legitimate, many felt that the changes were done without adequate stakeholder consultations.

Public health interventions such as harm reduction programs for people who inject drugs underwent a change as well. One major purpose of harm reduction is to provide people who inject drugs with sterile and safe equipment in a supervised public health setting so they do not spread or become exposed to blood-borne diseases such as hepatitis C. Additionally, being supervised at a public health unit prevents thousands of overdose cases. An indirect goal is to establish a relationship with these people so that they feel more comfortable accessing public health unit services, which improves their health and wellbeing. It may also encourage them to seek abstinence on their own, thereby augmenting their quality of life. However, the Ontario government capped the number of sites at which the program can be delivered to 21, and only 15 sites have been approved so far ("'Unacceptable': Toronto Board of Health Chair Slams Province," 2019).

Furthermore, public health units throughout Ontario may undergo an amalgamation process that decreases the number of regional bodies from 35 to 10 (Jeffords, 2019). The amalgamation may be coupled with decreased funding to all public health units, which would negatively affect the services they provide and the populations who depend on these services. Some services may be discontinued but some services are so essential that the municipal governments may decide to dedicate additional funding to public health units (Payne & Willing, 2019). No one knows how this amalgamation will take shape; it may manifest as centralized agencies with branch offices at former public health unit locations, or it may manifest only as centralized agencies covering large and densely populated areas. In the County of Lambton, LPH will be merged with four other units, including those in Windsor and London ("Middlesex London Health Unit to Merge with Four Others," 2019). This merger may lead to the discontinuation of LPH's advocacy efforts if the new health unit agency chooses to prioritize programs and services that address different health and wellbeing issues. Although reforms to public health units were put on hold in December 2019, the originally planned date of resuming changes on April 1st, 2020 have been postponed due to the COVID-19 pandemic ("Ontario postpones part of its health care overhaul due to COVID-19," 2020).[1]

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[1] Refer to Ontario Health Agency and Health Canada for updates on the COVID-19 pandemic.

Advocates should be sure to understand their audience (i.e. the government) and how they perceive evidence. Robin felt that she needs? to keep in mind adequate stake holder agreement and the possibility of spending cuts as she attempts to advocate for a cost savings measure.

PERCEPTION OF EVIDENCE AND ITS SOLUTION

Evidence can take on various forms depending on the methodology and outcomes being measured. Evidence can be quantitative or qualitative. It can be published in peer-reviewed journals or it can exist as grey literature. In evaluations of treatments for disease, the outcome can be improved effectiveness, efficacy, or efficiency. All these factors should be considered when advocating for any program or service. Knowing the audience is important for a successful advocacy campaign because audiences will differ in their perception of evidence and their preference for one type of evidence over another. For example, although there is plenty of evidence about how well public health interventions work, the Ontario government's view of evidence could be a challenge when public health workers advocate for such interventions.

The funding cuts that public health units will experience in the next few years, coupled with the potential LHIN amalgamation, will negatively impact services such as immunization and infectious disease prevention and control programs (Payne & Willing, 2019). These services are in place to protect the population from potential disease outbreaks that would incur massive costs to the health care sector. Severe Acute Respiratory Syndrome (SARS) is an example of why public health services are necessary. Early in 2003, the SARS outbreak occurred in several parts of Greater Toronto Area including hospitals, which resulted in a total of 438 probable SARS cases and 44 SARS-related deaths (Canada.com, n.d.). Because of rigorous public health interventions, the chain of disease transmission was disrupted, and no new cases have been detected or reported since (Canada.com, n.d.). Robin felt that the Ontario government was discounting evidence from such incidents when it substantially cuts funding to public health units. If there is less funding and fewer public health units in Ontario, the province's ability to detect new disease cases and to generate evidence for the existence of problems may be limited, which increases the chance of a disease outbreak.

In Robin's estimation, Ontario's current government (i.e., the audience) seems to prefer evidence related to efficiency and cost savings. Therefore, framing advocacy activities so they match the government's preference will contribute to success in introducing policy change.

FRAMING OF ADVOCACY

The problem at hand is that public health professionals and the government believe in different sets of values, which is consequently limiting positive interaction between them. According to a study in the United States, there is a major schism between people who hold social justice values (i.e., public health professionals and health promoters) and people who hold market justice values (Dorfman et al., 2005). Public health professionals struggle to advocate for health policies against the increasingly dominant market justice values. Advocacy messaging that takes both sets of values into consideration will be more successful at communicating compelling arguments for the implementation of health policies while minimizing opposition from actors and stakeholders (Dorfman et al., 2005).

With different sets of values come different perceptions of evidence. Regardless of whether stakeholders are public health professionals or members of the provincial government, their values will ultimately determine how they deal with evidence and what evidence-based practice looks like. Public health professionals will fall back to their social justice values when

epidemiological evidence regarding certain issues is absent or lacking, whereas government officials who subscribe to market justice values will look at an issue through a purely economic lens (Dorfman et al., 2005). These values can be reconciled when the people advocating for public health interventions frame them as beneficial both for the economy and for the population's health. However, in order to further understand what actors and stakeholders are involved, how policymaking is influenced, and how policies are introduced to the provincial agenda, theoretical frameworks must be used to shed light on how to frame public health interventions within Ontario's current context.

MODELS AND THEORIES

In her search for models and theories that can help with her advocacy, Robin finds a Canadian study that used media analysis to explore the evolution of the maternity leave benefit policy in order to provide recommendations for the improvement of the compassionate care benefit policy (Dykeman & Williams, 2014). Dykeman and Williams used Kingdon's multiple streams model (Exhibit 1) as their theoretical framework to accomplish their objectives, and this caught Robin's attention. Briefly, Kingdon's model is a framework by which policy analysts form an understanding on how problems are officially or institutionally recognized on the government's agenda. The Model deconstructs the political phenomenon into three streams: the problems stream, which consists of issues that are perceived as problems that should be solved; the policies stream, which is filled with ideas and solutions that are generated by academics, analysts, and researchers, consultants, and other experts; and the politics stream, which encompasses national mood, political trends and influences, and advocacy campaigns, all of which are involved in swaying the decision-making process at the government level. These streams flow independently of one another and only cross when policy windows (usually caused by crises, protests, or periodic elections) open, making the issue a recognized problem. Robin decides to learn how the model was used to understand the political influences surrounding the issue of tuberculosis testing.

The study coded 50 years of articles (163 articles) since the year 1960 to the three streams of Kingdon's model (i.e., the policies stream, problems stream, and politics stream), which was then used to build a timeline of events and policy changes. The analysis showed that there are two layers of data: the understanding of how maternity leave benefits evolved in Canada, and the understanding of what influences led to the opening of policy windows and defined the evolutionary path of maternity leave benefits. Further, because most articles discussed news of policy proposals from academics and influential organizations, the policies stream contributed the most in shaping the maternity leave benefits policy, leading to the opening of policy windows over time. The problems stream was less common in influencing agenda setting during the evolution of the maternity leave benefits policy. The content in most articles that discussed subjects matching the problems stream took the form of a comparison between Canada's policy and the policies of other countries, triggering a response from participants of the policies stream. The politics stream had the smallest contribution in opening policy windows for the maternity leave benefits policy. Events that fit within this stream include swings in national mood and changes in government.

Not only did the study provide an understanding of which stream influenced policy change the most, but it also used Kingdon's model to describe the trends and patterns of the policy's evolution. The study showed that, before the implementation of the maternity leave benefits policy, the opening of the policy window that contributed to the policy's inclusion in the government's agenda was predominantly influenced by the policy stream. The problems stream saw more contribution after the implementation of the maternity leave benefits policy because of

the comparisons made between the quality of Canada's policy and the rest of the world. The study then used these findings to provide recommendations on how to improve the compassionate care benefit policy that was introduced in 2004, accelerating the process of policy change for the better (Dykeman & Williams, 2014).

The complexity of the model, however, motivated Robin to look into other political models, one of which was the policy triangle model (Exhibit 2) developed by Walt and Gilson (1994). Like Kingdon's model, the policy triangle model is used to understand policymaking in the past and to plan for it in the future. But instead of focusing on the agenda-setting aspect of policymaking, it focuses on the centrality of actors and their influences within certain contexts. A literature review showed that the policy triangle was the most widely used model in low- and middle-income countries because it was used to study and analyze numerous health issues, such as mental health, tuberculosis, reproductive health, and health sector reform (Gilson & Raphaely, 2008). For example, a study from India used the policy triangle model as its theoretical framework to understand the Indian health policy experience (Pradyumna & Saligram, 2016). Another study from Lebanon used the policy triangle model along with Kingdon's model to retrospectively analyze a health policy in terms of Lebanon's voluntary health insurance system (El-Jardali et al., 2014).

SPECIFIC PROBLEM OF DECISION
Robin is worried about the fate of her advocacy efforts in light of what is happening in Ontario, and she wants to seek the best outcome possible. Given Ontario's current political climate, she needs to decide how to frame the issue of screening for LTBI, how to navigate the political system, and what type of evidence will appeal to the Ontario government. How should she proceed?

CONCLUSION
After much contemplation in her office, Robin looked through the material she had compiled to assist her in generating evidence that appeals to the audience in question. She wanted to strike the perfect balance between economic analyses and health research evidence to gain support and minimize opposition from people who have different sets of values than public health workers. The time window is closing in knowing the disruption that will occur to public health in Ontario; she needs to act fast. However, her advocacy effort now has a direction toward potential success.

EXHIBIT 1
Kingdon's Multiple Streams Model
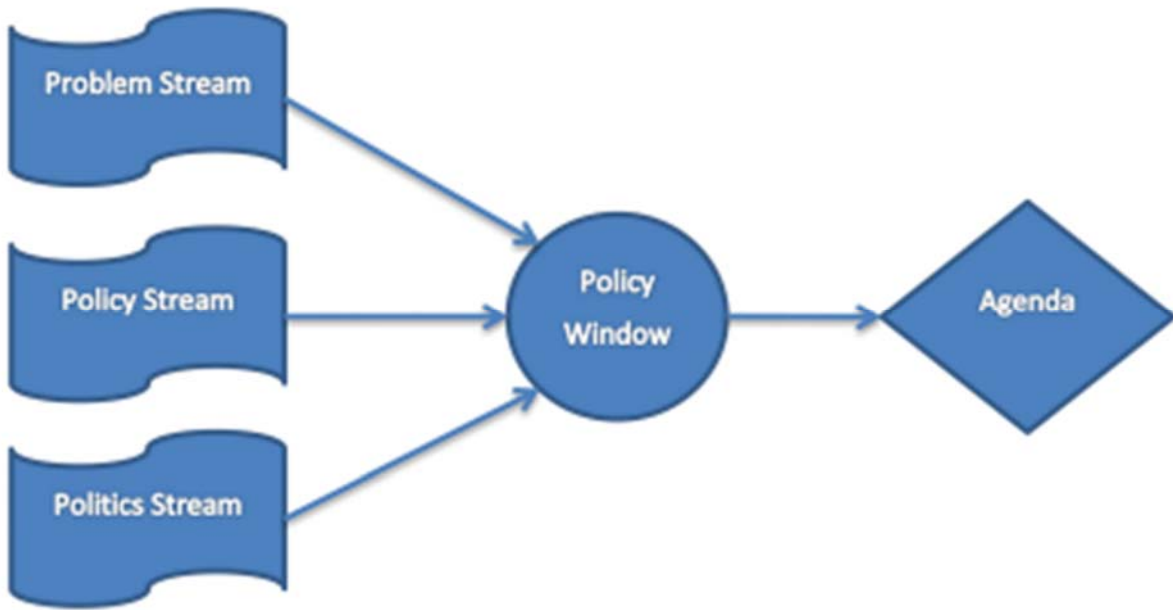
Source: Aluttis et al., 2014.

EXHIBIT 2
Walt and Gilson's Policy Triangle Model
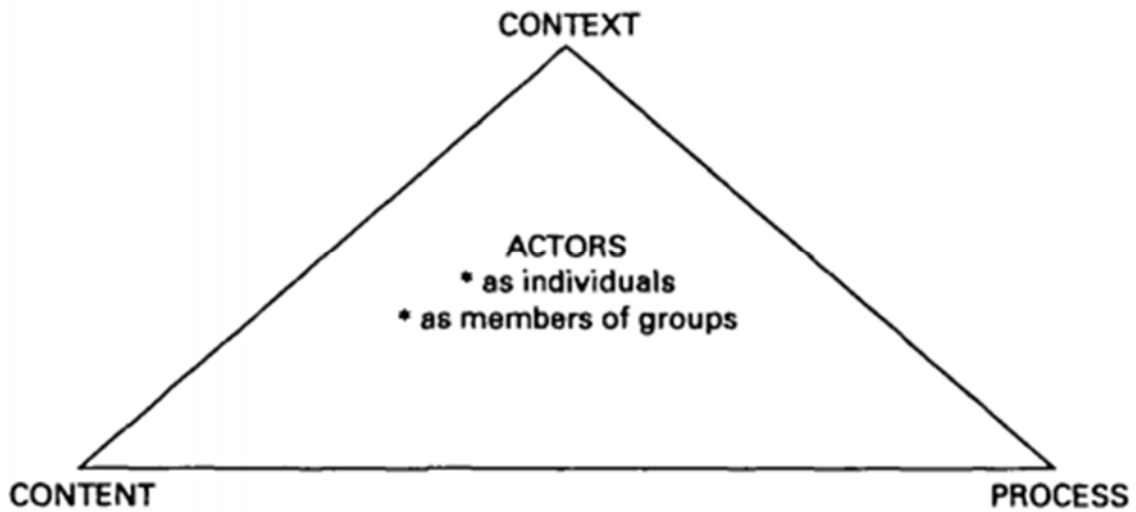
CONTEXT

ACTORS
* as individuals
* as members of groups

CONTENT   PROCESS

Source: Walt & Gilson, 1994.

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INSTRUCTOR GUIDANCE

Policy Change and Public Health: Obstacles to Advocating for Public Health Interventions

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BACKGROUND
Robin Scherbatsky, a public health nurse at Lambton Public Health in Sarnia, Ontario, plans to advocate for public funding of the more accurate interferon-gamma release assay (IGRA) test for latent tuberculosis infection (LTBI). She wants the IGRA to be covered by the Ontario Health Insurance Plan the same way the tuberculin skin test, which also tests for LTBI, is covered. Although IGRA tests are more expensive than tuberculin skin tests, IGRAs are very accurate and effective at reducing unnecessary treatments given to people falsely diagnosed with LTBI, and this results in cost savings for the public payer. Given that the Ontario government is regarding preventative health interventions as soft targets for reduced funding, Robin is worried about whether her future advocacy activity will be successful. Robin has formed working relationships with local stakeholders such as health facilities, physicians, general practitioners, and nurses through advocating to them about how to test and treat LTBI and tuberculosis. She has to decide how to best advocate for this issue, making sure she has used all available and potential resources. The case aims to provide foundational knowledge of relevant political models and theories by applying them to Robin's example.

OBJECTIVES
1. Understand the building blocks, models, and theories behind policy changes such as Kingdon's three streams model and the policy triangle model.
2. Apply political models and theories to a given context by categorizing the information describing a situation into a model's basic elements.
3. Develop strategies to advocate for public policy change regarding public health interventions based on the application of political models and theories.

DISCUSSION QUESTIONS
1. What are the contextual factors influencing Robin's future advocacy efforts?
2. How can Robin use political models, such as Kingdon's three streams model and the policy triangle model, to better understand these contextual factors and how they influence her advocacy efforts?
3. How should Robin proceed with her advocacy given Ontario's current political context?

KEYWORDS
Tuberculosis; LTBI; advocacy; context; evidence; framing; models; political climate

CASE 2

The Double Burden of Malnutrition: Challenges and Opportunities in Thailand

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As a senior-level researcher with the Association of Southeast Asian Nations (ASEAN) Institute for Health Development, Sanji Suresh had the chance to observe many hospitals and schools in geographically distinct areas in Thailand. He noticed many of the children who came to these institutions were very small for their age, whereas others were overweight. After reviewing the literature, he learned that this paradox—known as the "double burden of malnutrition"—is quite common in developing regions of the world. Returning to his office after a long flight from a remote area in Thailand, Sanji found a massive document on his desk containing child development data from the Thailand Multiple Indicator Cluster Survey (MICS) (UNICEF, 2016). Sanji's eyes widened as he saw the high prevalence of children under five years of age who were stunted, wasted, or overweight, which confirmed his observations. He wondered what percentage of these children were experiencing concurrent stunting and being overweight, an indicator that Thailand was facing this double burden. Because he had read some research papers about this phenomenon, his mind raced with all the potential problems he knew he might have to help address.

THE DOUBLE BURDEN OF MALNUTRITION

The double burden of malnutrition is defined as the coexistence of undernutrition with overweight and obesity (or overnutrition) (World Health Organization [WHO], 2019). The double burden can occur within individuals, households, populations, and over the entire life course (WHO, 2019). The double burden of malnutrition can occur at the individual level when a person is overweight or obese yet lacks specific vitamins or minerals such as iron or folate in their diet. This burden can also occur when someone who is overweight or obese as an adult experienced stunting during childhood. An example at the household level is an overweight mother with underweight children (WHO, 2019). The coexistence of both undernutrition and overweight in the same community or region is an example of the double burden of malnutrition at the population level.

In 2014, approximately 42 million children worldwide under the age of five were classified as overweight or obese and 156 million children were stunted, which means they are too short for their age (WHO, 2019). Being stunted is indicative of the failure to reach a linear growth potential as a result of inadequate nutrition (WHO, 2019). In the same year, approximately 50 million children worldwide were affected by wasting, which means they are too thin for their height (WHO, 2019). Wasting can be indicative of severe weight loss that can be linked to acute

starvation or chronically unfavourable conditions (WHO, 2019). Worldwide, half the deaths of children under the age of five are due to poor nutrition (WHO, 2017a). Many low- and middle-income countries also are seeing a rise in overweight and obesity rates among children (WHO, 2017a). Being underweight in early childhood may predispose children to be overweight and have noncommunicable diseases later in life (WHO, 2017a). The double burden of malnutrition affects all nations regardless of whether they are rich or poor, but it is a particular concern in countries that have high rates of stunting (Shrimpton & Rokx, 2012).

The double burden of malnutrition is caused by three interrelated, dynamic processes known as the nutrition transition, the demographic transition (Exhibit 1), and the epidemiological transition (Shrimpton & Rokx, 2012).

THE NUTRITION TRANSITION
Global changes have occurred related to diet and physical activity patterns over the past two decades (Popkin, 2004). Modernized societies are consuming a higher proportion of calories from fats, saturated fats, and sugars, and fewer calories from complex carbohydrates and fibres (Drewnowski & Popkin, 1997). In addition, there are lower levels of energy expenditure by people in relation to their activity levels (Popkin, 2004). This underlies the concept of the nutrition transition. As the shift to a more "Western" diet occurs, there are notable changes in nutritional consequences such as changes in average stature, body composition, and morbidity (Popkin, 2004).

In 2015, Professor Barry Popkin, who developed the concept of the nutrition transition, wrote that "the nutrition transition places human diet, activity, and body composition in a broad historical perspective, with emphasis on understanding the pace, magnitude, determinants, correlates, and results of dietary change across centuries and millennia". The four main underlying drivers of the nutrition transition are advances in technology, urbanization, expansion of global trade, and shifts in income per capita and general economic welfare relative to the cost of food (Popkin, 2015).

The concept of the nutrition transition is closely linked to two other processes: the demographic transition and the epidemiological transition. The demographic transition occurs as societies gradually move from high birth and death rates to low birth and death rates (Bongaarts, 2009). The epidemiological transition refers to the process of moving from a period of pestilence and famine through one of receding pandemics to a modern phase marked by degenerative and noncommunicable chronic conditions (Omram, 2001).

THE THAILAND MULTIPLE INDICATOR CLUSTER SURVEY
The Thailand Multiple Indicator Cluster Survey (MICS) was conducted in 2015–2016 by the National Statistics Office, working closely with the United Nations International Children's Emergency Fund (UNICEF). The purpose of this survey was to support the collection of international data to compare a wide range of indicators pertaining to children and women. These indicators facilitate the creation of policies and programs and allow the monitoring of countries' progression towards the Millennium Development Goals (UNICEF, 2016).

According to the 2015–2016 data, approximately 10% of children in Thailand are moderately or severely stunted, and 5.4% of children under the age of five are moderately or severely wasted. Similar to stunting, 10% of children under the age of five in Thailand are overweight.

The data showed that boys, children who were living in the southern region of Thailand, and children living in households in the poorest wealth index quintile were most likely to be stunted

and wasted. It also showed that children who lived in rural areas of Thailand experienced a higher prevalence of stunting and wasting. Children under the age of five who had mothers with no education had a higher prevalence of being stunted or wasted compared with children whose mothers had some education (primary, secondary, or higher). In terms of age-related patterns, children from birth to five months of age were more likely to experience wasting than other age groups. The children who were 24 to 35 months of age were more likely to be stunted than any other age group. Families who had a non-Thai household head (person who makes decisions and earns money) also had children who had the highest prevalence of stunting.

ASSOCIATION OF SOUTHEAST ASIAN NATIONS INSTITUTE OF HEALTH DEVELOPMENT

In 1982, the ASEAN Institute for Health Development (AIHD), which is located in Thailand, was created through a joint effort between Mahidol University, the Ministry of Public Health, and the Royal Thai Government (AIHD, 2019). The AIHD supports the global strategy of health for all through an approach used by the WHO (AIHD, 2019). As the training centre for primary health care development, the AIHD has three main missions—to provide education and training, to provide technical services, and to provide research and development that focuses on community-based health and management (AIHD, 2019).

As a senior-level researcher for the past three years, Sanji had focused his work on policy development and health promotion initiatives around Thailand. After reading through Thailand's MICS report, he thought about all the health challenges and future implications these alarming rates of stunting and overweight would have on Thailand. Beyond that, he thought about the possible implications of dealing with the potential double burden of malnutrition among Thai children under the age of five. However, the report did not specify the prevalence of the double burden of malnutrition among this age group. Sanji had to obtain the raw data from the national survey to make the necessary calculations and provide some insight into the at-risk populations in Thailand.

Because the AIHD had made several strong partnerships with the many governmental and public health organizations in Thailand and across the ASEAN countries, obtaining the data was the least of his worries. After reviewing the raw MICS data, which included data from 12,313 children, he organized the dataset. He recategorized the data related to stunting and overweight so that the children were organized into two categories: child stunted/child not stunted and child overweight/child not overweight. Sanji made the distinction between the child being stunted or overweight according to the WHO Child Growth Standards median. This allowed him to accomplish two things. First, he was able to calculate the prevalence of children under the age of five who were concurrently stunted and overweight, which indicated the double burden of malnutrition. Second, he was able to look at the population of currently stunted and overweight children and relate this to different sociodemographic factors that were included in the original survey.

Based on his calculations, Sanji was able to determine that the prevalence of the double burden of malnutrition for children under the age of five in Thailand was approximately 2%. Although this percentage seemed low, there was still a great cause for concern. He determined that the double burden was also significantly positively associated in boys, in children with mothers having a secondary education, in households having one child under the age of five, in urban settings, in households where the household head was non-Thai, and in children ages 24-35 and 36-47 months.

The prevalence of underweight preschool children in Thailand declined from 20% in the 1990s to below 10% in 2006 (Chavasit et al., 2013). Although Thailand has been able to limit the incidence of undernutrition, there has been an increase in overnutrition, which includes increasing rates of overweight and obesity (Chavasit et al., 2013). Taken with the recent data reported from the 2015–2016 Thailand MICS that one in 10 children under the age of five was stunted or overweight, Sanji knew he had to think of strategies to more effectively combat this problem. But first he had to understand what kind of initiatives were already present in Thailand to address undernutrition and overnutrition.

PAST AND CURRENT INITIATIVES TARGETING UNDERNUTRITION AND OVERNUTRITION

In 1998, Thailand implemented a voluntary nutrition labelling policy (Chavasit et al., 2013), which mandated that milk and food-related products making nutrient claims have nutrition labelling. The goal of this initiative was to address undernutrition and overnutrition concerns (Chavasit et al., 2013). However, despite being similar to the United States Food and Drug Administration's nutrient fact table (Judprasong et al., 2013), the labelling in Thailand was too complicated for the general population to understand because it focused on making products seem appealing rather than on providing useful information (Chavasit et al., 2013).

In another attempt to tackle the issues of overweight and obesity, Thailand initially tried to improve its nutrition education. This led to the development of a national dietary food guideline that emphasized maintaining proper weight and eating food across a diverse range of food groups (Food and Agricultural Organization of the United Nations, 2010). Thailand also created a nutrition flag that provided information to the population about the proportion of the different food groups that should be eaten each day (Ministry of Public Health, 2001).

In 2005, Thailand's Ministry of Public Health also launched a campaign called "Half Fruits and Vegetables and Half of Others". This campaign aimed to encourage people to consume fruits or vegetables for half their diet and foods from other food groups for the other half. Despite being widely adopted and easy to understand, the Ministry of Public Health lacked funding for this campaign, so it ended in 2006 (Chavasit et al., 2013).

The Thailand Food and Drug Administration also decided to implement a guideline called the Guideline Daily Amounts, which was a nutrition profile for all food products (Rimpeekool et al., 2015). This profile included recommendations for saturated fats, sugars, and sodium. There was much debate about the implementation of this guideline because some people thought this would lead to more confusion, whereas others thought that consumers had the right to know what they were eating (Chavasit et al., 2013).

There have also been campaigns targeted at incorporating regular exercise and physical activity. This concept has been adopted by many public and private organizations, with these organizations establishing public areas for exercise in an effort to achieve this goal (Chavasit et al., 2013). Similarly, the "Thai People Have Flat Belly" campaign also sought to promote healthy behaviours in terms of food consumption and physical activity (Chavasit et al., 2013). This campaign had a lot of traction, in particular as a result of the involvement and influence of several high-ranking politicians (Chavasit et al., 2013).

In 2004, a collaboration of dentists, pediatricians, and several public health workers created the Sweet Enough Network. This group started initiatives that advocated for banning added sugar in infant formulas and sugar-sweetened beverages in school (Thai Health Promotion Foundation,

n.d.). Through the efforts of the Sweet Enough Network, a national law banning added sugars in infant formulas was eventually adopted.

There was also a regulation put in place to combat the commercialization of food for children through limiting television advertisements targeted at children during certain times of the day (Chavasit et al., 2013). In addition, toys were not allowed to be sold with unhealthy foods targeted at children. Unfortunately, despite these regulations, there have been reports that they have been widely violated (Kulsomboon, 2013).

There is also a wide range of other nutrition initiatives that are in the planning or pilot stage in Thailand. These include standard indicators for nutrition and noncommunicable diseases, food guidelines for different age groups, nutrition education for different age groups, programs to increase fruit and vegetable consumption, initiatives to decrease sugar, sodium, and fats in diets, school-based food and nutrition programs, community-based food and nutrition programs, annual national surveys for nutrition status and noncommunicable diseases, and food and nutrition management during crisis (i.e. massive floods) (Chavasit et al., 2013).

LIFE COURSE APPROACH AND "DOUBLE-DUTY ACTIONS"

Given the rising rates of overnutrition and noncommunicable diseases in conjunction with the current prevalence of undernutrition in Thailand, traditional approaches may not effectively address these health burdens. Knowing this, Sanji looks into some of the more nuanced frameworks for addressing this double burden of malnutrition. After completing his research, he decides that it is essential to address the determinants of health for noncommunicable diseases across the entire life course. This entails appropriate interventions targeted at every stage of life to reduce the overall risk of developing noncommunicable diseases (Baird et al., 2017). Taking a life course approach allows for the early identification of risks to allow for the development of nutrition and lifestyle interventions that can prevent disease (Baird et al., 2017). This approach considers preventive measures before conception and during fetal development, early childhood, adolescence, adulthood and beyond (Baird et al., 2017). Although early preventative measures require a long-term investment, in the long run, they have the potential to lead to disease reduction.

Many studies have shown that maternal undernutrition during pregnancy is associated with low birthweight and childhood stunting (Oken & Gillman, 2003). As such, maternal undernutrition and associated factors such as economic strains and food insecurity must be taken into account by using the life course approach to help obtain a holistic picture of the health of children (Baird et al., 2017). In addition to this, establishing healthy behaviours and physical activity patterns during early childhood is essential to promote health and protect against noncommunicable disease over the child's life course (Ezzati & Riboli, 2013). To this end, it is known that parents have a strong influence on the eating habits and exercise patterns of their children through mirroring of behaviours (Barlow & Blair, 2012). Therefore, interventions that can allow parents to modify current maladaptive patterns of behaviours may go a long way for developing healthier child behaviours.

Sanji also understands that any such solution to this huge problem needs to be aligned with the double-duty actions (Exhibit 2) that were outlined by the WHO in a recent policy brief (WHO, 2017b). This policy brief calls for programming and policies that reduce the burden of undernutrition and overnutrition by following three levels of actions. The recommended actions ensure that current interventions, policies, and programs targeted at one form of malnutrition do not have the unintended consequence of increasing another (WHO, 2017b). For example, interventions aimed at addressing undernutrition should not increase the burden of overnutrition.

Sanji knows it is of great importance to incorporate double-duty actions into any intervention to ensure there is a simultaneous reduction of undernutrition and overnutrition. He also knows that double-duty actions do not require a new idea or intervention. Rather, interventions and actions that are already known to have the potential to reduce both forms of malnutrition can be used. Common platforms that should be examined for delivering these double-duty actions include national dietary guidelines, health systems, urban food policies and systems, national-level policies pertaining both to undernutrition and overnutrition, humanitarian aid and emergency nutrition programs, and social policies (WHO, 2017b).

Once again, Sanji, realizes the complexity of being able to address such a big problem in Thailand, which has such a diverse population with such different needs. Before his meeting to debrief his staff on his findings, Sanji has to think about some critical questions. What kinds of integrative strategies that incorporate double-duty actions can be used to reduce the rates of undernutrition and overnutrition in Thailand? Should there be a greater focus on pregnancy and early childhood interventions to prevent future noncommunicable diseases? How should the diverse sociodemographic backgrounds of the Thai population be accounted for to ensure its needs are met? How can the life course approach be applied to some of the strategies to tackle the double burden of malnutrition?

The demographic transition in 5 stages

Our World in Data

Birth and death rates (per 1,000 people per year)

Birth rate

Death rate

Natural Increase

Total Population

	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5
Birth rate	High	High	Falling	Low	Rising again
Death rate	High	Falls rapidly	Falls more slowly	Low	Low
Natural increase	Stable or slow increase	Very rapid increase	Increase slows down	Falling and then stable	Stable or slow increase
Population Pyramid					

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Source: Roser, Ritchie, & Ortiz-Ospina, 2020.

EXHIBIT 2
Double-Duty Actions

Source: World Health Organization, 2017b.

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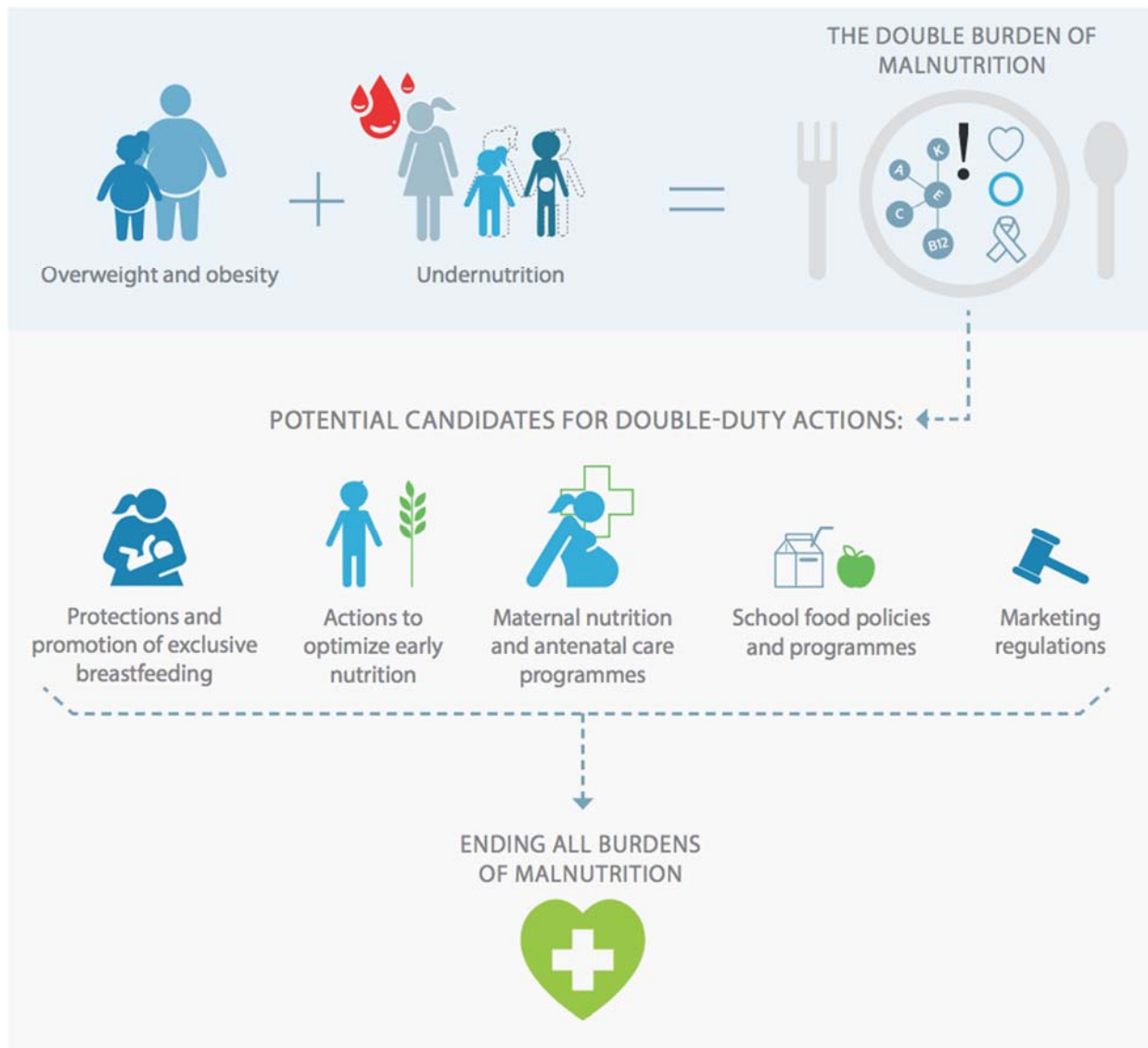3. Barlow, J. & Blair, M. (2012). Chapter 6: Life stage: early years. Chief medical officer's annual report 2012: our children deserve better: prevention pays. (pp. 1-13) https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/252656/33571_2901304_CMO_Chapter_6.pdf
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INSTRUCTOR GUIDANCE

The Double Burden of Malnutrition: Challenges and Opportunities in Thailand

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BACKGROUND

Sanji Suresh, a senior-level researcher at the Association of Southeast Asian Nations (ASEAN) Institute of Health Development, received a document containing national child development survey data from Thailand. The data indicates that children under the age of five have high rates of being overweight and stunted. After seeing this literature, Sanji realizes that there is the potential for a double burden of malnutrition in Thailand. Sanji is tasked with identifying current initiatives and possible solutions to help address this dual burden. The country's diverse sociodemographic data adds to the complications Sanji must account for to ensure the health of the children of Thailand. Being underweight in early childhood can predispose children to be overweight and have noncommunicable diseases such as diabetes and heart disease later in life. Sanji understands that the establishment of healthful behaviours and physical activity patterns during early childhood are key to health promotion and act as protective factors against noncommunicable disease over the child's life. Realizing the complexity of addressing such an immense problem, will Sanji be able to come up with suggestions to tackle it?

OBJECTIVES

1. Understand the concept of the double burden of malnutrition and nutrition transition.
2. Understand measurements and standards related to calculating the double burden of malnutrition such as those measuring stunting, wasting, and being overweight.
3. Evaluate some of the sociodemographic factors associated with overnutrition and undernutrition and develop strategies to address them.
4. Identify current and future initiatives in Thailand to address overnutrition and undernutrition with key consideration of "double-duty actions".
5. Explore the life course approach to help navigate a complex public health issue.

DISCUSSION QUESTIONS

1. What kinds of integrative strategies that incorporate double-duty actions can be used in Thailand to reduce the rates of undernutrition and overnutrition?
2. How can we account for the diverse sociodemographic backgrounds of the population in Thailand to ensure its needs are met?
3. How can the life course approach be applied to some of the strategies to tackle the double burden of malnutrition?

CASE 3

Coming Together to Promote Change: Best Practices to Prevent, Treat, and Manage Type 2 Diabetes in Indigenous Communities in Canada

Sacha Bragg, BA, MPH (Class of 2019)
Harsh Zaran (Program Coordinator, Diabetes Alliance)
Regna Darnell, PhD (Professor, Western University)

Bull Rapids First Nation is an Oji-Cree community located along the shores of James Bay. This community has a population of 1,872 people and is only accessible by air for most of the year. Marie Burningstar is the daughter of the chief of Bull Rapids First Nation. She left her community when she turned 20 to pursue her dream of becoming a nurse. She wanted to be a nurse because she saw the need to have more health care providers in her community and in other Indigenous communities. To become a nurse, she moved to London, Ontario to attend university. It was during her time at university that she became interested in researching diabetes in Indigenous communities. She knew from listening to her father's stories and teachings that life had not always been this way. Prior to colonization, Indigenous communities rarely experienced chronic diseases such as diabetes. In the past, her community was a hunter–gatherer society. They moved with the seasons and were very active in their search for food. They had extensive knowledge of the environment and the food that could be harvested from it. This knowledge is passed down through the different stories and teachings that Elders share with the younger generations.

This hunter-gatherer lifestyle is mostly nonexistent today because many First Nations peoples live on reserves and have no need to hunt or fish to feed themselves, which has created a more sedentary existence for this population. This change in diet has led to an increase in the rates of diabetes and associated comorbidities in this population (Kakekagumick et al., 2013). The supermarket food available to the community is high in calories, fats, and carbohydrates, causing high rates of obesity that have led to even higher rates of type 2 diabetes. Type 2 Diabetes is a chronic disease that is characterized by high blood glucose levels caused by either lack of insulin or the body's inability to use insulin efficiently. There are three different types of diabetes—type 1, type 2, and gestational diabetes.

Marie knew that this is what had happened to her community; now she had to figure out how she was going to help make the changes her community needed to become healthy again.

During her time away at university, Marie had worked as a research assistant on several diabetes projects and was hoping to use this experience to develop an intervention that could help her community manage and prevent type 2 diabetes. She knew it was going to take a lot of work to convince the community to work with an external research organization, but she was determined to make it happen because she truly believed it could help improve the health and well-being of the inhabitants of Bull Rapids First Nation. Many different factors needed to be considered as she created this intervention. She wanted to develop an intervention that was

culturally relevant, cost effective, specifically tailored to her community, and managed by the community with as little outside help as possible.

On June 10, 2019, she was woken in the middle of the night by a phone call telling her that her father had to be flown out of the community to a hospital in a neighbouring town. He was experiencing complications due to his diabetes and the community health nurse did not have the resources to deal with it. Marie could not get to the hospital, but she was able to call and speak with a doctor. She was reassured that her father was going to be okay but that they were going to have to focus on controlling his sugar levels through diet, exercise, and medication. The doctor also informed Marie that her father had a large ulcer on his leg that could be troublesome or could lead to amputation if it was not treated properly or monitored closely when he returned home. Marie knew something had to be done to help manage the prevalence of diabetes in her community because it was beginning to affect younger and younger people. What could she do that would have an immediate impact?

BACKGROUND

Type 2 diabetes is a major public health issue in Canada and around the world. In 2017, approximately 2.3 million people 12 years of age and older in Canada reported being diagnosed with diabetes (Statistics Canada, 2017). Type 2 diabetes is a chronic disease caused by the body's inability to produce or use insulin properly. Insulin is a hormone produced by cells in the pancreas that enables the body to absorb sugar from the bloodstream to create energy (Public Health Agency of Canada [PHAC], 2016). If diabetes is left untreated it can cause high blood sugar levels, which can cause damage to blood vessels, nerves, and organs such as the kidneys, eyes, and heart, and can lead to severe health complications and even death (PHAC, 2016). Even though there are three different types of diabetes, they are all described as the body being incapable of maintaining healthy sugar levels; each type may have different causes, complications, and treatments. It is estimated that 90% to 95% of people diagnosed with diabetes have type 2 diabetes and 5% to 10% of people are diagnosed with type 1 diabetes (PHAC, 2016). Gestational diabetes develops during pregnancy and is detected in 3% to 5% of all pregnancies (PHAC, 2016).

Numerous health disparities exist between Indigenous people and other Canadians. The prevalence of type 2 diabetes is an example of this, with Indigenous people having two to five times higher rates of diabetes than non-Indigenous people (Institute of Health Economics, 2018). The PHAC reports that the prevalence of diabetes is approximately 17.2% among Indigenous people living on reserves and 10.3% among Indigenous people living off reserves (PHAC, 2016). The adverse health outcomes and higher rates of chronic disease experienced by Indigenous people can be linked to many factors such as social determinants of health, lifestyle, and historical, political, and social influences (Lavoie et al., 2011). Indigenous people face many barriers that continue to aggravate the problem, including fragmented heath care, poor chronic disease care and management, and inadequate disease surveillance (Gracey & King, 2009).

PROXIMAL DETERMINANTS OF HEALTH

The United Nations Human Development Index ranks Canada's Indigenous population 65th in the world for life expectancy, education, and income, whereas the rest of the Canadian population is ranked 12th (United Nations Development Programme, 2018). The proximal health inequities experienced by Indigenous people provide a foundation for deteriorating physical, emotional, mental, and spiritual well-being (Reading & Wien, 2009). Health behaviours, physical environment, and food insecurity are only a few of the proximal determinants of health that affect Indigenous people and communities in Canada. An example of this is the overcrowding that many Indigenous families experience. These families do not have enough space for

children to play in or enough space for people to relax in. The lack of space can act as a stressor and can lead to many other negative behaviours (Reading & Wien, 2009).

Health Behaviours

Health behaviours are well-known proximal determinants of health. Unfortunately, some Indigenous people engage in negative health behaviours such as alcohol use, which is linked to increased morbidity and mortality. (First Nations Centre, 2004). Smoking tobacco is another negative health behaviour that many Indigenous people undertake, and this can lead to increased rates of heart disease and lung cancer (Reading & Wien, 2009). A lack of physical activity and loss of traditional diets has also been linked to the prevalence of type 2 diabetes among Indigenous adults and the increasing rates of type 2 diabetes among Indigenous youth (Reading & Wien, 2009). In order to overcome the health disparities experienced by Indigenous people, these negative health behaviours need to be taken into consideration and addressed.

Physical Environment

In determining the health of a community, the physical environment plays a primary role, especially in Indigenous communities because of their connection to the land. The creation of reserves has had a negative impact on the health and well-being of Indigenous people. Many reserves lack access to safe drinking water and suffer from housing shortages that have led to overcrowding, poor quality housing, and unsanitary living conditions. There is also a shortage of affordable housing, with many urban Indigenous people experiencing homelessness (Reading & Wien, 2009). Because the houses on reserves are often overcrowded and not properly ventilated, there are serious problems with mould. Mould has been associated with numerous health issues such as asthma and allergy development in children (Reading & Wien, 2009).

Food Insecurity

Indigenous people who reside in remote rural communities experience substantial food insecurity due to the challenges faced acquiring market and traditional foods. Research has shown that food insecurity in low-income populations is related to being overweight and obese. The relationship between food insecurity and obesity is often due to poor diet (Kirkpatrick & Tarasuk, 2008). Indigenous people may be consuming an acceptable number of calories to meet daily requirements but because they have difficulty accessing healthy foods, they are forced to buy less costly and energy-dense foods that contain more added sugars and fat.

INTERMEDIATE DETERMINANTS OF HEALTH

Intermediate determinants of health can be thought of as the origin of the proximal determinants of health. If we look at the determinants of health as a tree, the proximal determinants would be the roots, the intermediate determinants would be the trunk of the tree, and the distal determinants would be the branches and leaves.

Health Care Systems

To reap the rewards of an advanced health care system, people must have physical, political, and social access to health care and social services, which is not the case for most Indigenous people in Canada. Health care for Indigenous people is managed by the federal government whereas the rest of the Canadian population accesses health care via provincial governments. Indigenous health care is fragmented and not well organized and has limited accountability. In addition, health care services continue to focus largely on communicable diseases. This approach is less helpful for Indigenous people because morbidity and mortality rates in Indigenous communities are typically more related to chronic illnesses and diseases (Reading & Wien, 2009). Access to health care is often limited or even denied to Indigenous people

because these systems do not take culture, language, or the social determinants of health into account (Assembly of First Nations, 2006). To have positive health outcomes, people must have access to required services in a suitable amount of time, which is not the case for many isolated Indigenous communities. This leaves many Indigenous people feeling that their health care needs are not being met and unfortunately this is a reality for many Indigenous people in Canada (Reading & Wien, 2009).

Education Systems

Many Indigenous people do not have access to adequate education, which can have an overwhelming influence on income, employment, and living conditions especially over the long term. Educated people often have higher incomes, and this generally improves their proximal determinants of health. They also pass the value of education and learning on to the next generation. Education has been associated with optimal child development and can alleviate some of the effects that inadequate child development can have on adult health (Reading & Wien, 2009). Finally, conventional education systems do not acknowledge the social determinants of health that can create barriers and prevent Indigenous children from receiving the maximum benefit from the education system (Greenwood et al., 2007).

Environmental Stewardship

Indigenous people have traditional ties to the natural environment. It is these ties to the land that were a major reason for the good health experienced by Indigenous people before European contact (Waldram et al., 2006). This is no longer the case. Over the past 500 years, there has been a rapid change from Indigenous people having healthy relationships with the land to now experiencing dispossession and disempowerment. Indigenous communities no longer have access to their traditional territories, and they do not share in the profits from the resources extracted from these territories (Reading & Wien, 2009). Finally, the wildlife, fish, and vegetation on these lands have been severely contaminated, forcing many Indigenous people to give up the traditional diets that once sustained their healthier communities (Reading & Wien, 2009).

DISTAL DETERMINANTS OF HEALTH

The distal determinants of health have a major impact on the health of people because they represent political, economic, and social contexts that construct the intermediate and proximal determinants (Reading & Wien, 2009). History clearly shows that there is a connection between the social inequalities that originated with colonialism and the disease, disability, violence, and early mortality that Indigenous people currently experience today (Reading & Wien, 2009).

Colonialism

Colonialism has had a negative impact on the health and well-being of Indigenous people because it has created a severe and devastating cultural change (Reading & Wien, 2009). The Canadian government developed policies that were intended to eliminate Indigenous people or assimilate them into non-Indigenous culture. An example of this is the residential schools and the trauma that Indigenous students experienced at these institutions. These schools were established in an attempt to "kill the Indian in the child", as stated by Duncan Campbell Scott, the Minister of Indian Affairs from 1913 -1932. The residential schools are just one of the many attempts the Canadian government has made to assimilate and/or eliminate Indigenous people. Many communities continue to feel the negative effects that these institutions had on the students, their children, and even their grandchildren, and this has affected the long-term health and well-being of many Indigenous communities. The Indian Act is another government assimilation policy. This act outlawed the practicing of Indigenous ceremonies, created the reserve system, and allowed children to be forcibly removed from their homes to attend

residential schools. The loss of culture has had an extremely negative effect on the overall health and well-being of Indigenous people.

TRUTH AND RECONCILIATION COMMISSION

The Truth and Reconciliation Commission was created in response to a class action lawsuit filed by former residential school survivors against the federal government and four churches (Truth and Reconciliation Commission of Canada, 2015). At one point, there were 130 residential schools operating throughout Canada except in the provinces of Newfoundland, Prince Edward Island, and New Brunswick (Truth and Reconciliation Commission of Canada, 2015). It is estimated that 150,000 Indigenous children attended these schools. These children were forcibly removed from their communities and families, placed in these institutions, and not allowed to practice their culture or speak their language. Many of the children experienced physical, emotional, and sexual abuse at the hands of teachers, priests, and other students. The creation of the Truth and Reconciliation Commission was part of the settlement agreement. In 2015, the Truth and Reconciliation Commission made 94 calls to action to address the injustices that Indigenous people have experienced because of colonial policies such as the residential school system (Truth and Reconciliation Commission of Canada, 2015).

Racism and Social Exclusion

Unfortunately, many Indigenous people have experienced racism and social exclusion from the time they first contacted Europeans. Racism and social exclusion have created numerous barriers that continue to make it difficult for many Indigenous people to be productive and contribute to the Canadian economy (First Nations Centre, 2004). Indigenous people have been relegated at the bottom of the social hierarchy where they continue to experience harmful intermediate and proximal determinants of health. These determinants of health have decreased the ability of Indigenous people to resist disease and deal with many different types of illness (Reading & Wien, 2009). Research has determined that people facing racial discrimination may experience more negative health outcomes as a result of the stress associated with living in a racially charged atmosphere (Galabuzi, 2004).

MARIE'S IDEA

Marie knew that the problem had become so dire that more than traditional knowledge was needed to address the issue. Traditional knowledge had to be part of the solution but there needed to be something else. While in school, Marie had learned about a concept called *two-eyed seeing*, which was developed in 2004 by Mi'kmaw Elder Albert Marshall. This means to:

> Learn to see from your one eye with the best or the strengths in the Indigenous knowledges and ways of knowing ... and learn to see from your other eye with the best or the strengths in the mainstream (Western or Eurocentric) knowledges and ways of knowing ... but most importantly, learn to see with both these eyes together, for the benefit of all (Marshall, Marshall & Bartlett, 2015).

She knew that any intervention would have to incorporate two-eyed seeing to be successful in her community. Marie decided she would conduct a sharing circle. A sharing circle is a part of the oral tradition of Indigenous communities that ensures everyone belongs and everyone is equal. Participants in the sharing circle learn to listen and respect the views of others. Marie thought that this would be the best way to engage her community and solicit everyone's perspective on how to deal with the diabetes epidemic their community was experiencing.

After completing the sharing circle, Marie knows she has to get to work and undertake some comprehensive research to see what can be done to help manage and prevent type 2 diabetes

in this population. She knows that she is going to face many challenges, such as getting the community to agree to work with an outside organization, but it is critical that the Bull Rapids First Nation gets help addressing the issue of type 2 diabetes. Another important issue in making this intervention successful is ensuring that any implemented plan includes traditional knowledge. Previous interventions that had not included and integrated traditional knowledge had not been successful. The community wanted their culture and teachings incorporated into any new program or project. Many community members had expressed negative opinions about working with external researchers. They complained about not being included in the research process and not being provided with the results when the research was completed, which made them feel like guinea pigs. Marie knows that overcoming these issues is going to be a challenge, but she is ready to tackle it because the health and well-being of her community is at stake. Later that week as she was sitting in her favourite spot on a cliff overlooking the community, she came across the Diabetes Alliance website. After reading about their vision, mission, and values, she was confident that they might be able to help her address the issue of diabetes in her community. She would definitely be researching the Alliance further. She is hopeful this is the partnership she has been looking for.

DIABETES ALLIANCE

Western University and the Canadian Diabetes Association united in 2008 to form Diabetes Alliance, previously known as The National Diabetes Management. Diabetes Alliance's vision is "to be a global leader in diabetes research by cultivating collaborative partnerships and research excellence through innovation and translation of findings into discoveries". The team emphasizes a unified and collaborative approach to diabetes research that focuses on Indigenous health, hypoglycemia, and clinical trials. Their Indigenous program is based on an award-winning quality improvement strategy that empowers and enables community-centred teams to identify barriers to diabetes care and conduct tests of change that can lead to improvements at the community level (Diabetes Alliance, 2019). Diabetes Alliance has been working with Indigenous communities to prevent, treat, and manage type 2 diabetes by creating quality improvement strategies such as the SOAR program. They have shown that this project is an effective way for Indigenous communities to manage type 2 diabetes. This project has also proven to be scalable to other Indigenous communities.

SOAR: Pathway to Wellness

SOAR is a three-year research project funded by the Canadian Institutes for Health Research (CIHR), AstraZeneca Inc., and the Juvenile Diabetes Research Foundation, now known by the acronym JDRF to ensure inclusivity. The name SOAR pays tribute to the four communities: Sheshatshiu Innu First Nation, Oneida Nation of the Thames, Abegweit First Nation, and Serpent River First Nation. The name and logo of the program were developed by these communities. In November 2017, the program was rebranded SOAR, which is an acronym of the names of the community partners involved in the project, as a continuation of another research project known as FORGE AHEAD. The FORGE AHEAD project was a five-year program (2013 to 2017) which developed and evaluated community-driven, culturally relevant, primary health care models that enhanced chronic disease management and appropriate access to available services in First Nations communities throughout Canada. FORGE AHEAD stands for TransFORmation of IndiGEnous PrimAry HEAlthcare Delivery. The program ensured culturally appropriate implementation and integrated knowledge translation by involving stakeholders throughout the entire project (Diabetes Alliance, 2019).

The FORGE AHEAD project incorporated a series of 10 interrelated projects created to foster community-driven initiatives with type 2 diabetes as the action disease. The project included developing community and clinical readiness consultations, quality improvement activities, cost

analyses, scale-up toolkits, and a diabetes registry and surveillance system. The core objectives of the project were to assess, enhance, implement, and help manage chronic diseases in First Nations communities (Diabetes Alliance, 2019).

The SOAR project is a community-driven program focused on improving the health and well-being of Indigenous people in Canada who have type 2 diabetes. SOAR researchers work with Indigenous communities to change and strengthen the effectiveness and scalability of a quality improvement program. This quality improvement program offers training, coaching, and tools to support community-led initiatives that improve diabetes care and community member health. This venture benefits from the diverse contributions of its many participants. SOAR aims to build upon its successes and lessons learned to promote sustainability and to build scale-up plans with participating communities. The SOAR team consists of representatives from Abegweit First Nation (PEI), Oneida Nation of the Thames (Ontario), Serpent River First Nation (Ontario), and Sheshatshiu Innu First Nation (Newfoundland) along with researchers, health care providers, and the university research team. The teams work in collaboration with each other to discover how to improve, adapt, implement, and scale up the quality improvement strategy as a health intervention in Indigenous communities. The philosophies of community-based participatory research (Israel et al., 2005) are incorporated in the SOAR project to ensure that Indigenous communities are treated as equal partners during the research process through the planning, implementation, evaluation, and knowledge exchange phases. The research team makes sure that community partners are involved and consulted, and the community partners work with the research team to adapt the diabetes quality improvement strategy by focusing on the community's strengths and needs. The methodologies used for data collection recognize and respect the traditions of knowledge exchange within each community. The SOAR program supports capacity building and is guided by the First Nations Information Governance Centre's Principles of Ownership, Control, Access, and Possession, the CIHR Guidelines for Health Research Involving Aboriginal Peoples, and the Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans, specifically Chapter 9: Research Involving the First Nations, Inuit, and Métis Peoples of Canada.

COMMUNITY SETTING: BULL RAPIDS FIRST NATION

In order to deliver effective health care and properly manage chronic diseases it is essential to recognize the needs of the particular community that is affected. The community has a grocery store, a gas station, two restaurants, and three retail stores. There is one school that only serves students up to grade 10. If children wish to obtain a high school diploma, they must live away from home to attend school in another community. There is also a nursing station that is staffed by a nurse practitioner and a doctor that visits once a month and provides the community with basic health care needs. People who have a medical emergency or serious health issue must be flown to the nearest hospital for treatment; the nursing centre does not have the resources to deal with major health issues or medical crises. If they need to go to the hospital they have to go alone to a strange place because there is no room to include support people such as family members or friends, and this causes further isolation for these patients. Another issue is that many of the people who have been transported to local hospitals experience racism from some nurses and doctors, making them reluctant to seek help unless it is necessary. This makes it hard to provide consistent care to people suffering from type 2 diabetes and other chronic diseases.

Before being colonized by European settlers, the residents of Bull Rapids First Nation were hunter–gatherers that led physically demanding and challenging lives, and consumed diets consisting of wild game, fish, roots, and seasonal berries. Their traditional routines helped keep

them healthy. This traditional existence has been eroded by policies implemented by the Canadian government, including the Indian Act and the residential school system. The loss of a traditional diet has been harmful to the health and well-being of Bull Rapids First Nation and other Indigenous communities in Canada. Because of the remoteness of the community, Bull Rapids First Nation continues to face challenges treating, managing, and preventing type 2 diabetes. One of the main issues the community is facing is accessibility to, and cost of, healthy food. This is a major issue in this remote community because of the high food prices and the difficulties transporting fresh food to the local grocery store (Kakekagumick et al., 2013). Access to care is another issue faced by the people of Bull Rapids First Nation. Not only does access to care refer to ease of access, but it also refers to care that is free from discrimination and racism, which has been an issue for residents in the past and continues to be an ongoing issue. The community's inhabitants need health care to be locally available and provided by their own members.

Marie knows a great deal about her community, but she does not yet know their specific needs or strengths, or how the strengths of the community could be used to help create or implement a program for managing, preventing and treating type 2 diabetes. She decides she needs more information and that she has to conduct research within the community to better understand the experiences of people affected by type 2 diabetes. She needs to speak with community members to determine how they cope with the disease, who they seek help from, and whether their experiences with a diabetes diagnosis have been positive or negative.

After listening to community members at the sharing circle, one of the main concerns Marie heard was that the people did not want to work with outside institutions or organizations because of past experiences when they felt like they were test subjects. Marie knew this was going to be a major barrier she would have to overcome because, without outside assistance, there was little chance she could help the way she wanted to. Many people voiced their concerns about the lack of adequate health services and the need for local access to care in the community. Marie knows that for a program or intervention to be successful she would have to address these issues. She also knows that further research is needed, but she was just not sure how to convince her community of this necessity.

RESEARCH PRINCIPLES
In the past, research has been conducted on Indigenous people and not in collaboration with them, which has created a lot of distrust. Many researchers have arrived in these communities, conducted research, and left without discussing the research outcomes or any potentially beneficial findings with the community's members. These actions have had a negative impact on the relationship between Indigenous people and researchers. As a result of these experiences, several ethics guidelines for working with Indigenous people have been created in collaboration with the Assembly of First Nations and the Government of Canada. The three main guidelines discussed in this case are the Ownership, Control, Access, and Possession principles, the Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans, and the CIHR Guidelines for Health Research Involving Aboriginal People. These guidelines were created to protect Indigenous people and ensure that they own and control the data collected in their communities. These guidelines are used by Diabetes Alliance in their projects involving Indigenous people.

MARIE'S NEXT STEPS
Marie has completed her research and she believes that the SOAR program with Diabetes Alliance would be a good fit for her community. She has contacted the coordinator of the

Indigenous team and is scheduled to meet with the team to go over what involvement in the program would entail. After meeting with the Indigenous team, she is excited because she believes this program is exactly what her community needs to help improve its rates of diabetes. She just has to determine how to convince her community to work with Diabetes Alliance after their previous negative experiences with other researchers. She plans to have the Diabetes Alliance team present to the Bull Rapids First Nation council, chief, and Elders, and any other community members interested in listening to what SOAR is and how it can benefit them.

CONCLUSION

Marie does not have to wait long for her community to decide that working with Diabetes Alliance could be beneficial. The community agrees to work with the Alliance because they follow the principles of Ownership, Control, Access, and Possession. The community knows these principles will protect them and give them possession and ownership of all the data collected, which makes them feel more secure about this decision. Now that she has the community's support, Marie can begin planning with Diabetes Alliance to best address the health issues facing Bull Rapids First Nation. She knows that working with Diabetes Alliance is only part of the puzzle. To improve the overall health of Bull Rapids First Nation, she also needs to try to change the food the community accesses and she needs to encourage community members to incorporate traditional diets once again. She knows it is going to be a challenge, but she is up for it.

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INSTRUCTOR GUIDANCE

Coming Together to Promote Change: Best Practices to Prevent, Treat, and Manage Type 2 Diabetes in Indigenous Communities in Canada

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Regna Darnell, PhD (Professor, Western University)

BACKGROUND

Marie is a nurse and a member of the Bull Rapids First Nation. She is frustrated that there are no resources to help Indigenous people cope with the issue of chronic diseases such as type 2 diabetes, which is a major health issue in this community. Marie knows something needs to be done, so she undertakes research to determine whether there are any interventions that can help her community prevent, treat, and manage type 2 diabetes. During her research, she discovers Diabetes Alliance and the quality improvement strategy they have developed to empower Indigenous communities to create their own plans to combat diabetes.

The purpose of this case is to give a brief overview of the colonial practices and the proximal, intermediate and distal determinants of health that have caused many of the health issues that occur today in Indigenous communities. It will also provide an opportunity for students to think critically about how chronic diseases can be addressed and what can be done to help improve the situation in Indigenous communities in Canada. This case gives students a chance to explore the concept of traditional knowledge, its importance to Indigenous communities, and how it can and should be incorporated into interventions. After reading this case, students will understand the historical events that have created the current health predicament in these communities. If students understand the issues that have caused the problem, it can help dispel any negative preconceptions that students may have of Indigenous people. This case provides an avenue for Indigenous students to discuss issues that actually impact them, their families and communities.

OBJECTIVES

1. Identify the proximal, intermediate, and distal determinants of health and the vast impact that they have on the health and well-being of Indigenous people and their communities in Canada.
2. Understand the impact that colonialism has had on Indigenous communities and how it has played a role in creating health disparities.
3. Explain the guiding ethical research principles that have been created for working with Indigenous people and why these principles are needed.
4. Examine interventions that can help alleviate health disparities experienced by Indigenous communities.

DISCUSSION QUESTIONS

1. Why do the social determinants of health play such a large role in determining the health and well-being of Indigenous people and their communities?
2. What is community-based participatory research and why is it an important concept to adopt when working with Indigenous people?

KEYWORDS

Community-based participatory research; two-eyed seeing ; health disparities; health intervention; Indigenous communities; Indigenous people; social determinants of health; type 2 diabetes

CASE 4

Opioid Crisis in the Windsor-Essex Community: Time for Responsible Opioid Prescribing?

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"Any other ideas about what our group's focus should be?" Julianne asked the health care provider working group committee while concluding the Thursday operational meeting (TOM). The meeting had been scheduled every two months for the past six months to discuss priorities within the Prevention and Education working group, one of the four pillar working groups that were part of the Windsor-Essex Community Opioid and Substance Strategy (WECOSS). Julianne Shelby is the Director of Health Promotion at the Windsor-Essex County Health Unit (WECHU) and has been actively involved with the WECOSS since its inception. She knew how important it was to push the WECOSS forward to address the growing opioid crisis in the community. She had been in frequent discussions with community partners for the past several months to develop priorities for improving overdose prevention and education in the Windsor-Essex region.

Responding to Julianne's question, Sharon Grey, a nurse practitioner, replied, "I think addressing opioid prescription should be the priority of our group—we need to start looking for alternatives for pain management so that we can limit our prescriptions for opioids."

Simran Gill, one of the representatives from the local Family Health team nodded while echoing Sharon's comment: "Yes, our team should focus on developing best practices and educational materials related to opioid prescriptions and promote sharing of these resources with clients and patients." Julianne agreed immediately. Given the disproportionally large number of opioid prescriptions filled every year in the community, she knew it was time for action. However, she felt somewhat overwhelmed knowing that developing a strategy for implementing this plan within a short time frame was going to be challenging for her and her team.

BACKGROUND

Julianne Shelby has been working as the Director of Health Promotion for more than five years. She has a keen interest in equity and social determinants of health and, more recently, she has developed a desire and need to mitigate the risks of opioid use in the community. As the Director, Julianne has been responsible for managing multiple programs and personnel in different health promotion programs, including chronic disease and injury prevention, oral health, healthy schools, and healthy families. Because of her growing interest in opioid prevention, and in response to the recent opioid crisis in the Windsor-Essex region, she became an active member of the WECOSS leadership committee. The leadership committee was formed in 2016 by bringing together community partners and key stakeholders from different

sectors to collectively address the growing opioid crisis in the Windsor-Essex region. The committee aims to address this crisis by reviewing local data, and by employing community resources and evidence-based best practice strategies (WECOSS, 2018). With multiple community partners across the region all working towards improving the lives of Windsor-Essex residents, it did not take long to attract like-minded stakeholders to form this leadership committee and create an action plan that would help address the local opioid crisis. Throughout the creation of the WECOSS leadership team, Julianne Shelby with Steven Dire, Manager of Chronic Disease and Injury Prevention, and Dr. Tim Mackenzie, Executive Director of WECHU, have played a key role in assembling the leaders and community partners to initiate a conversation on opioids and discuss what can be done to curb this community crisis.

THE OPIOID CRISIS

The opioid crisis refers to the rising number of opioid-related overdoses and deaths, either from prescription opioids or from the increased availability of illegal, adulterated forms of potent opioids such as fentanyl (Health Canada, 2018).The problem of opioid misuse and abuse has become one of the most pressing public health concerns within Ontario and across Canada. Over the past few years, the number of opioid-related deaths, emergency department visits, and hospitalizations has increased at an alarming rate, leading to the declaration of the opioid crisis as a public health emergency (Health Canada, 2018). No region in Canada has remained unaffected by the crisis – the problem has affected communities of all sizes across the country, triggering prompt action at both the federal and provincial levels. Today, over-prescription of opioids, coupled with an increased availability of illicitly manufactured fentanyl, have resulted in an increased supply of opioids in the environment, which in turn has inevitably led to a number of unwanted consequences, particularly a rise in the number of misuse and opioid-related deaths (Canadian Psychological Association, 2019).Today, fentanyl and fentanyl analogues have been reported to be the major drivers of the opioid crisis in the country, accounting for approximately 73% of accidental opioid-related deaths (Public Health Agency of Canada, 2019). A recent report published by Statistics Canada (2019) showed that average Canadian life expectancy has not increased for the first time in four decades, and the reason behind this is being largely attributed to the increased number of opioid-related deaths.

The Changing Face of the Opioid Problem

Opioids are one of the most effective medications for pain relief; however, today, there is a huge number of overdoses and deaths due to excessive marketing and opioid over-prescription (Rose,2018).The 2000s witnessed a significant rise in opioid prescriptions with resultant increases in addiction, diversion, and fatal overdoses (Schatman, 2015). With a population of approximately 13 million in Ontario, more than 9 million opioid prescriptions were filled by Ontarians between 2015 and 2016 (Health Quality Ontario, 2017) (Exhibit 1).The total number of opioid prescriptions dispensed to Canadians in 2016 increased to more than 20 million, making Canada the second largest user of prescription opioids in the world, next to United States (Belzak & Halverson, 2018). The Canadian Institute for Health Information (2019) reported that at least 1 in 8 Canadians (12.3%) were prescribed opioids in the year 2018 (Exhibit 1). In the same year, more than one quarter of opioid prescriptions reportedly failed to meet the recommended dosage guidelines (Pasricha et al., 2018). These findings come amid concerns that Canadians are often overprescribed opioids for chronic pain conditions, and this has, in part, led to the higher number of opioid addictions in the country (Institute for Clinical Evaluative Sciences, 2018).This highlights the fact that the nature of opioid dependency has shifted, with most users now first exposed to the drug through prescriptions instead of through the illegal market. A report published by the Canadian Tobacco, Alcohol and Drugs Survey (2017) showed a similar finding with 12% of Canadians aged 15 years and older using

prescription opioids in 2017. These findings are particularly alarming. With rising national awareness regarding the potential harms associated with opioid use, the number of opioid prescriptions has started to show a slight decline in the recent years; however, the rise in opioid-related harms and deaths either due to illicit drug use or overprescribing of opioids still needs to be adequately addressed using an effective, multipronged strategy (Canadian Institute for Health Information, 2019).

The changes witnessed with opioid use implies the public health response in Canada needs to be re-evaluated and adjusted, with new approaches needed, including better prescription awareness. In addition to enhanced patient awareness about appropriate opioid use, there is a need for enhanced prescriber education about appropriate prescribing practices to ensure healthcare professionals prescribe opioids more responsibly to minimize opioid-related harms and addiction (Kolodny et al., 2015).However, the matter is complicated by the fact that preventing people from refilling their prescriptions will have unintended negative consequences that need to be considered when making any policy changes. Opioid prescribing is currently garnering significant attention from community members and public health professionals, and it is hoped that addressing this issue through a multifaceted approach will provide a solution to reduce the overall problem of opioid addiction in the country.

THE LOCAL CONTEXT

The WECHU is located in the Southwestern Ontario county of Essex. The county comprises one metropolitan area, the City of Windsor, and eight municipalities: LaSalle, Amherstburg, Essex, Leamington, Lakeshore, Kingsville, Tecumseh, and Pelee Island (WECHU, 2016) (Exhibit 2). The City of Windsor comprises most of the population in the county. The highest rates of opioid overdose-related incidents such as emergency department visits and deaths have been reported in downtown Windsor, with a high rate of opioid users found in the downtown core of Leamington as well (WECOSS, 2018). Because the concentration of opioid users and resultant opioid-related harms is highest in the downtown hubs of Windsor and Leamington, these areas have been given the greatest priority for addressing the issues of the opioid crisis in this region. The Windsor-Essex region ranks seventh among the highest rates of opioid users in the province, with the rates progressively increasing each year (WECHU, 2018). In addition to the high number of opioid users in the Windsor region, opioid prescriptions are notably highest within the Erie St. Clair Local Health Integration Network, which includes the Windsor-Essex region, thus posing an area of concern for this community (Health Quality Ontario, 2017). Since 2003, the number of opioid-related emergency department visits and deaths has increased significantly, with 19 of 24 opioid-related deaths occurring in the City of Windsor in 2015 alone (WECHU, 2017). The Windsor-Essex region reported 220 opioid-related emergency department visits in 2017, two times more than the 78 opioid overdose emergency department visits reported in 2007 (WECHU, 2019) (Exhibit 3). Each day, there are three to four emergency department visits related to opioid use, which is a serious concern for the county (WECHU, 2019). It is noteworthy that, as opioid-related harms have increased across the province, the burden of opioid use in the Windsor-Essex region has been unfortunately increasing even faster than in other regions (WECHU, 2017).

In April 2019, the accidental opioid overdose death of a 23-year-old man named Aamir sparked an alert in the community. Aamir was an electrician at Canadian Motor Corporation, an automotive company, and had become addicted to prescription opioids after sustaining an injury while working at the plant. He was a typical case of "iatrogenic" opioid addiction; he had no known history of substance use. At first, Aamir took his pain medications in the quantities prescribed by his family doctor; however, he started increasing his dose inappropriately when

he began experiencing more episodes of acute, debilitating pain. As the news of Aamir's death spread across the media, Dr. Tim Mackenzie started to feel very anxious about the situation. "Aamir's death is one among hundreds of cases that could have been prevented if there was more awareness in the medical community about appropriate opioid prescribing," Dr. Mackenzie murmured to himself. He was concerned about the number of young adults dying from overdose cases in the region. In early 2019, before Aamir's death, there were four opioid-related overdose deaths over a 24-hour period in Windsor's downtown area, prompting public concern. So far, efforts to address this situation have not curbed the rising rates of overdoses and deaths associated with opioid use. As Dr. Mackenzie looked out the window while hearing the sirens of an ambulance whiz by, he wondered whether it was another victim of an opioid overdose. He knew that, although the WECOSS was in effect, a lot of work still needed to be done to prevent overdose deaths in the local context. He picked up the phone and made a call to Julianne and said, "Hi Julianne, let's plan a meeting. We can't let this continue. I think it's time for the health unit to take prompt action by pushing the opioid strategy forward."

The opioid crisis soon became a high priority in the Windsor-Essex region and, in response to this, the provincial government provided increased funding to the WECHU to address the issue. Julian and Steven knew right away that the funds needed to be allocated in an efficient manner to create the maximum impact on the community. Julianne said to Steven, "I have a couple of strategies in mind for allocating the resources. However, we need to discuss the plans with Dr. Mackenzie as well as with our WECOSS leadership committee members, and then work out a plan to best meet the needs of the Windsor-Essex region residents."

The Windsor-Essex Community Opioid and Substance Strategy
The WECOSS leadership committee was formed with the collaboration of multiple stakeholders representing different sectors, including public health, emergency services, the Erie-St. Clair Local Health Integration Network, Windsor-Essex Police Services, the City of Windsor, County of Essex, Windsor-Essex hospitals, primary care providers, pharmacists, addiction and mental health service providers/harm reduction agencies, school boards, pharmacies, and peer community members. The leadership committee's initial vision was to work collectively towards the implementation of a local opioid strategy, and this later became known as the WECOSS. These community partners had two main objectives – reduce the burden of opioid-related harms and deaths in the community, and mobilize individual and collective efforts to improve the social and health issues associated with the increasing use of opioids in the community (Canadian Centre on Substance Use and Addiction, 2017).

The initial step for the development of the WECOSS was to create a local response plan by consulting residents of Windsor and Essex County to get a complete picture of the issues and concerns relevant to the community. This was followed by an environmental scan of existing community resources and best practices from national and international agencies. A special effort was undertaken to include people with lived experiences because a majority of the leadership committee felt that involving these people was critical in the planning and decision-making process, particularly for developing the types of programs and services these community members would want to access. This strategic planning process was further shaped by two community engagement and feedback forums and an online community feedback survey (WECOSS, 2018). The community feedback questionnaire was disseminated to gather information about the knowledge gaps regarding opioid use and the barriers to accessing existing community programs and services. The survey was also designed to generate feedback from the community about the different ways the current system could be improved to meet their needs. The survey was disseminated to 53 local organizations. The organizations

that responded to the survey were also asked about their interest in collaborating with the WECOSS leadership committee to support the development and implementation of the community opioid strategy. Approximately 91% of the survey respondents responded positively, indicating that the opioid strategy was something they wanted to support in an effort to grapple with the opioid crisis in the community (WECOSS, 2018).

The development process resulted in eight key recommendations categorized under the four pillars of the Canadian drugs and substances strategy – prevention/education, harm reduction, treatment/recovery, and enforcement/justice (Health Canada, 2019) (Exhibit 4). The eight recommendations have both short-term and long-term action plans. The execution of these action plans is the primary responsibility of the four pillar working groups who are achieving this by utilizing a combination of existing community programs, resources, and services.

The Pillar Working Groups – The Windsor- Essex Community Opioid and Substance Strategy
The four working groups of the WECOSS represent the four pillars of the Canadian drugs and substances strategy (Health Canada, 2019). These groups are assigned the task of implementing strategies based on the WECOSS action plan.

1. Prevention and Education. The Prevention and Education working group aims to address and minimize the risk factors associated with substance abuse, enhance protective factors including prevention and awareness strategies, and promote a supportive and healthy environment.
2. Harm Reduction. The Harm Reduction working group is tasked with developing initiatives to minimize the physical, social, and financial harms associated with substance use, and to enhance the knowledge and skills of people who use substances. They are achieving this through a variety of approaches that include, but are not limited to, preventing risk of infectious diseases, preventing overdose-related deaths, and helping minimize the consumption of substances by providing a safer, supervised use environment.
3. Treatment and Recovery. The Treatment and Recovery group works toward facilitating access to services for people who use substances; these services include withdrawal programs, residential programs, and counselling.
4. Enforcement and Justice. The Enforcement and Justice working groups work to strengthen community safety by facilitating coordination between healthcare services and law enforcement agencies, and by reinforcing the role of enforcement agencies and first responders who respond to crimes associated with substance use.

THE THURSDAY OPERATIONAL MEETING
The first Thursday operational meeting was held in May 2018 to discuss priority areas and to create an action plan for the Prevention and Education working group. The health care provider working group was one of the subcommittees of the Prevention and Education working group, and their focus was the implementation of best practices pertaining to opioid prescribing and alternative options for pain management. Dr. Mackenzie and Julianne were the chair and co-chair, respectively, with Julianne acting as chair if Dr. Mackenzie was away. The working group included members from WECHU's Health Promotion team, as well as representatives from Family Health Teams, community health centres, area hospitals, and nurse practitioner-led clinics.

Opioid Crisis in the Windsor-Essex Community: Time for Responsible Opioid Prescribing?

Julianne began the meeting by providing a brief overview of the meeting agenda, while Steven presented the updates on the WECOSS. Before creating an action plan, Julianne opened up the conversation and asked the committee members to come up with their own ideas and priorities for the group.

Sharon Grey replied, "I would like to be able to confidently prescribe pain medications for my clients who have back pain, but I don't want to prescribe opioids without a clear understanding of best practices. We need to have more resources in our community." After recently helping establish a pain clinic in the Windsor-Essex region, Sharon was in the process of shifting her job focus to prescribing.

Tiara Hewes, one of the representatives from the community health centre, added: "Going back to the recent overdose-related death of Aamir, I feel it is time for additional attention and education around opioid prescribing and opioid use in the community, both for clinicians and patients. We need to take a coordinated approach to address the multifaceted problem of this opioid crisis."

"I agree," said Kelly Shaw, a family physician in Essex Family Health Team. "When we talk about the number of opioid overdose deaths and addiction cases that are attributable to prescriptions, we need to identify the underlying issues, the knowledge gaps, and the attitudes of opioid prescribers in the community."

Dr. Gary Murray, a physician with the community health practice team and a member of the health care provider working group, responded, "We also need to be aware of the unintended consequences of opioid prescription. I have seen prescribers in the United States refusing to prescribe opioids to their patients who have pain conditions largely because they fear legislation or threats from drug enforcement agencies. We need to cautiously move towards an opioid prescribing strategy."

Polly Fells, a pharmacist from Leamington, agreed with Dr. Murray's comments. "I second Dr. Murray's opinion. I have seen my own relatives who have chronic pain conditions making the 'pharmacy crawl' looking for a pharmacy that is willing to fill their prescriptions. It's hard for patients who have genuine pain conditions. The whole situation needs to be addressed strategically."

"I believe that we need to review research evidence-based guidelines for opioid prescribing practices," said Jacqueline Slovak, a pharmacist at the Windsor Regional Hospital who was also pursuing research related to opioid misuse prevention for the past seven years. "We should be looking for best practices and educational materials that we can share with our physicians, pharmacists, patients, and their families to empower them with the information they need to make the right decisions. I think public awareness about the risks of opioids in the community should also be enhanced further," she added.

After listening to the conversations in the room, Julianne mentioned, "I totally agree with everyone in this room – the discussion has been very informative. Considering the local evidence, our priority at this moment should be addressing opioid prescribing among primary healthcare providers. However, we need to be cautious and attempt to strike the right balance between overprescribing and maintaining patient access. Our focus should also be on increasing overall education and knowledge about the potential for opioid abuse in the community. There is a general lack of awareness about opioid use across all demographics."

Steven Dire commented, "I think our priorities also align with the data that we generated from the community consultation process. The information we have gathered and reviewed so far has pointed toward a general agreement across all community sources regarding the dire need for providing better education on pain management and appropriate opioid prescribing practices for physicians, nurse practitioners, and pharmacists." He added, "We have noticed that more than 80% of survey respondents viewed this as a huge benefit for the community at large, and more than 15% of the comments collected from the forum supported this." Steven began sharing some of the responses that WECOSS had received as part of the survey and community consultation process (WECOSS, 2018).

> "We are concerned about the frequency and reasons for which the family doctors and dentists are prescribing opioids and narcotics, even for young children. My 9-year-old son was offered opioids after a minor dental procedure."
> – Survey respondent

> "Physicians today are giving huge prescriptions (70 pills); rather, they should give a seven-day dose and follow up with the patient."
> – Community forum participant

In keeping up with Steven's update, Dr. Mackenzie provided further highlights regarding opioid prescribing in the Windsor-Essex region. He commented that, "According to the report, healthcare providers in our community prescribed, on average, approximately 40 more opioid prescriptions per 1000 population every year, and five to 12 more opioid prescriptions per 1000 population to treat cough per year, than the provincial average." He emphasized that this was an area of concern for the Windsor-Essex region, and added that "perhaps the initiation of opioid use among Windsor-Essex region residents and increased cases of opioid overdose in recent years could partly be attributed to some of these factors. In my opinion, this issue should be considered as one of the top priorities for the health care provider working group."

Overall, members who attended the Thursday meeting had agreed to examine opioid prescribing tools or materials being used within their own practice. Before adjourning the meeting, Julianne thanked all the working group members for their time and said, "I am glad that we have been able to reach a consensus regarding the group's priorities. We hope to organize the next meeting in two months and finalize our next course of action." As she walked back to her office, she pondered the discussion they had during the meeting. "How serious could the unintended negative consequences of restrictive prescribing be?" she wondered, and thought to herself, "But it is also what is needed right now." Julianne knew that a lot of work needed to be done to get this project started. She had several questions. What sources of evidence should be reviewed for best practices and tools for opioid prescription? What would the best strategy be for developing educational resources for patients and families? How do we determine the existing knowledge and knowledge gaps among healthcare providers regarding opioid prescribing practices? Her next challenge was to find someone who could take the project forward. The next meeting was in two months, but she knew she had to initiate the planning process immediately. She wondered, "How do we develop an action plan to implement the opioid prescribing project within such a short timeframe and without an appointed and dedicated project chair?"

EXHIBIT 1
Number of Opioid Prescriptions Filled in Ontario between 2015 and 2016

Number of opioid prescriptions filled, per 100 population, in Ontario, by LHIN region, 2015/16

Dispenses per
100 population

Region	Value
Ontario	66
Erie St. Clair	100
South West	81
Waterloo Wellington	61
Hamilton Niagara Haldimand Brant	90
Central West	47
Mississauga Halton	40
Toronto Central	47
Central	38
Central East	62
South East	95
Champlain	57
North Simcoe Muskoka	84
North East	110
North West	97

Local Health Integration Network (LHIN) Region

Source: Health Quality Ontario, 2017.

EXHIBIT 2

The Regions of Windsor-Essex that are Served by the Health Unit

Source: Windsor-Essex County Health Unit, 2016.

EXHIBIT 3
Opioid-Related Emergency Department Visits and Deaths in Windsor-Essex

Confirmed overdose monthly emergency department visits

Windsor-Essex County 2017–2019
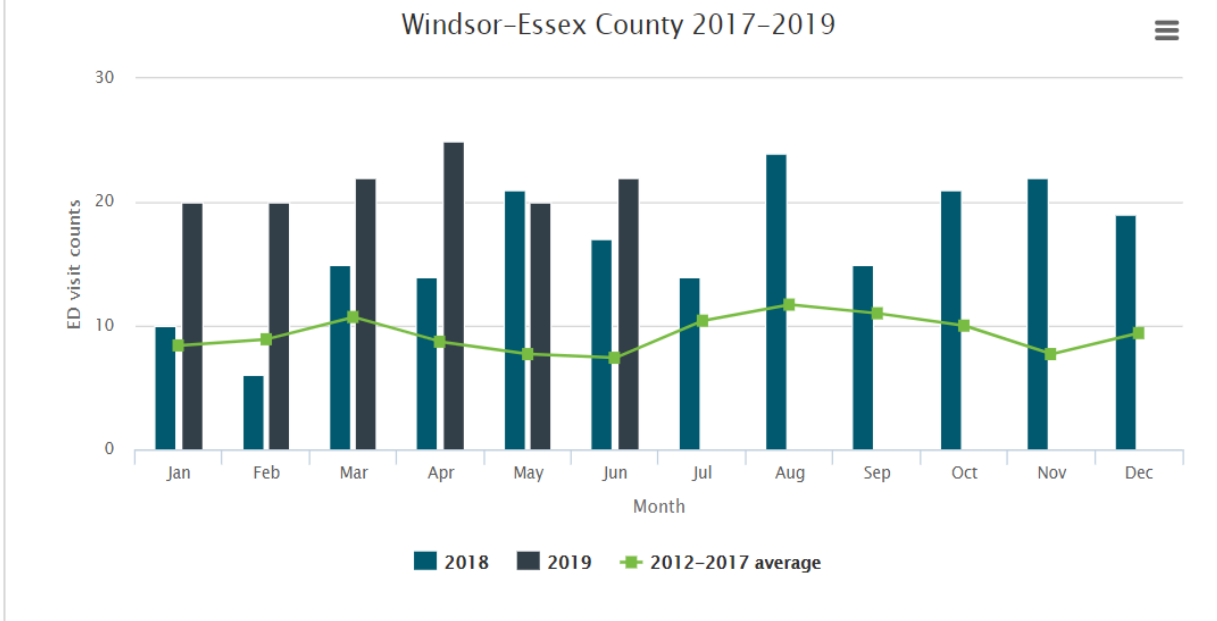
Annual opioid-related ED and hospital visits
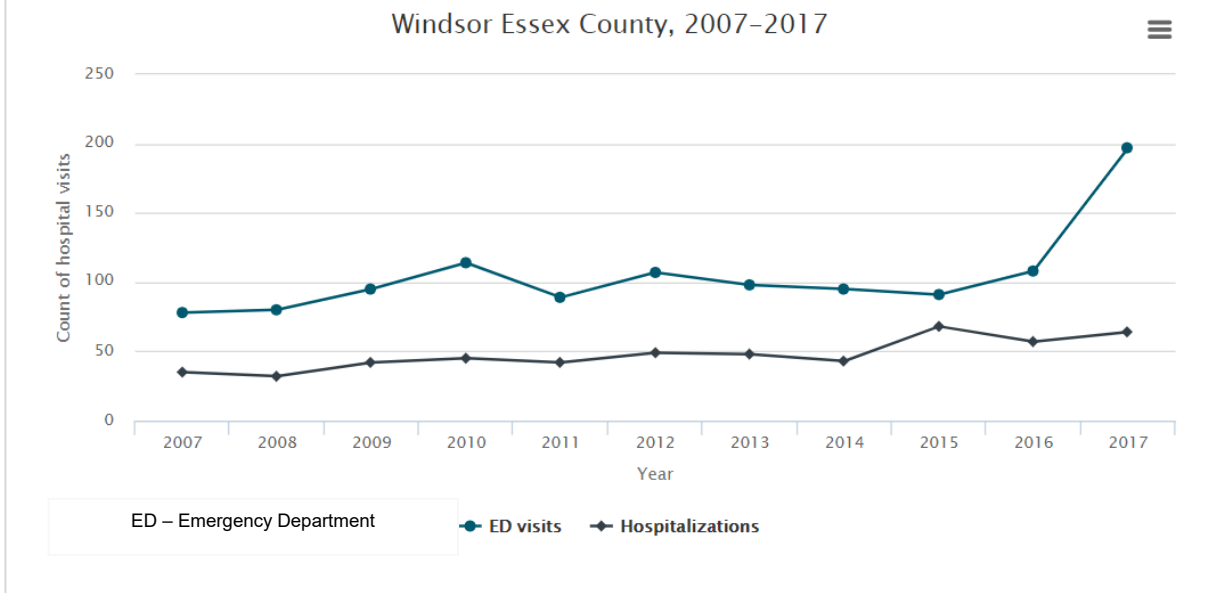
Windsor Essex County, 2007–2017

ED – Emergency Department

Source: Windsor-Essex County Health Unit, 2019.

54

EXHIBIT 4
Canadian Drugs and Substances Strategy

A COMPREHENSIVE, COLLABORATIVE, COMPASSIONATE
AND EVIDENCE-BASED APPROACH TO DRUG POLICY
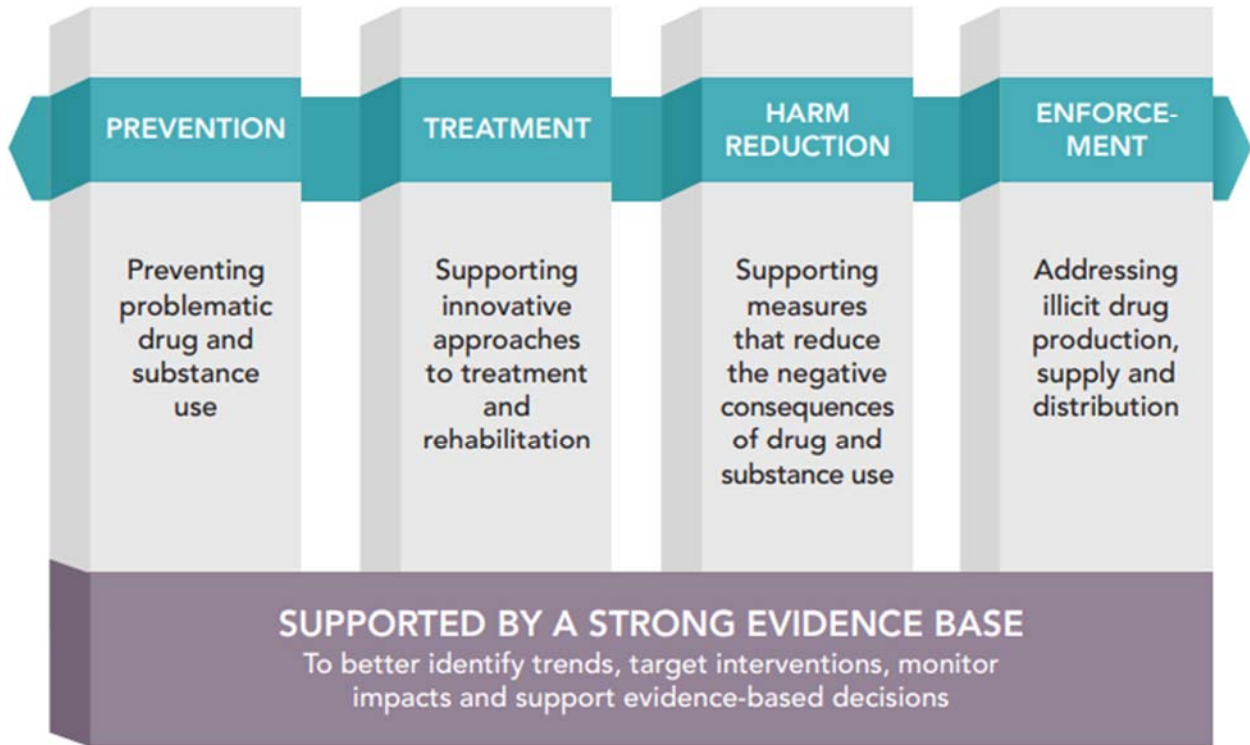
PREVENTION	TREATMENT	HARM REDUCTION	ENFORCE-MENT
Preventing problematic drug and substance use	Supporting innovative approaches to treatment and rehabilitation	Supporting measures that reduce the negative consequences of drug and substance use	Addressing illicit drug production, supply and distribution

SUPPORTED BY A STRONG EVIDENCE BASE
To better identify trends, target interventions, monitor
impacts and support evidence-based decisions

Source: Health Canada, 2019.

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INSTRUCTOR GUIDANCE

Opioid Crisis in the Windsor-Essex Community: Time for Responsible Opioid Prescribing?

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BACKGROUND

Canada is in the midst of an opioid crisis, with the number of opioid-related harms and overdose cases increasing rapidly over the past few years. The opioid crisis involves a rising number of opioid-related deaths and overdoses, either from prescription opioids or from the increased availability of illegal, adulterated forms of potent opioids such as fentanyl. Today, fentanyl and fentanyl analogues have been reported to be the major drivers of the opioid crisis in the country, accounting for approximately 73% of accidental opioid-related deaths. Opioid-use disorders are increasingly prevalent in patients with chronic pain who have received opioids for management of their condition. Canadians are often overprescribed opioids for chronic pain conditions, which has, in part, led to the higher number of opioid addictions in the country. Unfortunately, with the increase in opioid-related harms across Ontario, the burden of opioid use in the Windsor-Essex region has increased even faster than in other regions in the province. In response to the growing opioid crisis in the Windsor-Essex community, a multipronged initiative - the Windsor Essex Community Opioid and Substance Strategy - was developed and adopted to address the increases in opioid-related harms in the county. As a result of the increasing number of opioids prescribed by healthcare providers in Windsor-Essex County, and after consulting community partners and key stakeholders, it was decided that educating patients about opioids and supporting healthcare providers through appropriate opioid prescribing practices should be the main components of the strategy. Enhancing the education of health care providers has been identified as a key strategy to prevent opioid addiction and overdose in Ontario.

To implement the healthcare providers' education program, it is important to gather information on the best practices and guidelines for opioid prescribing, and to understand healthcare provider knowledge/knowledge gaps in relation to best practices. This will inform the planning and development of tools and resources for educating patients and healthcare providers on opioid use and chronic pain management.

OBJECTIVES

1. Understand the state of current knowledge about the prevalence of opioid use within Ontario.
2. Describe the goals and objectives of the four pillars of the Canadian drugs and substances strategy.
3. Demonstrate evidence-based planning skills and strategies to develop action plans for a healthcare provider education program.

4. Discuss the importance of community engagement and communication in addressing the multifaceted problem of the opioid crisis.
5. Describe the role of quantitative, qualitative, and/or mixed-methods research in understanding and evaluating population health and service provider perspectives by reviewing data for needs assessments and program evaluation.

DISCUSSION QUESTIONS
1. Summarize the current state of knowledge about the opioid crisis in Ontario.
   a. What is the significance of the issue?
   b. Why should opioid prescribing be considered as a priority for addressing the issue?
   c. What are the unintended consequences of adopting the guidelines for opioid prescribing?
2. Explain the critical importance of evidence in the planning and implementation of an education program for healthcare providers.
3. Discuss your proposed plan for implementing the program based on the priorities set by the health care provider working group.
   a. Review the best practices and sources of data used.
   b. Understand healthcare providers' perspectives and knowledge about best practices on opioid prescribing through appropriate use of research methodologies.
   c. How would you use the evidence generated to develop tools and resources for educating health care providers and patients about opioid use and prevention?

KEYWORDS
Best practices; health care providers; opioid crisis; opioid prescription; pain management; patient education.

CASE 5

The Precision of Aid: Remembering the Forgotten Disease in the Horn of Africa

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A HIGH OF 30°C

The hustle and bustle of volunteers and delegates in and out of the meeting room was a familiar sight. It was 10 a.m. on June 18, 2017, and the sun's rays made their way toward the meeting room tents. The beads of sweat that ran down the delegates' foreheads reflected the sunshine as the electric fans also suffered from the heat. The meeting had ended but discussions about data sharing were still transpiring. The Somaliland Ministry of Health (MOH), the Somali Red Crescent Society (SRCS), the World Health Organization (WHO), the United Nations International Children's Emergency Fund (UNICEF), Save the Children, World Vision International, the International Organization for Migration, Health Poverty Action, and other partner national societies such as the Norwegian Red Cross, the German Red Cross, the British Red Cross, and the Canadian Red Cross (CRC) all had a stake in the discussions.

Walking in the muggy heat, Eve Tinuviel's clothes seemed to have found solace in her sweat. It was not long before she found an empty tent. She placed her laptop on the table, turned on a small fan, and proceeded to lay out the reports she had collected from the meeting. One report came from the Cholera Treatment Centre (CTC) (Exhibit 1; Canadian Red Cross, 2017) supported by the Canadian Red Cross that had opened on May 25th (Exhibit 2; Canadian Red Cross, 2017) . The CTC is an isolated treatment ward for managing and treating severely sick cholera patients (Médecins Sans Frontières, 2019). Hospital reports and reports from the Red Cross Red Crescent Movement Field Assessment Coordination Teams (FACT) were also included. Eve could hear the activity of people and voices echoing throughout her room. The volunteers and delegates from partner national Red Cross Red Crescent societies had organized themselves in the other tents where they were treating people who were confirmed cholera cases and were preparing for community mobilization to curb the epidemic. Eve plugged her USB into her laptop and delved into her analysis.

Eve is a global health advisor with the Canadian Red Cross and is responsible for emergency health services. Eve's role in the deployment is triangulating all cholera data pertaining to Somaliland, an autonomous region of Somalia. Eve had completed both a Master of Public Health degree and a Master of Global Health degree and had expertise in the areas of community health and epidemiology. Eve was supported by the Senior Health Manager, Dr. Ike Elos, who had also been deployed with her. Dr. Elos' main responsibility was overseeing the health programs already in place within the region. Eve had worked with the Canadian Red Cross for two years and her deployment to Somaliland was her second deployment.

The Republic of Somaliland gained its autonomy as the country declared its independence from Somalia in 1991 (Somaliland, 2020). The country is located in the Horn of Africa and is bordered by Ethiopia and the adjacent region of Puntland in Somalia. The region has a separate government that is not recognized by the international community ("Why Somaliland is not a Recognized State," 2020). Somaliland has a population of approximately 4.5 million people and an average life expectancy of 50 years. Its main source of income is livestock exportation (The World Bank, 2015). Somalia, neighbouring Puntland, and Somaliland are prone to La Niña and El Niño cycles, natural ocean–atmosphere phenomena that affect global temperatures and rainfall, resulting in extreme weather events such as drought, flooding, and tropical cyclones. These weather events are endemic to the region (IFRC, 2017a) promoting population displacement. One of those endemic weather events that initiate population movement is drought. Drought triggers epidemics such as acute watery diarrhea (AWD) or cholera and measles, some of which are cross border outbreaks (IFRC, 2017a). When there is a disease outbreak that compounds fragile health infrastructures it is difficult to mitigate disease spread and cases rise as a result of the movement of peoples across borders.

SITUATION ANALYSIS
Somaliland had early indications of food insecurity in September 2015. In February 2016, the Somaliland and Puntland governments issued an alert to humanitarian agencies and donors requesting support to deal with drought (IFRC, 2017a). The drought continued and worsened through the final months of 2015, affecting more than 50% of the population (IFRC, 2017a). The population suffered livelihood, livestock, water source, pasture, and food loss that contributed to 535,624 internally displaced people across the area (IFRC, 2017a).

To address the occurrence of natural disasters, the Somaliland MOH submitted an appeal to the disaster emergency relief fund of the International Federation of Red Cross and Red Crescent (IFRC) on April 2017 and was granted approximately CHF300,000 Swiss francs in epidemic relief aid (IFRC, 2017a). The MOH also requested aid from other relief organizations to address capacity shortages induced by the AWD/cholera epidemic (IFRC, 2017a).

Prior to her arrival in Somaliland, Eve reviewed the WHO bulletins, the case fatality rates and local health authority reports from UNICEF and the United Nations High Commissioner for Refugees (UNHCR). Also included in the documents were the emergency appeal update reports from the IFRC and MOH reports. Eve needed to gather as much surveillance data and information as possible to understand the context of the region in order to develop a plan, identify necessary health interventions, and advocate for implementing those interventions.

THE FORGOTTEN DISEASE
Known as the "disease of inequity", cholera threatens the world's most vulnerable communities (Legros, D., 2018). A forgotten disease in high-income countries, cholera is prevalent in low-income countries where infrastructure is lacking and natural phenomena compound and trigger disease outbreaks (Legros, D., 2018; WHO, 2019). An outbreak is defined as disease in a localized area or community, whereas an epidemic is when cases suddenly increase within a community or region, and an endemic is the constant presence of a disease within a geographic area (CDC, 2020a & Gordis, 2014). According to the World Health Organization, cholera can either be an epidemic or an endemic (WHO, 2019). In countries where cholera is endemic, the outbreak of the disease can be seasonal or sporadic or result from an influx of confirmed cases (WHO, 2019). In addition, cholera-endemic countries are classified to have unimported cholera

cases within that last three years (WHO, 2019). The outbreak or epidemic of this virulent disease can occur in both endemic countries and non-endemic countries (WHO, 2019).

Natural disasters such as drought and floods increase the likelihood of disease epidemics, and this is particularly true for cholera (IFRC, 2017a). Low-income countries are disease hotspots, experiencing more than 70% of the world's natural disaster phenomena (United Nations, 2018). One-third of the people living in these multi-hazard zones are affected by disease outbreaks, the severity of which is compounded by lack of infrastructure and treatment availability (United Nations, 2018).

In Somaliland, the response to drought has been compounded by cholera and measles, some of which are cross-border epidemics (IFRC, 2017a). The surveillance guidelines by the Global Task Force on Cholera Control in 2017 deem cholera an outbreak once there is at least one confirmed case of cholera plus evidence of local transmission (WHO, 2020b). The co-existing challenges of drought, cholera and measles lead to calls-to-action by the MOH for humanitarian organizations to respond because the region's own resources have been overwhelmed.

As cholera is also often associated with shame and social stigma, trained personnel can help by providing counselling and support to affected people and their families (IFRC, 2020e). The social stigma can reduce rates of treatment seeking (Tamason et al., 2016), influence case reporting and jeopardize receipt of international aid (Ali et al. 2015; Jerving, 2017 & Jerving, 2018). Furthermore, when countries report cholera outbreaks it can negatively affect trade and tourism and is viewed as serving notice to other communities that the nation failed to protect the citizens' health (Jerving, 2018). As a result, countries often report 'Acute Watery Diarrhea' instead of cholera, but this has the unintended consequence of jeopardizing the disease response. Miscommunication about the specific nature of the outbreak, reduces the likelihood of receiving timely financial aid (Harden, 1985 & Jerving, 2018). Cholera is classified as an AWD (WHO, 2019) and other types of organisms and factors such as malnutrition can also cause AWD (WHO, 2020a). Humanitarian organizations tend to mirror the governments' language in order to maintain good relationships, continue operating in the country and continue their humanitarian efforts (Jerving, 2018). In Somaliland, cholera is an endemic disease and it is reported as "AWD/Cholera Outbreak" (IFRC, 2017a & Jerving, 2018).

John Snow famously recorded the distribution and incidence of cholera cases that ravaged the region of Soho in London, England (Hare, 1955), giving birth to the branch of science known as epidemiology. *Vibrio cholerae* is a water-borne bacterium responsible for outbreaks of cholera in afflicted populations (Jahan, 2016). It is estimated that 1.3 million to 4 million confirmed cases of cholera lead to anywhere between 21,000 and 143,000 deaths worldwide each year (Ali et al. 2015). Cholera is transmitted by ingesting food and water that is contaminated with the bacterium (Jahan, 2016). The water and food sources are usually contaminated by *Vibrio cholerae* strains from human feces and can survive in aquatic environments for extended periods (WHO, 2020b). The transmission is closely linked to poor sanitation, access to clean water and poorly cooked seafood. Most populations at risk are in peri-urban slums and internally displaced persons or refugee camps (WHO, 2019).

In temperate regions, the bacterium is often found in estuaries, rivers, and coastal waters (Jahan, 2016). Once inside the body, the bacterium's incubation period is short—symptoms appear 0.5-5 days after ingestion of contaminated food or water (WHO, 2019). The main symptoms of infection are often mild or asymptomatic, however 1 in 10 infected individuals can

develop severe symptoms and experience profuse watery diarrhea, leg cramps and vomiting and if left untreated the severity of the symptoms can lead to death (CDC, 2020b).

Cholera is a virulent disease that can kill its victims within hours if left untreated (WHO, 2019). According to the World Health Organization, cholera can successfully be treated with immediate application of oral rehydration solutions (WHO, 2019). Oral rehydration solutions can be used to treat up to 80% of cases, with severe cases needing rapid treatment with intravenous fluids and antibiotics (WHO, 2019). Oral cholera vaccines have recently been developed to mitigate infection and if administered in conjunction with strategies to improve regional infrastructure to promote clean water and sanitation, can be effective at preventing and controlling cholera outbreaks in at-risk populations (WHO, 2019). Health education programs delivered through community mobilization, adapted to local and cultural norms, which advocate for and promote hygiene are key to long-term changes in behavior to prevent the spread of cholera (WHO, 2019). Long-term solutions however, require economic development and the universal access to safe, clean drinking water and sanitation (WHO, 2019).

THE INTERNATIONAL FEDERATION OF THE RED CROSS AND RED CRESCENT MOVEMENT

One of the most recognized humanitarian networks around the world, the International Federation of the Red Cross and Red Crescent Movement, headquartered in Geneva, Switzerland, is impartial and neutral in providing assistance and protection to those affected by natural disasters and man-made conflict (IFRC, 2019a). The Movement is composed of three components: the IFRC provides humanitarian assistance to people affected by natural disasters and differs from its counterpart, the International Committee of the Red Cross (ICRC), whose sole objective is to provide humanitarian assistance to victims of armed conflict and strife (ICRC, 2019). The third component, the National Societies, are the backbone of the Movement, with 192 national societies around the globe composed of 13.7 million volunteers (IFRC, 2019a). Each of these bodies are independent and hold no authority over the other. Their roles are to aid and empower communities in humanitarian and development projects in collaboration with governments and other aid organizations (IFRC, 2019a).

When an appeal to IFRC has been made by a country whose capacities are overwhelmed by a natural disaster or infectious disease, the IFRC coordinates its response and collaborates with other national societies by selecting delegates from approved rosters. The emergency response units from national societies—that have the capacity and tools, such as CTCs, begin their deployment to aid (L. Olson, personal communication, June 21st, 2019). In 2017, the Canadian Red Cross deployed an emergency response unit to Somaliland that consisted of 27 delegates who were rostered and required by the IFRC to facilitate health interventions and data analysis in the region (IFRC, 2017b). An auxiliary actor in national and international humanitarian responses, the Canadian Red Cross' critical role is emphasized in its preparedness and response to local, national, and international public health crises (Canadian Red Cross, 2016). A CTC was also established in response to the request from the MOH to support the Somaliland effort to treat the disease. The CTC is mainly staffed by nurses and doctors who provide the additional human resource support required to relieve the overwhelmed hospitals and health care providers in the region (IFRC, 2017a). The IFRC also works with FACT delegates who are experienced Red Cross and Red Crescent Movement disaster managers supporting national societies with expertise in finance and administration, logistics, health services, relief, nutrition, epidemiology, psychological support, water and sanitation, and language capabilities (IFRC, 2019b).

The IFRC has developed approaches and tools to fight outbreaks and epidemics based on its previous experiences in various countries and regions. These approaches are:

Community-based surveillance involves training community volunteers to detect specific conditions and highlight unusual disease trends (IFRC, 2017c). This approach has been effective at curbing outbreaks early (IFRC, 2017c).

Community-based health and first aid emphasizes health promotion and is grounded in evidence-based behaviour changes and principles, and in empowering communities to identify and address their own health issues and concerns (IFRC, 2020a). Community volunteers help with programs and areas such as water management, personal hygiene, immunizations, acute respiratory infections, and waste/garbage management (IFRC, 2020a).

Community engagement and accountability empowers communities to be at the centre of health promotion and protection (IFRC, 2020b). This approach includes listening to community needs, feedback, and complaints to ensure community members can and are actively participating in and guiding the IFRC's actions (Canadian Red Cross, 2019 & IFRC, 2020b).

Protection, gender and inclusion is an approach to ensure that programs and interventions are inclusive (IFRC, 2020c). For example, national societies provide resources such as menstrual hygiene management toolkits and clinical and psychosocial care for rape victims, helping build the capacity of national societies to move toward gender inclusivity (Canadian Red Cross, 2019).

Infection, prevention, and control works to prevent and contain disease spread through safe and dignified burials and specialized isolated treatment centres such as CTCs and malaria treatment centres (IFRC, 2020d). This intervention includes decontaminating households and public places (including public latrines) in addition to other prevention activities. Volunteers can use The Epidemic Control for Volunteers toolkit, which was designed to help them in their roles preparing for and responding to epidemics and disease outbreaks in a variety of contexts (IFRC, 2008).

Psychosocial support provides counselling services by trained community volunteers to communities affected by an epidemic and/or natural disaster (IFRC, 2020e).

Water, sanitation, and hygiene involves providing communities with sanitation platforms, well protection, latrines, soap, and disinfectants (IFRC, 2020f). Organizations also provide equipment and education to ensure community ownership and commitment to water and sanitation sustainability (IFRC, 2020f). This intervention also consists of training volunteers in water and sanitation techniques through the use of the Participatory Hygiene and Sanitation Transformation tool (WHO, 2020d).

The Global Health Unit at CRC advocates for and evaluates the health programs and interventions implemented during natural disasters and epidemics (H. Qosa, personal communication, May 30, 2019). Other organizations such as UNICEF, the WHO, Save the Children, World Vision International, the International Organization for Migration, and Health Poverty Action are also involved in aiding the country with fighting the epidemic by providing funds, nonfood items such as household items, and services such as maternal care and nutrition support (IFRC, 2017a). Under the leadership of the WHO, the different aid organizations coordinate their roles and deploy their services with the goal of allocating services

appropriately and efficiently (IFRC, 2017a; H. Qosa, personal communication, May 30, 2019). The WHO schedules regular health cluster coordination meetings in the affected regions devastated by the disease. UNICEF is responsible for the upkeep of wells and latrines, whereas the WHO and MOH are responsible for clinical responses and data gathering within the regional hospitals affected by the disease (H. Qosa, personal communication, May 30, 2019).

When Eve first arrived in Burao, a district in Togdheer, Somaliland, she attended a health cluster coordination meeting that included other colleagues from the CRC, the MOH, SRCS, other national societies, and partner organizations. The goal of these meetings was to share information on interventions already in place and outline the gaps in health services that require partner attention and coordinated responses.

The organizations reported on several activities. The MOH and the SRCS had already begun community mobilization campaigns promoting the drinking of safe water and the establishment of appropriate personal hygiene practices (IFRC, 2017a). The IFRC, in coordination with the MOH, had implemented social mobilization strategies to facilitate the training of volunteers to help promote better washing, sanitation, and hygiene in their communities. Volunteers conducted chlorination campaigns in the community and distributed chlorine tablets to families and individuals (IFRC, 2017a). The IFRC established oral rehydration stations in camps for displaced migrants, providing four chlorinated water reservoirs in the camp to prevent the spread of cholera (IFRC, 2017a).

The SRCS and the MOH established primary health care clinics for case management and passive surveillance (IFRC, 2017a). Passive surveillance was used as it is less expensive compared to other surveillance strategies (WHO, 2020c). Health institutions that see patients and/or test specimens report case data to higher administrative sources, and there is no active search for cases (WHO, 2020c). Even though this type of surveillance covers a large area, it relies on hospitals or health facility networks to produce case reports (WHO, 2020c). If a country does not have the support to identify all cases or has limited resources, completeness of the data is difficult to ensure (WHO, 2020c). On the other hand, active surveillance is the 'active' search of cases, where health agencies contact health providers in a region garnering reports and recording the data (WHO, 2020e). Active surveillance involves extensive observation and investigation of healthcare facility reports (WHO, 2020e). This type of surveillance requires designated staff who regularly visit affected health facilities, documenting epidemiological data, sending specimens to laboratories, conducting interviews of healthcare providers and patients and visiting hospital wards in accordance with national health policies (WHO, 2020e). If Eve were able to gather enough data on the origins of the cholera cases in Burao and the other surrounding communities, her next meeting with partner organizations would be well-informed. She would be able to present data identifying key areas to implement health programs. Eve hoped that the SRCS and MOH had generated early warning surveillance data that provided information on the location and number of cases within the region—key analytic information needed to support intervention planning.

Despite the many activities reported during the meeting, key gaps in health services were identified by the organizations. Access to lifesaving services in communities where outbreaks had occurred was inadequate (IFRC, 2017a). Funding was deficient and the logistics of responding were poorly implemented; therefore, outbreak responses were slow (IFRC, 2017a). Coordination among the MOH and different service providers on the ground was poor (IFRC, 2017a). The number of health personnel and case managers was insufficient (IFRC, 2017a).

More water, sanitation, and hygiene interventions for access to safe water (IFRC, 2017a) were needed (IFRC, 2017a). Lastly, the early warning surveillance to assist investigations and responses was not adequate (IFRC, 2017a). Eve grew worried.

DATA, DATA, AND MORE DATA OR LACK THEREOF?

As of April 10th, 2017, on the Somaliland/Ethiopian border there have been 291 cases and 14 deaths indicating a case-fatality rate of 4.8% (IFRC, 2017a). Eve had arrived in the Burao district during the 16th epidemiologic week; the number of significant cholera cases had increased in Togdheer from 134 to 780 in the past week with 18 reported deaths from the disease (Exhibit 3; International Federation of Red Cross and Red Crescent Societies, 2017b). The health cluster meetings identified that the Burao Regional Hospital needed to be prioritized for support since caseloads overwhelmed the hospital and patients were being managed in nurses' quarters, thus the CTC would be established and supported in Burao by the CRC (IFRC, 2017d).

Eve's collection of passive surveillance data, health maps, infographics, and reports painted an incomplete picture of the cholera outbreak. She was the first public health delegate to be deployed with her specific expertise, and she wished that she had been deployed earlier before the cholera cases overwhelmed the hospital. In most regions, only the established CTCs and regional hospitals had collected information on cholera cases since the beginning of the outbreak as resources were overburdened. Because data have been collected only in the one hospital and CTC in the Burao district, Eve did not have enough information on the origins of the disease within the region. She only had three weeks to overcome this knowledge deficit, but she did not have the human resources she needed. Delegates and volunteers were scarce, and all had pre-designated tasks assigned to them by their operations managers and/or aid organizations. Some Red Cross Red Crescent Movement delegates and hospital volunteers used a limited number of mobile phones to record the number of cases and report case severity, but these personnel worked in the CTC and regional hospital. None of them were out in the communities actively searching for cases where the outbreak had begun and continued to rage. Because the CTC and regional hospital were so busy, the likelihood that delegates and volunteers could be deployed to the affected communities was low.

Eve wiped the beads of sweat from her forehead, attempting to triangulate the data that was available to her. She proceeded to schedule another meeting with the MOH and pertinent partner organizations to see if they could garner more resources for data collection in different areas in Burao. The reports on her table were swaying to the breeze generated by the fan's hard work. Eve sighed.

EXHIBIT 1
Cholera Treatment Centre Tents/Partner National Society Camp in Burao, Somaliland

Source: Canadian Red Cross, 2017.

EXHIBIT 2
Canadian Red Cross Review and Support Timeline in Somaliland
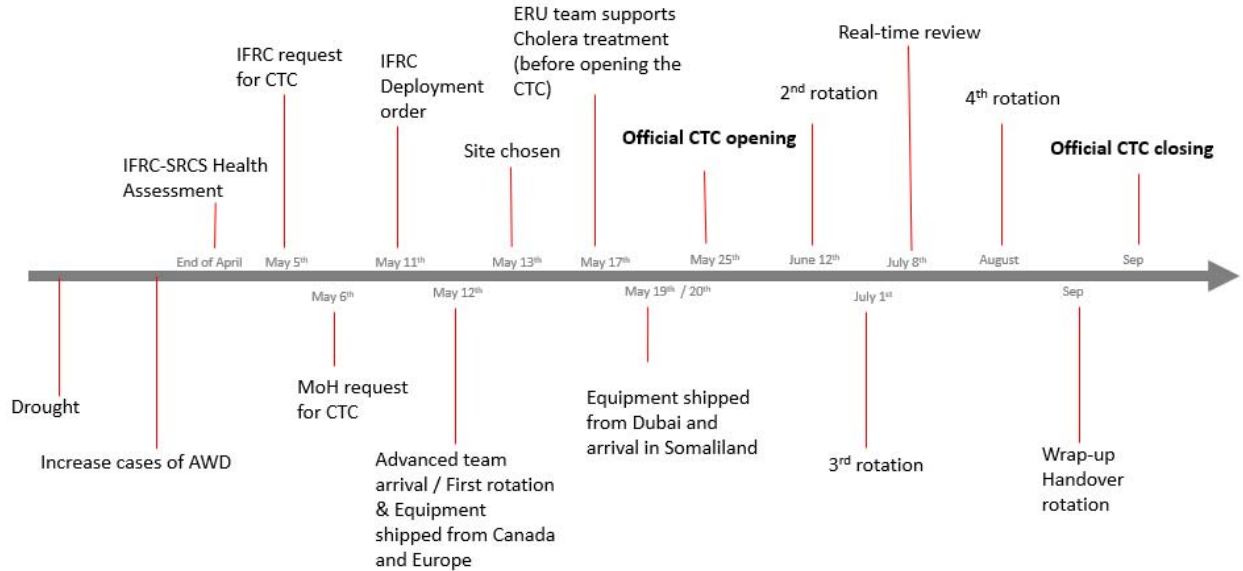
Timeline of key events relating to the Cholera Treatment Centre. Acronyms listed are: AWD: Acute Watery Diarrhea, IFRC-SRCS: International Federation of Red Cross and Red Crescent – Somali Red Crescent Society; MoH: Ministry of Health, CTC: Cholera Treatment Centre **(specifically in Burao)**, ERU: Emergency Response Unit

Source: Canadian Red Cross, 2017.

EXHIBIT 3
**Timeline of Cholera Cases and Deaths for Weeks 15 and 16 of the Outbreak
in Somalia, Somaliland, and Puntland**

Cases & Deaths: Week 15 & 16

| Region | Wk 15 | | Wk 16 | |
	# Cases	# Deaths	# Cases	# Deaths
Bay	1094	13	926	12
Bakool	215	3	175	12
L/Juba	61	1	72	1
Gedo	460	3	348	1
Galgaduud	285	0	221	1
M/Shabelle	122	0	71	1
Hiraan	4	0	6	0
L/Shabelle	344	6	292	6
Bari	26	0	37	4
Mudug	16	0	163	0
Nugaal	63	4	89	0
Togdheer	134	2	780	18
Banadir	160	2	176	4
Total	2984	34	3356	60
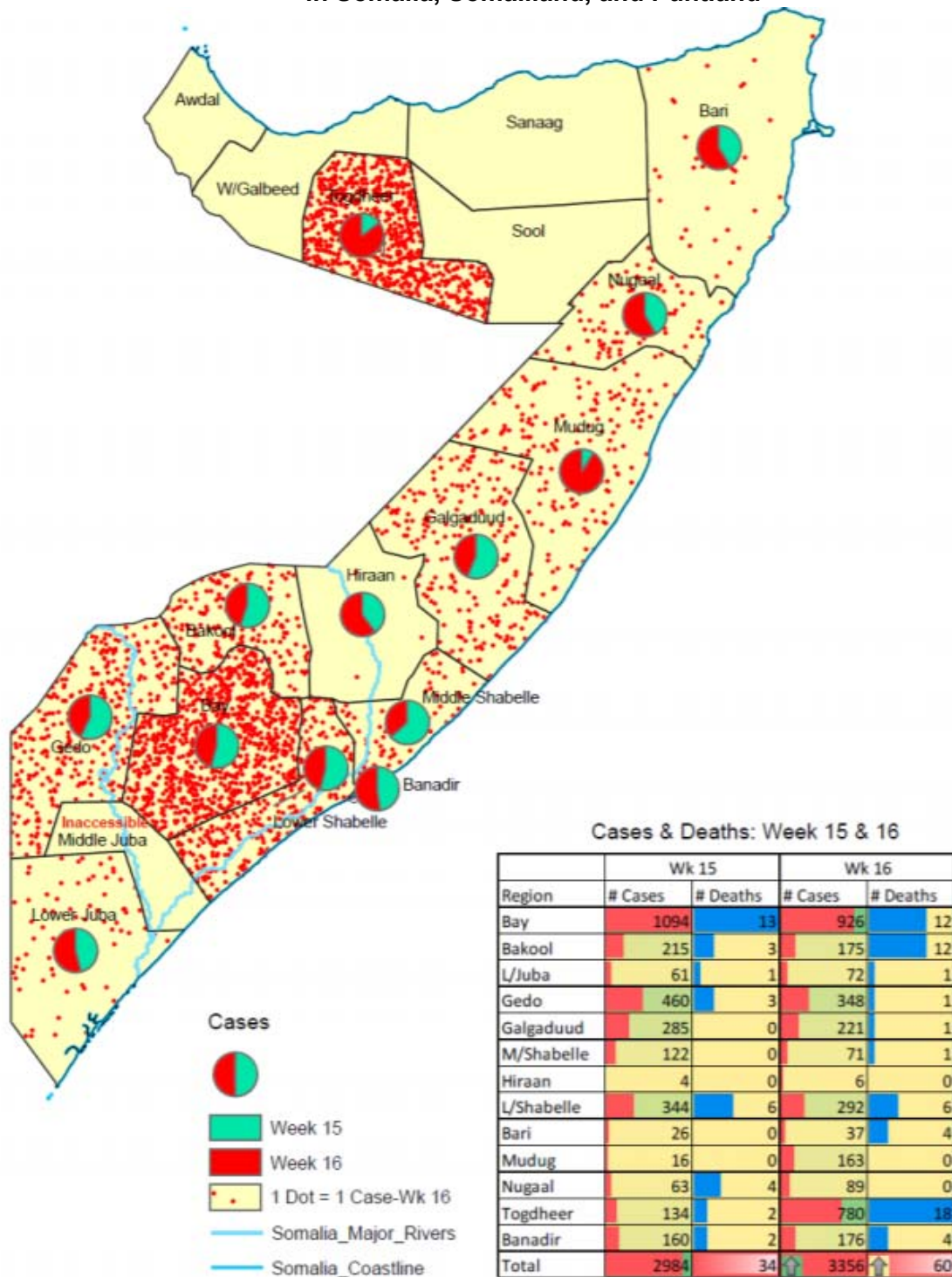
Burao is the district capital in the region of Togdheer where it was recorded to have the highest number of cholera cases.
Source: Canadian Red Cross, 2017.

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INSTRUCTOR GUIDANCE

The Precision of Aid: Remembering the Forgotten Disease in the Horn of Africa

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BACKGROUND
The district of Burao, Somaliland is in its 16th epidemiologic week in the midst of a cholera outbreak. The Somaliland Ministry of Health, in need of emergency relief, has requested that humanitarian organizations come to its aid. Eve Tinuviel has been deployed to Burao as a member of the Canadian Red Cross, where she serves as a global health advisor responsible for emergency health services. Eve's main responsibility is to analyze disease surveillance data, triangulating data from different sources. A Health Cluster Coordination meeting amongst different health and humanitarian organizations reveals gaps in the epidemic response. The scarcity of resources and volunteers, and more importantly the incompleteness and inadequacy of the passive surveillance data, threaten Eve's ability to trace newly affected individuals, identify the origins of the disease and develop strategies to help the affected communities.

OBJECTIVES
1. Understand the difference between active and passive surveillance.
2. Define outbreak, epidemic and endemic infection and differentiate among these concepts.
3. Understand the value of surveillance data and how these data can inform emergency responses and program implementation.
4. Recognize the challenges of conducting surveillance and coordinating amongst different organizations when resources are inadequate to support an epidemic response.

DISCUSSION QUESTIONS
1. Summarize the case.
2. Discuss the importance of surveillance data and the different types.
3. In your own words, briefly explain how data aids in implementing health programs.

KEYWORDS
Somaliland; Canadian Red Cross; International Federation of Red Cross and Red Crescent Societies; cholera; epidemiology; precision public health; disease surveillance

CASE 6

No Fixed Address: A Cost-Effectiveness Analysis of a Program to Prevent Psychiatric Discharge to Homelessness

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"I don't know how we're going to do it Najwa, but really… this needs to stop."

On that note, Jillian Chang, the Executive Director of Hampden Community House, ended the phone call. It had been a challenging discussion, initiated after Hampden Community House had received two clients by taxi in one week from psychiatric inpatient units at Hampden Health Care.

"Our shelters are no place for people to recover in," Jillian had stressed on the phone call, "they're over capacity, unhygienic, crowded, and loud—they are not ideal for anyone, but they are *especially* not ideal for people who have just been discharged from a hospital and are trying to stay healthy."

As the CEO of Hampden Health Care, the only health care system in the region with psychiatric care units, Najwa D'Souza had been asked to help solve this problem. She was sympathetic to this issue because she really did not want any of her clients discharged to homelessness either, but she was unsure how much she could actually do. It was not only Hampden Community House, the organization that ran all of Hampden's local shelters, that was running over capacity. Her hospitals were over capacity as well. To admit patients who needed help, they needed to discharge others who no longer needed care in hospital settings.

But this was not the first call they had received from shelters in the region. Hampden Health Care's leadership team had been dealing with this situation for months and fielding similar phone calls. More than 6% of patients discharged from the psychiatric care units at Hampden Health care were discharged to homelessness. In their annual report on the housing crisis in Hampden, Hampden Community House disclosed that 196 clients of their clients had been discharged to their shelters from psychiatric units within the last year. Understandably, shelter staff from around the region of Hampden were angry that psychiatric clients were intentionally being discharged to homelessness. Moreover, her organization's mission was, "improving the health of our community and the world by providing exceptional, compassionate care," and one of its principles was "affirming every person's dignity and value." Discharging people to homelessness hardly seemed congruent with these goals and values.

Jillian was right, this needed to end.

No Fixed Address: A Cost-Effectiveness Analysis of a Program to Prevent Psychiatric Discharge to Homelessness

BACKGROUND

Numerous studies indicate that people who have a mental illness are overrepresented within Canada's homeless population (Hwang, 2001; Public Health Agency of Canada, 2006). In one of the nation's most comprehensive studies of the characteristics of people experiencing homelessness, two thirds of respondents reported having a mental illness diagnosis (Goering, et al., 2002). The relationship between mental illness and homelessness is complex. For some, mental health struggles precede the onset of homelessness (Canadian Population Health Initiative of the Canadian Institute for Health Information, 2009). In these cases, the lack of energy, social isolation, pain, psychosocial distress, challenges maintaining a job, difficulties managing personal finances, and the stigma of mental illness can make securing and maintaining stable housing challenging (Topor & Ljungqvist, 2017; Frith & Johnstone, 2003). For these reasons, people who have serious mental illnesses are also more likely to experience chronic homelessness (Canadian Population Health Initiative of the Canadian Institute for Health Information, 2009). For others, mental health can deteriorate as a result of prolonged homelessness (Frankish et al., 2005). Mental health deterioration has been attributed to the harsh conditions that often accompany homelessness, which include living in crowded shelters, suffering from food insecurity and experiencing prolonged outdoor exposure (Frankish et al., 2005).

Regardless of the circumstances that lead to homelessness, many find themselves in this situation after receiving care at public institutions (Forchuk, 2013a). In general, there is a lack of integration among various public sector services and programs such as housing, financial aid, corrections, health, and child protection services. In particular, housing is often seen as outside the mandate of these other systems (Forchuk, 2013a). As a result, people are sometimes released from the care of public institutions without housing or support networks (Forchuk, 2013a).

Hospitals contribute significantly to this problem. People experiencing homelessness have been found to be high users of hospital services in Canada (Buccieri et al., 2019; Tadros, et al., 2016). On average, they spend four more days per year hospitalized than people who have housing (Highley, 2008). Additionally, once they are discharged, they are four times more likely to be readmitted to hospital within 30 days (Saab et al., 2016). Because of this, recent estimates suggest the annual average cost of hospitalization for someone experiencing homelessness in Canada is $2,495 compared with $524 for someone who is housed (Gaetz, 2012; Hwang & Henderson, 2010).

Although these figures strongly suggest that hospitals should have a role in preventing homelessness and providing interventions to reduce homelessness, a national survey of key stakeholders conducted by the Canadian Observatory on Homelessness suggests that, if anything, these institutions are exacerbating the issue (Buccieri et al., 2019):

- Ninety-three percent of respondents agreed with the statement, "hospital discharge planning for patients experiencing homelessness is an issue that needs to be better addressed in my community."
- Eighty-three percent of respondents agreed with the statement that, "persons experiencing homelessness are usually discharged from hospitals to the streets or a shelter."
- Twenty-four percent of respondents agreed with the statement that, "hospitals and homelessness sector agencies work well together to coordinate care."
- Eighteen percent of respondents agreed with the statement that, "persons experiencing

homelessness are usually discharged from hospitals with treatment plans that are clear and easy to follow."
- Eleven percent of respondents agreed with the statement that, "persons experiencing homelessness are usually discharged from hospitals into supportive housing."

THE *NO FIXED ADDRESS* MODEL

The week after her phone call with Jillian, Najwa skimmed the literature discussing the problem of discharge to homelessness from psychiatric hospital units. She was horrified at how blind she had been to her organization's culpability. It was hard accepting the fact that homelessness can not only lead to hospitalization, but that hospitalization can trigger homelessness. However, she felt a sense of commitment and hope realizing that for these same reasons, Hampden Health Care could also be a key site in the prevention of homelessness in her community.

With this in mind, she sent an e-mail to Zola Malik, her lead for knowledge synthesis. In it, she asked her to identify the most effective models for preventing psychiatric discharge to homelessness. She specified she was looking for models that were evaluated in contexts and patient populations similar to Hampden Health Care's psychiatric units; essentially, she was looking for interventions which were successful in large Canadian hospital systems. She also gave Zola a rough profile of the clients from her psychiatric units who were being discharged to homelessness so she could select models with the highest likelihood of applicability and success for her patients. Many of her clients:

- had diverse ethnocultural backgrounds, ages, and family structures;
- were suffering from physical comorbidities in addition to mental health issues;
- were generally unemployed or underemployed; and
- were recipients of income from Ontario Works[1] or the Ontario Disability Support Program (ODSP)[1].

Two weeks later, Zola set up a meeting to present what she had found.

In the meeting, Zola started by saying, "There's bad news and good news. The bad news is that there hasn't been a lot of research examining the links between mental illness, homelessness, and hospital discharge, especially in Canada. The good news is that the research that has been done is coming from London, Ontario, a city that is quite similar to Hampden, so the model for intervention that they have generated seems very applicable to our context."

Najwa breathed a sigh of relief—she always preferred not having to reinvent the wheel. "That's wonderful," she said, "what's the program called?"

"The *No Fixed Address* program, or NFA for short," responded Zola.

"So, what did they do exactly?"

"It was a program for clients of psychiatric hospital units who were either experiencing homelessness or at risk of homelessness. Hospital staff referred clients they suspected were at risk of being discharged to homelessness to the NFA program. From there, clients received help

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[1] See Exhibit 1 for a description of Ontario Works, the Ontario Disability Support Program (ODSP), acute psychiatric hospital units, and tertiary psychiatric hospital units.

from program staff during drop-in hours to identify housing and income support" (Forchuk et al., 2013a).

"Okay, so they connected people to pre-existing community services while in hospital," summarized Najwa.

"Exactly," Zola responded. "Community services can be hard to navigate, especially when you're struggling with mental illness. Having people help clients navigate those services while in the hospital made a real difference."

Zola took a moment to shuffle her papers before continuing. "That's the general overview. Like all programs, it evolved over time, so there were three stages that looked somewhat different. In the first stage, the program was studied in a very small, proof of concept, randomized controlled trial. Policies concerning housing and start-up fees were modified for some Ontario Works and ODSP income recipients. The trial enrolled a total of 14 inpatient clients of acute and tertiary psychiatric hospital units[1] who had no history of homelessness before their current hospital admission, who had stable income either through Ontario Works or ODSP, and who were stable psychiatrically when they were discharged" (Forchuk et al., 2008).

"Hmm, that's a bit of an ideal patient population isn't it?".

"Yes it was, but it was a small trial, you know?" Zola responded. "Program developers were just looking for proof of concept or lack thereof."

Najwa considered this. She supposed it was okay as long as the other stages had positive results and incorporated individuals who were more similar to her client population.

Zola continued, "So seven clients were randomly selected to be placed in the treatment arm. This group received streamlined Ontario Works or ODSP income support and rapid access to community start-up funds. Those funds were for things such as rent deposits, first month's rent, and utility arrears. The NFA team achieved this by negotiating with their local Ontario Works and ODSP offices to change certain procedures for the program's participants. Managers of these programs were able to fast-track the applications for NFA program participants. They also had access to a Canadian Mental Health Association (CMHA) housing advocate who helped them find housing by giving them information about rental listings and providing them with transportation to viewings. The remaining seven people were placed in a control arm and received 'usual care'" (Forchuk et al., 2008).

"What was the usual care?" asked Najwa.

"Same as it is here for people at risk of discharge to homelessness. They didn't receive any income or housing interventions in hospital. They had their acute health care needs met, but that was about it."

Najwa nodded. "So what differences did they see?"

"All seven clients who accessed the NFA program were housed at follow-up, six months after discharge. For the people who received usual care, six of the seven were experiencing homelessness. So only one person, or 14.3% of their control group, was able to maintain housing without the program's support. After these preliminary results, the team felt they could

not ethically randomize clients in future stages. If these relatively stable clients who had no history of homelessness were becoming and remaining homeless without the intervention, they realized that the more vulnerable clients would probably be the same" (Forchuk et al., 2008).

Randomized controlled trials were often considered the highest form of evidence on which to base decisions. The goal had been to enroll more patients into the trial, but Najwa could understand why the researchers felt they could not ethically continue after seeing the results from the trial with such a pronounced difference between the treatment and control arms after enrolling only 14 patients.

Pressing on she asked, "So what were stages two and three?"

"Stage two involved clients who were receiving acute psychiatric care at a London hospital, either inpatient or outpatient, and who were at risk of being discharged to homelessness. Anyone who met this criterion was invited to participate in the program and its associated study regardless of their financial stability, mental health status upon discharge from psychiatric care, or prior histories of homelessness – they could have experienced homelessness in the past, be presently experiencing it, or be at risk of experiencing it. Participants could be referred to the program by staff or self-refer. So, the NFA team were no longer working with the ideal population of the first study. That said, the services were similar to those of the first study. Ontario Works had a staff member who provided part-time in-person assistance to any Ontario Works applicants or recipients. This meant direct, in-hospital access to community start-up funds and income support. The CMHA once again provided a housing advocate. This individual had access to housing resources, referral applications for supportive housing, and a database of rental listings. The third stage offered the same services, but instead implemented them in a tertiary care psychiatric unit" (Forchuk et al., 2013a).

"So how did they evaluate those stages if not a randomized control trial?"

Referring to her notes, Zola responded. "Stages two and three were studied using a cohort design. They had a larger intervention sample of 251 clients, with 219 receiving acute psychiatric hospital care, and 32 receiving tertiary psychiatric hospital care. According to data tracked by the CMHA housing advocate, 92.5% of program participants who were identified as at risk of becoming homeless, or were already homeless, were housed by the time they were discharged" (Forchuk et al., 2013b).

"That's incredible," said Najwa, thinking about the implications. That was a lot of people diverted from homelessness. She was satisfied with those potential results and curious to see how implementing this type of NFA program, stages two and three specifically, would work in her hospitals.

THE NFA PROGRAM AT HAMPDEN HEALTH CARE

Najwa spent the following few weeks poring over as many details of London's NFA programs as she could. She shared the details of the program and their evaluations with her leadership team. She spent hours imagining and discussing what this type of program would look like in Hampden Health Care. Finally, she sat down with Boku Okafore, her Director of Community Collaborations, to draw up a proposal for a Hampden Health Care *No Fixed Address* program.

They decided that the program would run in Hampden Health Care's two psychiatric units. One of these units delivered acute psychiatric care and the other delivered tertiary psychiatric care.

All clients who were at risk of being discharged to homelessness and who were accessing care from these units could enroll in the program. This meant program participants could presently be experiencing homelessness, or they could be at risk of losing housing. Staff responsible for managing intake and discharge on these units would be instructed to refer people to the program who did not have a fixed address at intake or during discharge planning. Najwa didn't foresee this adding any significant amount of time to these processes because staff were required to collect addresses from clients during both of these patient interactions. To encourage clients to refer themselves if they felt their housing situation was precarious, posters advertising the program would be hung up around the units.

At its core, the pilot program would be run much like the NFA program in London. There would be program office hours held three times a week in each unit. Office hours would be three hours long. Najwa recognized that she was making the assumption that the number of drop-in hours sufficient to serve London's NFA clients would be the same for Hampden Health Care clients. However, given the two cities' comparable population sizes, housing crisis, and number of annual clients discharged from hospital-based psychiatric care, she was hoping her assumption would prove to be correct.

In terms of collaborators, in London the NFA program was conducted in partnership with Ontario Works, the main organization that administered the delivery of financial aid, and in partnership with the CMHA because they employed housing advocates. In Hampden, Ontario Works was also the primary administrator of financial aid. However, most of the city's housing advocate workers were employed by Hampden Community House. As such, Najwa and Boku saw Ontario Works and Hampden Community House as the organizations they would need to get on board. First, they would need to ask Hampden's regional Ontario Works office to commit to the same procedure changes that London's had in terms of fast-tracking applications for financial support for first and last month's rent, rent in arrears, and utility in arrears. They would also need to ask them to send and cover the wages of two Ontario Works staff who could be present during the program's office hours. These staff members would help people apply for Ontario Works or ODSP, make referrals to Hampden's ODSP office when necessary, and help fast track applications for financial support.

Najwa wondered whether Hampden Community House could be convinced to be a project partner and cover the wages of two housing advocate workers to be present at NFA office hours. The housing advocates would help program participants secure appropriate and affordable housing. Their responsibilities would include finding and sharing listings, helping clients attend viewings, supporting clients in submitting required documents, assisting with the review and signing of leases, or making arrangements with agencies that had transitional housing programs. In addition to the housing advocate's wages, Najwa also hoped that transportation costs incurred by the housing advocates while taking clients to viewings would be reimbursed by the Hampden Community House.

After walking around the two hospital units where the program would be delivered, Najwa decided that the best they could do space-wise would be to provide two board rooms for office hours, one for each psychiatric unit. Office hours would run simultaneously on the units, so each would need their own Ontario Works employee and housing advocate staff to be present throughout. An added benefit to using these rooms would be that they were already equipped with telephones and Wi-Fi that could be used for NFA purposes and these costs would already be accounted for in the cost of renting the board room. Boku also informed her that they would need to provide parking passes for the staff they were hoping to bring in from Ontario Works

and Hampden Community House (two per organization), purchase a computer for each unit, and have a budget for necessary printing and office supply costs (e.g. printer paper and pens).

ECONOMIC EVALUATION

Hampden Health Care was committed to being a leader in providing exceptional care to its clients. However, the organization was inundated with requests to provide new treatments, services, and programs. At the same time, their overall budget had increased marginally over the past decade. In response to these realities, the board adopted a policy in 2007 that required all new proposed treatments, services, and programs to undergo an economic evaluation to assess their value for money before a pilot project could be approved. These evaluations compared the proposed treatment, service, or program against what was currently being done in terms of their costs and their consequences (Hurley, 2010). The board used the findings of economic evaluations to decide whether proposed treatments, services, or programs would be adopted.

Najwa had already decided she would present a cost-effectiveness analysis to the board. This is a method of economic evaluation that measures consequences in the natural units in which they occur (Hurley, 2010). If a cost-effectiveness analysis was conducted, the board also required that an incremental cost-effectiveness ratio (ICER) be calculated. This statistic summarizes cost-effectiveness by dividing the difference in cost between two potential interventions by the difference in their effect (Hurley, 2010). The board required that consequences be considered, and so conducting a cost-analysis, that is comparing only the costs without consideration of consequences, was out of the question. Cost–utility analyses standardized the units used to measure consequences using healthy year equivalents such as the quality-adjusted life year (Hurley, 2010). This was helpful when choosing which interventions to adopt among many different types that addressed different health problems. However, Najwa chose to focus on cost-effectiveness analysis using natural units. The board would not be comparing the NFA intervention to other interventions, but would be considering the NFA on its own. Najwa needed the board to make a decision about continuing as they had been or piloting the NFA intervention. Cost–benefit analyses were economic evaluations that valued health outcomes in monetary terms (Hurley, 2010). This valuation of consequences was often challenging and time consuming, so Najwa opted to avoid this method.

Before sending this assignment to her health economics consultant, Najwa knew she needed to make a few more decisions. First, she needed to choose which perspectives to incorporate in the assessment. They did not have infinite time and resources to invest in this research and, if Jillian Chang had stressed nothing else on their call, it was that they needed to do something and do it quickly. Obviously, they needed to include Hampden Health Care's perspective, but which other perspectives were to be included? Remembering she would eventually need to approach her local Ontario Works office and Jillian Chang about establishing a partnership for a pilot project, she decided these were the two other perspectives she would include. If she could prepare a cost-effectiveness estimate for them, it might reduce some of the uncertainty in their decision making process.

The second decision Najwa needed to make was which consequences to prioritize. The two that stood out to her were the number of people at risk of discharge to homelessness from Hampden Healthcare's psychiatric units who were housed upon discharge and the number of people diverted from discharge to a homeless shelter from Hampden Healthcare's psychiatric units.

Finally, Najwa needed to decide on a time frame for the evaluation. She felt a one-year time horizon was realistically achievable and would provide enough information to approve or reject a pilot project. Although longer time horizons were usually preferable because they allow decision makers to see how the program costs and consequences would evolve over time, modelling became a lot more difficult — more information about the program and its effects would be needed and more complex calculations would be required. This meant that conducting an economic evaluation for anything longer than a year was more than Najwa could reasonably expect given the turnaround time she was hoping for.

Having decided what she needed, Najwa sent these specifications to her lead health economist along with the proposal that had been written and the background research Zola had compiled. Now all there was to do was wait.

NEXT STEPS

Using the information Zola compiled and searching for additional information when necessary, a member of Najwa's health economist team put together a list of parameters relevant to estimating the costs and consequences associated with running the NFA program at Hampden Health Care (Exhibit 2).

As a member of the health economist team, you have been assigned the tasks of comparing consequences, comparing costs, and generating ICERs. To do this, use the information provided in this case and the notes on assumptions which are provided on the worksheets:

1. Complete worksheet 1 to compare consequences for the comparators.
2. Complete worksheet 2 to compare the costs for the comparators.
3. Complete worksheet 3 and 4 to determine the ICERs for the NFA program compared to no program, from the perspectives of Hampden Health Care, Hampden Community House, and Ontario Works.

EXHIBIT 1
Descriptions of Programs Relevant to NFA

Acute Psychiatric Hospital Units: Psychiatric units within general hospitals. These are generally the first place someone with a mental illness would be admitted. Often, treatment focuses on working through a temporary crisis. Depending on their unique needs and circumstances, clients may receive treatment on either an inpatient our outpatient basis.

Canadian Mental Health Association (CMHA): A non-profit organization that provides advocacy, resources, and community-based programs that help prevent and address mental health problems and illness across 330 communities in Canada (Community Mental Health Association National, n.d.). The organization has 75 service regions (Community Mental Health Association National, n.d.) that provide unique combinations of programs to best address the needs of the community they serve.

Ontario Disability Support Program (ODSP): A government program that runs across the province of Ontario to assist individuals who have a disability and who do not have sufficient financial resources to cover basic living expenses. The program is delivered through regional offices. It offers recipients financial assistance through income support and by providing health benefits not covered by the province's universal health insurance program (e.g. dental care). It also offers support to clients in finding employment and advancing their careers (Ontario Ministry of Children, Community, and Social Services, 2020a).

Ontario Works: A government program that runs across the province of Ontario to assist individuals whose household does not have sufficient financial resources to cover basic living expenses. The program is delivered through regional offices. It offers recipients financial assistance through income support and by providing health benefits not covered by the province's universal health insurance program (e.g. dental care). It also offers employment assistance to help recipients find, apply to, and sustain employment. If an individual or family is in crisis (e.g. they have lost their home, they are fleeing violence), emergency financial assistance is available to cover essential expenses (Ontario Ministry of Children, Community, and Social Services, 2020b).

Tertiary Psychiatric Hospital Units: Psychiatric hospital units provide specialized care for individuals with a mental illness. Clients often receive care on a tertiary psychiatry hospital unit after a number of acute psychiatric care admissions. Treatment is generally longer and focuses on rehabilitation instead of the management of a crisis. Depending on their unique needs and circumstances, clients may receive treatment on either an inpatient our outpatient basis.

EXHIBIT 2
List of Parameters Relevant to Estimating the Costs and Consequences of Implementing No Intervention and Running the NFA program at Hampden Health Care

Parameter	Value	Source	Notes & Assumptions
Number of discharges from Hampden Health Care psychiatric units	3481	Hampden Health Care Patient Activity Reports	Assumes the number of clients discharged from Hampden Health Care's psychiatric units will be the same as the organization's yearly average over the past five years.
Percentage of psychiatric clients at risk of being discharged to homelessness	6.74%	Hampden Health Care Patient Activity Reports	Assumes that 1) the percentage of psychiatric clients at risk of being discharged to homelessness is equivalent to the number of clients who report not having a fixed address at intake or during discharge planning (this number likely underestimates those who are at risk of being discharged to homelessness), and 2) assumes the percentage of clients will be the same as the organization's yearly average over the past five years.
Percentage of people at risk of discharge to homelessness who are discharged housed after participating in the NFA program	92.5%	Forchuk et al., 2013b	Assumes the NFA program will have the same effect in Hampden as it did in stages 2 and 3 of London's NFA program. CMHA identified that this percentage of NFA participants who were receiving either acute or tertiary psychiatric hospital care were discharged housed.
Percentage of people identified as being at risk of discharge to homelessness from psychiatric units who are able to find housing without an NFA intervention	14.3%	Forchuk et al., 2008	Assumes that people who do not receive the NFA intervention in Hampden will be able to find housing prior to discharge at the same frequency as people who were able to find housing in the control arm of the original NFA randomized control trial (stage 1). This percentage is likely to be lower as Hampden Healthcare's NFA criteria for participation is a lot more inclusive than the study population of the first stage of NFA. Specifically, participants can have prior histories of homelessness, unstable income, and not be psychiatrically 'stable'

Parameter	Value	Source	Notes & Assumptions
			at discharge to participate in Hampden Health Care's NFA program.
Number of discharges from psychiatric units to homeless shelters without an intervention	196	Hampden Community House, 2019	Assumes that the number of people discharged from psychiatric units to a homeless shelter in Hampden will be the same as it was in 2019 if an intervention is not delivered.
Percent reduction in discharges from psychiatric units to homeless shelters when the NFA program is implemented in a community's psychiatric units	92.3%	Forchuk et al., 2013b	Assumes that the same percentage reduction to discharge from psychiatric units to homeless shelters seen in London, Ontario between 2002 (before the NFA program was implemented) and 2008 (after NFA was delivered in acute and tertiary psychiatric hospital units) will be seen in Hampden once Hampden Health Care implements the NFA program in their psychiatric units. In London, the number of individuals discharged to homelessness decreased from 194 in 2002 to 15 in 2008.
Number of Hampden Health Care psychiatric hospital units	two		The program will need to be set up and run in two locations: in Hampden Health Care's acute psychiatric care unit and its tertiary psychiatric care unit.
Number of rooms needed to deliver the NFA program per psychiatric hospital unit	one	Forchuk et al., 2013a	Assumes the amount of space needed to successfully run the NFA program in a Hampden hospital unit will be the same as it was in stages 2 and 3 of London's NFA program.
Cost of renting a hospital board room at Hampden Health Care	$195 per hour	Hampden Health Care, 2018	Although Hampden Health Care is entitled to use the board room free of charge, the board requires an estimate of the opportunity cost of all hospital space. The cost listed indicates what would be charged to a private corporation seeking to rent a hospital boardroom from Hampden Health Care.
Number of drop-in hours for clients needed per hospital unit	nine hours per week	Forchuk et al., 2013a	Assumes the amount of drop-in hours needed to successfully run the NFA program in a Hampden hospital unit will be the same as it was in stages 2 and 3 of London's NFA program. One Ontario Works

Parameter	Value	Source	Notes & Assumptions
			staff and one housing advocate would be available during the drop-in hours.
Number of computers needed per hospital unit	one	A. Peters, personal communication, May 28, 2019	Assumes the number of computers needed to successfully run the NFA program in a Hampden hospital unit will be the same as it was in stages 2 and 3 of London's NFA program.
Cost of a computer	$865.74	Statista, 2019	The cost of a computer used for the NFA program is equivalent to the average selling price of personal computers worldwide in 2019. $632.00 USD = 865.74 CAD. USD to CAD conversion calculated June 26, 2020.
Number of parking passes needed for NFA staff	4		Allows office hours to be run at the same time on the different psychiatric units. i.e, two Ontario Works employees and two housing advocates could be working NFA office hours and using their parking passes at the same time.
Cost of a monthly parking pass at Hampden Health Care	$75	Hampden Health Care parking service desk	
Printing and office supply costs per program participant	$0.15	A. Peters, personal communication, May 28, 2019	Assumes the amount of printing and office supplies needed to successfully run the NFA program in a Hampden hospital unit will be the same as it was in stages 2 and 3 of London's NFA program.
Housing advocate time per hospital unit	nine hours per week	Forchuk et al., 2013a	The housing advocate will staff the drop-in centre at one of the hospital units.
Housing advocate hourly wage	$20.66 per hour	Neuvoo, 2020a	Assumes the average compensation of a housing support worker in Canada is the same as that of housing advocates employed by shelters in Hampden.

Parameter	Value	Source	Notes & Assumptions
Number of apartments viewed before signing a lease	three	B. Tracey, personal communication, June 7, 2019	Assumes Hampden's NFA program participants will look at the average number of apartments viewed before signing a lease in London, Ontario.
Round trip driving distance to view apartments	21.3 km	Google Maps, n.d.	Assumes the average round trip to an apartment will be halfway across Hampden.
Cost of transportation	$0.58 per km	Government of Canada, 2019	Assumes the cost of transportation is equal to the Government of Canada's automobile allowance rates for kilometres driven under 5000 kilometres.
Cost of housing someone in a homeless shelter per year	$15,600	London Ontario Community and Protective Services Committee, 2008	Assumes that the cost of housing someone in Hampden Community House is the same as housing someone in shelters in London, Ontario in 2008.
Ontario Works employee time per hospital unit	nine hours per week	Forchuk et al., 2013a	Assumes the amount of drop-in hours needed to successfully run the NFA program in a Hampden hospital unit will be the same as it was in stages 2 and 3 of London's NFA program.

WORKSHEET 1
Comparison of Consequences

Consequence	No Intervention	No Fixed Address (NFA) Intervention	Difference
Number discharged from Hampden Health Care psychiatric units			
Number at risk of discharge to homelessness			
Number of clients served			
Number of people at risk of discharge to homelessness who were housed upon discharge			
Number of people diverted from discharge to a homeless shelter			

Assumptions

Of the people at risk of being discharged to homelessness from Hampden Health Care, 100% will take part in the voluntary NFA program.

WORKSHEET 2
Comparisons of Costs

Cost	No Intervention	No Fixed Address (NFA) Intervention	Difference
Hampden Health Care Costs			
NFA office rent (opportunity cost)			
Computers			
Parking passes			
Printing and office supply costs			
Total Organizational Costs			
Hampden Community House			
Housing advocate worker wages			
Transportation costs			
Cost of housing clients discharged from Hampden Health Care's psychiatric units			
Total Organizational Costs			
Ontario Works			
Ontario Works employee wages			
Total Organizational Costs			
Costs to all Organizations (Hampden Health Care, Shelter(s), Ontario Works)			
Total Costs			

Assumptions
The 196 clients discharged from Hampden Health Care's psychiatric units to shelter will remain in shelter for the entirety of the year. The average duration of a period of homelessness identified by Allgood and Warren (2003) is 761 days. As such, it is assumed that clients will spend at least the first year of that time in shelter. Additionally, it is assumed that clients who did not initially get discharged to shelter will not utilize shelter services throughout the year. While clients who access shelters regularly cycle in and out of using them, the rate of this cycling is unknown. As such, an individual's housing status (in shelter or otherwise homelessness) at the moment of discharge is assumed to be their status for the duration of the year.

**Calculating Incremental Cost-Effectiveness Ratios for the
Number of People at Risk of Discharge to Homelessness Who Were Housed Upon
Discharge**

Perspective	Calculating Incremental Cost-Effectiveness Ratios (ICER)	ICER
Hampden Health Care		
Hampden Community House		
Ontario Works		
All Partnered Organizations		

WORKSHEET 4
Calculating Incremental Cost-Effectiveness Ratios for the
Number of People Diverted from Discharge to a Homeless Shelter

Perspective	Calculating Incremental Cost-Effectiveness Ratios (ICER)	ICER
Hampden Health Care		
Hampden Community House		
Ontario Works		
All Partnered Organizations		

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INSTRUCTOR GUIDANCE

No Fixed Address: A Cost-Effectiveness Analysis of a Program to Prevent Psychiatric Discharge to Homelessness

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Cheryl Forchuk, RN, PhD (Professor, Western University
Ava John-Baptiste, PhD (Associate Professor, Western University)

BACKGROUND

Najwa D'Souza, the CEO of Hampden Health Care, is looking for an intervention that will reduce the rate of discharge to homelessness from the psychiatric units at her hospitals. She is presented with the *No Fixed Address* (NFA) program as a possible solution. This intervention is a multipronged, hospital-based intervention that provides support to psychiatric clients who are either experiencing homelessness or are at risk of homelessness. To implement the program at Hampden Health Care, hospital staff would refer clients they suspect are at risk of being discharged to homelessness to the NFA program. From there, clients would have the option of receiving streamlined Ontario Works support or seeing a housing advocate who is employed by the local shelter system, Hampden Community House. Excited about the possibilities this intervention holds, Najwa must conduct an economic evaluation to assess the NFA program's value for money, and support decision making for Hampden Health Care and other relevant stakeholders.

Students take the perspective of someone on Najwa's health economics team. They are given a list of parameters including the types, quantities, and costs per unit of the resources needed for the two interventions being compared (usual care versus NFA program). Students must incorporate the parameters into a model-based economic evaluation comparing the costs and consequences of the alternative interventions. Students are then tasked with working through the rest of the steps to complete a cost-effectiveness analysis.

OBJECTIVES
1. Review the various steps of conducting an economic evaluation.
2. Estimate costs and consequences for inclusion in a cost-effectiveness analysis when given a list of parameters (resources required, quantity of resources used, and valuation of resources).
3. Calculate and interpret incremental cost-effectiveness ratios (ICERs).

DISCUSSION QUESTIONS
1. What are the four types of economic evaluations? How do they differ in terms of their valuation of costs and consequences, and their associated key metrics?
2. Describe the stages of conducting an economic evaluation. How do you see them reflected in the case?
3. What are the steps of conducting a cost analysis?

4. Do the ICERs calculated represent good value for money for the different stakeholders represented? Would you recommend moving forward with the program?

KEYWORDS

Cost-effectiveness analysis; homelessness interventions; incremental cost-effectiveness ratio; No Fixed Address (NFA); value for money

CASE 7

Going Beyond Bike Racks and Pedestrian Crossovers: Achieving Health Equity in School Travel Planning

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Andrew Clark, PhD (Senior Project Coordinator, Human Environments Analysis Laboratory)
Jason Gilliland, PhD (Director, Human Environments Analysis Laboratory)
Lloy Wylie, PhD (Associate Professor, Western University)

James Marshall is preparing for the Elgin-St. Thomas, London-Middlesex, and Oxford Active and Safe Routes to School (ASRTS) steering committee meeting. He is sitting in his office trying to determine what the strategic priority areas should be for this year's ASRTS steering committee working groups. He begins by reviewing the School Travel Plans from this year to understand key gaps in programming. James knows that addressing these gaps are critical to better supporting schools in implementing and sustaining effective school travel planning.

As the ASRTS steering committee Co-Chair and Senior Project Coordinator at the Human Environments Analysis Laboratory (HEAL) at Western University, James has witnessed firsthand how engaging in cross-sector community collaborations can better support a school community's engagement in active school travel – defined as commuting to and from school by human-powered modes, such as walking, scootering, or biking. As James continues to review data from the School Travel Plans in preparation for the ASRTS steering committee meeting, he notices a trend—most schools are in suburban, high-income neighbourhoods. He knows that the ASRTS steering committee has a responsibility to take action to address this inequitable program access across the tri-county region.

James realizes that to help more families choose active modes of travel, the ASRTS steering committee needs to identify and address issues within the current processes, resources, and system that are preventing school communities from participating in the program. Although he is confident he can draw on the unique skills and resources of the ASRTS steering committee partners to develop recommendations, James is unsure about how to proceed. What tools can the ASRTS steering committee use to identify how the school travel planning program impacts school communities in different ways? What strategies can they adopt to address these contextual implementation challenges in lower socioeconomic school communities?

ELGIN-ST. THOMAS, LONDON-MIDDLESEX, AND OXFORD ACTIVE AND SAFE ROUTES TO SCHOOL PARTNERSHIP

When children use active modes of travel (e.g., walk, scooter, bike) to get to and from school, the health and safety of a school community improves. Specifically, improvements can be seen in children's physical and mental health, traffic volume, air quality, and community connectedness (ASRTS, 2013). Active school travel is also an important source of physical activity for children (Larouche et al., 2014). Despite these benefits, active school travel has consistently declined in Canada since the 1980s (Buliung et al., 2009). It is estimated that only

37% of Canadian children and youth five to 19 years of age use active modes of travel to get to and from school (Ontario Active School Travel, 2018). This is problematic because physical inactivity is associated with adverse health outcomes such as type 2 diabetes, cancer, and obesity across the life course. A national movement known as school travel planning emerged to encourage families to choose active school travel through the implementation of multicomponent, school-based health promotion interventions.

The ASRTS partnership coordinates the facilitation of school travel planning across Southwestern Ontario, targeting elementary school-aged children and their families. The multidisciplinary organization consists of community partners from across the tri-county region who have a shared vision of promoting children's health and well-being. Some of the 20 stakeholders include the City of London, the Middlesex-London Health Unit, the London District Catholic School Board, the Thames Valley District School Board, the HEAL, Southwestern Public Health, and Southwestern Ontario Student Transportation Services (ASRTS, 2013).

The mission of the ASRTS partnership is to work in partnerships to improve the health and safety of all children and the environment by encouraging active school travel and by removing barriers through comprehensive health promotion strategies (ASRTS, 2013). Their community-based model is grounded in the following principles (Green Communities Canada, 2018):

- education, encouragement, engineering, enforcement, and evaluation
  (the 5E's approach);
- tailor to the needs of each school community;
- school community engagement;
- strengths-based programming; and
- capacity building.

The ASRTS steering committee supports the advancement of school travel planning across Elgin, Middlesex, and Oxford counties and the cities of London and St. Thomas. The role of the steering committee is to (1) guide program planning, (2) identify priorities, (3) monitor program quality, and (4) make decisions related to program changes. As a member of the ASRTS steering committee, James has gained valuable insight into the social, political, and economic factors that impact school travel planning across different school communities. He knows that the steering committee needs to have an open conversation about the current trends in program participation and how to achieve health equity in school travel planning.

SCHOOL TRAVEL PLANNING
School travel planning is a community-based approach used to promote and encourage active school travel among elementary school communities (Green Communities Canada, 2018). The program's goals are to: (1) raise awareness about the benefits of active school travel; (2) create convenient and safer options for active school travel; (3) build confidence in using active school travel; (4) and motivate families to choose active school travel (Green Communities Canada, 2018). The level of priority a school community places on achieving each of these goals varies based on the contextual challenges they face (Green Communities Canada, 2018).

School travel planning depends on engaging multisectoral stakeholders (Exhibit 1) (Green Communities Canada, 2018). This occurs at the local and regional level with a regional committee and a school committee (Green Communities Canada, 2018). At the regional level, a steering committee of local community stakeholders, such as the ASRTS steering committee, guides strategic program planning across a geographic area (Green Communities Canada,

2018). In addition, each school creates a school travel planning committee (e.g., teachers, students, parents, and staff) to develop and implement tailored strategies to encourage active school travel in their community (Green Communities Canada, 2018). Over the course of two years, the school committee moves through five phases: set up, collect baseline data, develop an action plan, carry out action plan, and evaluation (Exhibit 2) (ASRTS, n.d.a). During this time, the school travel planning facilitator (e.g., public health nurse, student transportation service coordinator) acts as a liaison between these two groups (Green Communities Canada, 2018).

James recognizes the role of the ASRTS steering committee in educating facilitators about the importance of a health equity lens and how to apply it when implementing school travel planning. While ASRTS has the capacity to provide educational resources and guiding recommendations to integrate equity principles, facilitators play a significant role in identifying and implementing these strategies at the frontline. How can recommendations be established to support facilitators in ensuring equitable access to school travel planning? James added this question to a slide in his PowerPoint presentation so that it can be discussed during the steering committee meeting.

CONTEXTUAL CHALLENGES

James recognizes the importance of understanding and considering context-specific factors during school travel planning program planning, implementation, and evaluation. A school's ability to successfully implement school travel planning depends on school leadership, collaboration and communication, and community and parent engagement (Buttazzoni et al., 2018). He questions whether current school travel planning processes and resources fail to consider how these factors may differ between lower and higher SES school communities.

James thinks about an urban school where a large proportion of families are recent immigrants experiencing poverty, limited literacy, and unstable employment. Using current school travel planning practices and resources, facilitators may not meaningfully engage this school community if the current strategies do not align with these families' values, identities, and lived experiences. He realizes that for the ASRTS steering committee to build sustainable programs and increase active school travel among children and families, every school needs a different level of support from a facilitator and strategies will need to be tailored to the community's lived experiences.

HEALTH EQUITY

To achieve health equity, the ASRTS steering committee needs to address the negative impacts of the social determinants of health (Ministry of Health and Long-Term Care [MOHLTC], 2018). At the last steering committee meeting James attended, Sandy, a public health nurse at Middlesex-London Health Unit, explained four public health roles used by the unit to guide health professionals in reducing health inequities. He realizes the ASRTS steering committee needs to (NCCDH, 2013):

- **Assess and Report**. Discuss the presence and impact of health inequities and strategies to address these inequities.
- **Modify and Orient Interventions**. Implement strategies to reduce inequities, recognizing the unique lived experiences of these communities.
- **Partner with Other Sectors**. Collaborate with multisectoral stakeholders to identify methods to improve the health status of populations of interest.
- **Participate in Policy Development**. Advocate in collaboration with other stakeholders in policy analysis and development related to the improvement of health equity.

The Health Equity Impact Assessment Tool

While James is on his way to the steering committee meeting at the Middlesex-London Health Unit, he determines that the ASRTS steering committee needs to create a list of the contextual factors and social determinants of health that could impact a school community's ability to participate in school travel planning. As he reflects on this, he remembers a tool a colleague had told him about that could help them identify the potential unintended health impacts of school travel planning on marginalized groups—the Ontario Health Equity Impact Assessment tool (HEIA) (National Collaborating Centre for Methods and Tools [NCCMT], 2012).

By using this tool, the ASRTS steering committee can evaluate the impact of the school travel planning program on different school communities to develop recommendations to improve program access (NCCMT, 2012). To conduct a HEIA, the committee will need to complete five steps (NCCMT, 2012):

1. **Scoping**. Identify populations who are at risk of experiencing unintended health impacts of school travel planning and potential unintended health impacts on those groups.
2. **Potential impacts**. Use available data to assess the unintended positive and negative impacts of school travel planning on identified groups.
3. **Mitigation**. Develop evidence-based recommendations to minimize negative impacts and optimize positive impacts on identified groups.
4. **Monitoring**. Determine how implementation of the recommendations will be monitored to evaluate the impact on identified groups.
5. **Dissemination**. Share results and recommendations for building equity into school travel planning provincially, nationally, and internationally.

IMPLEMENTATION SCIENCE

James' experience in community-based research has helped him to recognize how important it is for the ASRTS steering committee to develop recommendations that are relevant to the real-world practices of facilitators. While the ASRTS steering committee can create educational resources and guiding recommendations to integrate equity principles, they are meaningless if facilitators cannot operationalize these strategies on the frontlines.

James recalls the definition of implementation science – "the scientific study of methods to promote the systematic uptake of research findings and other evidence-based practices into real-world settings" (Bauer, et al., 2015). Using this approach, the ASRTS steering committee will be able to collaborate with facilitators and school communities to develop context-specific strategies that address frontline barriers to implementation (World Health Organization, 2014). James knows that these social, political, and economic factors are contributing to variability in program participation across school communities.

CONCLUSION

James begins his PowerPoint presentation to the steering committee. He explains the key gaps in programming he identified from this year's School Travel Plans. As he presents the current trends in school sociodemographic composition, he pauses to gauge the response of the committee. As they reflect on these trends, an open discussion about achieving equitable access to school travel planning emerges. A consensus decision is made to develop a School Travel Planning Equity Working Group.

The working group will consist of representatives from the Middlesex-London Health Unit, the HEAL, the Thames Valley District School Board, the London District Catholic School Board, Southwestern Public Health, the Southwestern Ontario Student Transportation Services, and the City of London (Exhibit 3). The objective of the group will be to use the HEIA to evaluate the inequities in current programming by identifying populations, potential impacts, and strategies. These strategies will be applied to the development and revision of school travel planning resources over the next year.

EXHIBIT 1
Overview of Stakeholder Involvement
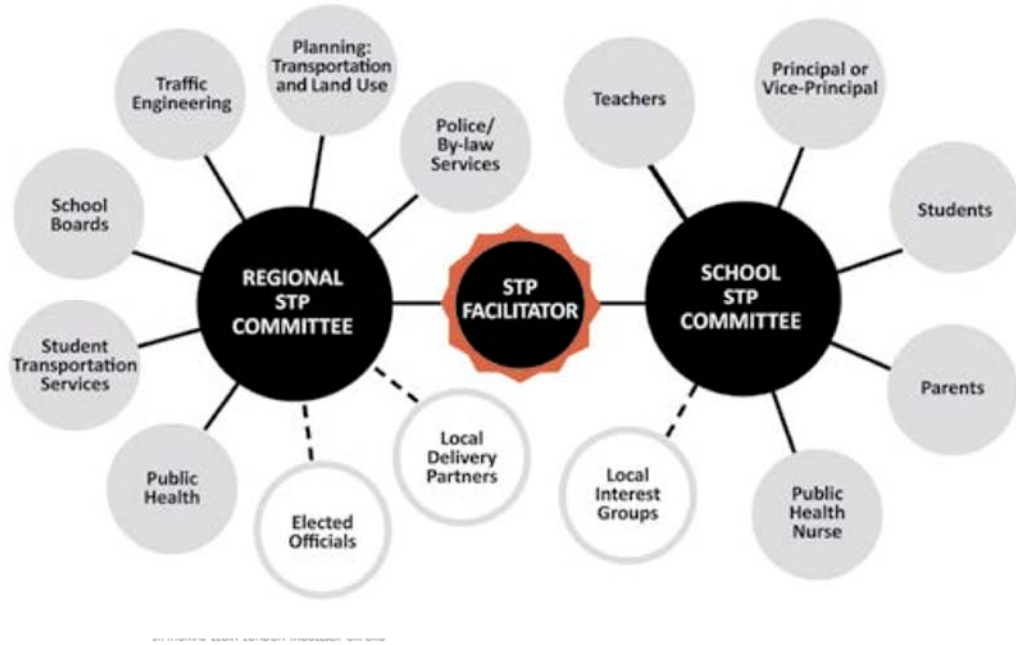
Source: Green Communities Canada, 2018. Copyright: Green Communities Canada. Used with permission.

EXHIBIT 2
Five steps of School Travel Planning

5 STEPS

Following the **5 steps of School Travel Planning (STP)** will help you and your school achieve success. The steps are meant to be sequential, but the process is not completely linear. For example, as **Action Plan** items are implemented (step 4) new ideas may be generated and added to the **Action Plan** (step 3)

1. SET UP   Tabs 1 & 2

- Contact school Principal and arrange meeting to introduce STP
- Review STP Manual and answer any questions about the program
- Complete **School Readiness Checklist**
- Complete **School Agreement** Form
- Engage school community (teacher, students, parents, community volunteers) and create a STP committee by:
  - Sending out **Newsletters** to parents and teachers
  - Conducting **presentation(s)** to introduce STP to parents, students, and school community (i.e., present to existing committees such as School Council, Safe School Committee, Healthy School Committee, etc.). Note that an existing school committee could have the STP as a subcommittee rather than creating a new committee
  - Provide a **Sign-Up Sheet** at the presentation and in the school's main office
- STP committee to establish a timeline and details for planning and implementing the STP
- Keep everyone well informed: continue to use the school's newsletter to communicate plans, progress and upcoming events with the school community

2. COLLECT BASELINE DATA   Tabs 3, 4, 5

- To understand the challenges affecting active transportation to and from school, 4 types of data are collected:
  1) **School Profile** (tab 1)
     - Fill in details specific to the school to assist in moving forward, such as: number of students in each grade and number of families (assists with knowing number of **Consents** and **Family Surveys** to print and distribute), percentage of bussed students, etc.

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2) **_Youth and Family Surveys_** (tab 3)
  - **_Family Surveys_** to be sent home with students in Grades FDK to 3. **_Family Surveys_** AND **_Consent Forms_** for **_Youth Surveys_** to go home with students in Grades 4 to 8. Students with returned **_Consent Forms_** will complete a **_Youth Survey_** during school time
  - Surveys and consents need to be coded using the **_Copying & Coding Process_** to maintain confidentiality. Assistance for coding can come from the HEAL at Western University (see **_Contacts_**)
  - Data entry and analysis will be provided by the HEAL at Western University. Results are then summarized and presented to the STP committee

3) **_Traffic Counts & Observation_** (tab 4)
  - Recruit volunteers to count active and motorized transportation use, number of students, and traffic pattern observations and concerns at identified locations around the school
  - Take place at the beginning and end of 3 consecutive school days

4) **_Walkabout_** (tab 5)
  - Areas of concern along student's routes to and from school are identified through a map on the **_Family Survey_** and assist in planning the **_Walkabout_** – a community supported walk along a designated route based on identified checkpoints of concern
  - Who to invite on the **_Walkabout_** - municipal transportation staff, facilities staff from Boards of Education, police officer for the school, city councillors, parents, etc. Take notes and share observations and ideas for improving active transportation following the event
  - Have a 'debriefing' session directly after the **_Walkabout_** to share observations and ideas for improving active transportation. This will become the basis for the **_Action Plan_**

3. DEVELOP ACTION PLAN   Tab 6

- Work with the STP committee to consider all collected data and the results of the **_Walkabout_** to complete the **_Action Plan_** with:
  - Measureable, clear and realistic recommendations
  - `Who' is responsible; and
  - Timeframe

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4. CARRY OUT ACTION PLAN
Tab 6

- The **Action Plan** resides with the school and is a living document that continually changes based on the achievement and development of action items
- Communicate the **Action Plan** to key community partners and to the school community through newsletters and the school web site
- Monitor progress through STP committee and regularly update School Council and/or other parent meetings
- Be patient- some **Action Plan** items are easily worked on but some require time, money and coordination with community partners

5. EVALUATION
Tab 10

- Approximately 2 years after the start of the STP (after several action items have been implemented), conduct follow-up data collection through evaluation youth and family surveys and **Traffic Counts & Observations**
- Should be conducted during a similar season to initial data collection to reduce effects based on weather (i.e., increased number of walkers when initial data collected in January and follow-up in June)
- Analyze the data with help from the HEAL at Western University
- Communicate the results: successes, results and next steps
- **Celebrate Success** no matter how small!
- Make necessary adjustments (revisions, additions, and removal of action items) to the **Action Plan** based upon the follow-up data

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Source: Active and Safe Routes to School, n.d.a.
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EXHIBIT 3
Overview of Health Equity Working Group Member Roles

Stakeholder	Overview of Role
Human Environments Analysis Laboratory (HEAL) Project Coordinator/Research Associate	• to help identify challenges and solutions to school transportation issues within the tri-county region • to collect and analyze baseline and follow-up data and develop the action plan • to summarize and present results to school communities
School Board Representative	• to help recruit school communities • to liaise with staff to support ethics reviews, communication, and engagement
Middlesex-London Health Unit Public Health Nurse	• to help identify challenges and solutions to school transportation issues within the tri-county region • to liaise with school staff, parents/guardians, and students to support program implementation • to address the health concerns of students within their family, school, and community contexts
Student Transportation Services Coordinator	• to help identify challenges and solutions to school transportation issues within the tri-county region • to liaise with school transportation staff to support program implementation
Transportation Demand Management Coordinator (City of London)	• to help identify challenges and solutions to school transportation issues within the tri-county region • to liaise with municipality staff to support program implementation and engineering modifications
Southwest Public Health Nurse	• to help identify challenges and solutions to school transportation issues within the tri-county region • to liaise with school staff, parents/guardians, and students to support program implementation • to address the health concerns of students within their family, school, and community contexts

Source: Active and Safe Routes to School, n.d.b.

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INSTRUCTOR GUIDANCE

Going Beyond Bike Racks and Pedestrian Crossovers: Achieving Health Equity in School Travel Planning

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BACKGROUND

The Elgin-St. Thomas, London-Middlesex, and Oxford Active and Safe Routes to School (ASRTS) Steering Committee have established a School Travel Planning Equity Working Group. The goal of this group is to use the Government of Ontario's Health Equity Impact Assessment tool to evaluate current inequities in school travel planning programming – a community-based approach to addressing barriers to and facilitators of walking and wheeling to and from school – by identifying relevant populations, potential impacts, and mitigation, monitoring, and dissemination strategies (Ministry of Health and Long-Term Care, 2018). The goal of the case is to provide readers with the opportunity to evaluate the inequities in current school travel planning by conducting a Health Equity Impact Assessment.

OBJECTIVES

1. Perform a community needs assessment that considers the unique social, environmental, economic, historical, and cultural characteristics of a community.
2. Recognize how the determinants of health (biological, social, cultural, economic, and physical) influence the health and well-being of specific population groups.
3. Formulate a response for marginalized populations that include community level and context-relevant strategies to improve population health.
4. Discuss the challenges associated with planning, implementing, and evaluating programs across different contexts and propose strategies to overcome them.
5. Describe how Health Equity Impact Assessments can be used to improve health equity among populations living in lower socioeconomic status neighbourhoods.

DISCUSSION QUESTIONS

1. Why is health equity an important consideration in program planning, implementation, and evaluation?
2. Brainstorm a list of contextual factors (social, political, economic, and environmental) that could influence a school community's ability to participate in school travel planning. What implications could these factors have on how the ASRTS working group designs its program? Be prepared to share this list with the class.
3. What are the contextual factors that make implementation in a lower SES school community difficult? How does this guide us to think about community readiness and project adaptability?

KEYWORDS

Active travel; health equity; healthy communities; healthy environments; implementation science; social determinants of health; socioeconomic status; school travel planning

CASE 8

Is it too Late to Re-evaluate? Creating Client-centered Changes within Canada's Medical Surveillance System

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Mia Baudin was beginning her day by scrolling through the news. Her routine of catching up on global matters was always the same when she headed to work, but today the news that she read on her morning commute resonated with her heavily. The headline "Drug-Resistant Tuberculosis: A Clear and Present Danger" caught her eye. Mia continued reading. A record number of drug-resistant tuberculosis (TB) cases were popping up in Southeast Asia and South Africa. The news article stated that, in 2017 alone, drug-resistant tuberculosis was estimated to have caused 230,000 global deaths (Pai, 2019). Mia let out a long sigh. It felt like tuberculosis was a relentless disease and the fight against it was constant.

Mia worked as a program officer in the Public Health Liaison Unit (PHLU) situated in the Migration Health Branch of Immigration, Refugees, and Citizenship Canada (IRCC). Her role was to communicate with provincial and territorial public health authorities (P/T PHAs) when foreign nationals enter Canada and record, when informed, that the foreign national had followed through with medical surveillance. Through her involvement with IRCC, Mia had been briefed on the tuberculosis situation in Canada. Although the incidence of TB here was relatively low, it was a large concern among the foreign-born population. Increasingly, the threat of multidrug-resistant tuberculosis and extensively drug-resistant tuberculosis within this population was also becoming a problem.

Just last week Mia had been briefed on the World Health Organization's (WHO) goal to eliminate tuberculosis. The objective of their End TB Strategy was to have a 95% reduction in global TB incidence and associated deaths by 2035 (World Health Organization, 2015). Mia knew that with immigration numbers on the rise, and the threat of drug-resistant TB being a greater concern than ever before, the medical surveillance system needed to be running effectively. She wanted to do whatever she could as a program officer to make this goal of eliminating tuberculosis tangible while keeping up with the increased demand on the medical surveillance system.

Mia's position required a balancing of roles. When informed of a likely case of active tuberculosis where the location of the client was currently uncertain, one of Mia's most critical responsibilities was to use information concerning the client in IRCC databases to determine the exact location of the client. This assisted in locating these individuals so that appropriate public health authorities could approach the client and provide appropriate treatment. In cases where an individual had remained untreated and was a potential public health risk, Mia had to work in collaboration with the P/T PHAs and the Public Health Agency of Canada (PHAC) to take

appropriate measures to mitigate any public health risk. Mia also had the more distinct responsibility of acting as a liaison and facilitating communication among foreign nationals, P/T PHAs, and regional health units. If a migrant arrived in Canada and reported to a public health unit, this reporting was then passed on to IRCC.

Despite these responsibilities, Mia felt her most demanding role involved communicating with clients directly regarding their concerns about TB screening and surveillance. Many clients were not aware of the medical surveillance system and were fearful about the process. Mia guided these individuals through the system and alleviated their uncertainty by explaining the steps they had to take. This was often a lengthy and challenging process. Within the past few months, Mia had received a surge of emails from clients who had interpretation challenges, questions about reporting locations, and the cost of medical surveillance. She was finding it increasingly difficult to keep up with the volume of emails she was receiving. As Mia logged in to her email today, she was greeted with an inbox full of much of the same.

She began to wonder if there was a more permanent way to address the concerns repeatedly brought forward. Migrants needed answers immediately and Mia wanted to ensure she could guide them through their requirement for public health surveillance inside Canada, but Mia also knew that she couldn't keep up with this demand alone. Her capacity within her role was already being stretched. Something more needed to be done to meet the current and future demands caused by population growth related to immigration. What was it within the medical surveillance system that was acting as a barrier to clients? Was the medical surveillance system not sufficiently client friendly? Perhaps identifying this was the first step.

BACKGROUND

As a program officer working in the PHLU, Mia had gained an in-depth understanding of the medical screening and surveillance processes. She reflected on the knowledge she had accumulated along the way.

Medical Surveillance and Immigration, Refugees, and Citizenship Canada

IRCC is the branch of the federal government responsible for regulating the entry of foreign nationals to Canada. This includes assessing the health of immigrants and refugees to Canada in order to identify certain infectious diseases of public health concern. The identification of these diseases then allows for effective facilitation of treatment.

Within IRCC, the Migration Health Branch oversees the health screening process which includes the Immigration Medical Examination (IME) and assessment of the IME which determines which clients can enter as well as the subsequent Immigrant Medial Surveillance (IMS) processes. The primary focus of the IME is to detect active cases of tuberculosis in the foreign national population, as active pulmonary TB renders a person medically inadmissible to Canada (Immigration, Refugees and Citizenship Canada – IRCC, 2014) until they are successfully treated. The primary focus of the IMS is to have clients at a risk of developing active TB report to P/T PHAs so they can be monitored and offered treatment if they become an active TB case (IRCC, 2014).

Immigration Medical Examination

Any person applying for permanent residency must undergo the IME. In addition, foreign nationals must undergo an IME even if they are temporary residents but intend to work in an occupation that could bring them in close contact with people, and in which the protection of public health is essential (IRCCa, 2019). There are many other applicants who are required to

undergo a medical exam, including some work permit candidates under International Experience Canada, certain health care students who are work-permit exempt, and people arriving as refugees (IRCCa, 2019). The IME must be conducted by a physician who is approved to conduct these types of exams. These physicians are known as panel physicians and they are located across the globe (IRCCb, 2019). The IME guidelines and components are outlined by IRCC. They include:

- Documentation of medical history
- Complete physical examination
- Chest x-ray and laboratory testing

Immigration Medical Surveillance
Foreign nationals found to have a condition that is a public health concern, such as inactive TB, must undergo IMS. Clients must proceed to a medical follow-up where further monitoring and appropriate treatment are determined. If a foreign national presents with inactive pulmonary tuberculosis, they must report to a public health authority within 90 days of entering Canada. However, if a client is identified as a more urgent case through the presentation of complex non-infectious active pulmonary tuberculosis, they must report within seven days (IRCC, 2014). Once this initial assessment is completed, a client is noted from an immigration point of view as being in compliance and the medical terms and conditions are lifted from their visa application.

Individuals who have active TB are inadmissible to Canada until they have undergone treatment for tuberculosis and have demonstrated proof of this. IRCC verifies this by collecting chest x-rays and other laboratory results from a respiratory specialist who confirms the client's diagnosis, the client's drug regimen/course of treatment, and their disease prognosis. Individuals who have active tuberculosis are also assessed for their antibiotic resistance to determine whether they present with multidrug-resistant or extremely drug-resistant TB.

The Medical Surveillance Pathway
Once a foreign national arrives at a Port of Entry in Canada, in many cases, a Canadian border security agent completes a medical surveillance undertaking form (IMM0535) and sends it to the PHLU. This form optimally contains the foreign national's Canadian address and contact information.

When the PHLU receives this information, they reference the province/territory indicated on the form and inform the designated jurisdiction of the individual's arrival to Canada. This starts the medical surveillance process. The province then initiates contact with a regional health unit or tuberculosis clinic that follows up with the client, does a risk assessment and directs them through the process of diagnostic testing and TB care if required. With this initial contact, the province/territory informs PHLU that a client is in compliance.

The British North America Act of 1867 (Health Canada, 2019) dictates that provinces/territories are responsible for healthcare provision. This means that implementation of TB control programs takes place at the provincial/territorial level and there are variations of these control programs depending on the responsible jurisdiction. Although there is a single published Canadian TB standard, each P/T determines how medical surveillance is carried out in their jurisdiction, including which IME documentation is required. These jurisdictional authorities are also able to establish how TB care is set up, with certain provinces having designated tuberculosis clinics and others relying on community health centers and public health units to facilitate care for the migrant population.

This lack of uniformity can create challenges for foreign nationals undergoing medical surveillance. Many migrants who move to different provinces might have to repeat their medical surveillance in order to meet compliance requirements in their new province. Clients are barraged with different types of insurance coverages, multiple costs associated with diagnostic tests, and disparate wait times for surveillance appointments depending on the province in which they reside. This makes creating a seamless and uniform country-wide medical surveillance system an even greater challenge.

The Global Tuberculosis Burden

Although Mia had been briefed on the purpose of medical screening and surveillance when she joined the Migration Health Branch, she initially had a limited understanding about tuberculosis itself. Dr. Greg Walkins, the Migration Health Branch's medical officer, had delivered a lecture on tuberculosis within Mia's first few weeks at the job, and this had helped her learn more about the disease.

Tuberculosis is a disease that has impacted humanity for thousands of years. It was only on March 24, 1882 when Dr. Robert Koch isolated *Mycobacterium tuberculosis* and determined it was the causal bacteria behind the disease (Floyd et al., 2018). At the time of this discovery, TB was responsible for devastating Europe, with mortality rates exceeding 100 per 100,000 people per year (Floyd et al., 2018). Although large strides have been made in tackling TB through effective drug treatment research, TB remains the top global cause of death from an infectious agent (Floyd et al., 2018). It is found in every country in the world, with drug-resistant TB being found in every country in which it has been measured (Floyd et al., 2018).

Tuberculosis is first treated via a six-month combination regimen of first-line drugs. These drugs include isoniazid, rifampicin, ethambutol, and pyrazinamide (Floyd et al., 2018). If an individual has multi-drug resistant TB (both rifampicin and multidrug resistant), they typically undergo treatment with second-line drugs that are more toxic and expensive. This regimen can last anywhere from nine to twenty-four months in duration. To date, the only licensed vaccine available to decrease the likelihood of developing certain severe forms of TB is the bacille Calmette-Guerin vaccine. This vaccine is most effective at preventing tuberculosis in infants and young children, with its protection in older children and adults ranging from 0% to 80% (Floyd et al., 2018).

With tuberculosis being responsible for 1.5 million deaths globally in 2018 (World Health Organization, 2019), it is critical that there are structures in place to limit the public health risk of TB transmission in Canada. Although the foreign-born population represents approximately one fifth of the total Canadian population, it constitutes a large majority of those enduring the greatest disease burden (PHAC, 2019). In 2017, the foreign-born population accounted for 71.8% of active TB cases in Canada (LaFreniere et al., 2019), demonstrating a disproportionate impact of the disease on this population. Furthermore, people who become permanent residents and may also have latent (inactive) TB are at a greater risk of developing active TB due to previous exposure, difficulty in accessing health services, and food and housing insecurity (LaFreniere et al., 2019). Appropriately directing individuals through treatment and surveillance is meant as an introduction to health care within Canada and as a method to ensure the health and safety of people arriving to the country as well as the local population.

The World Health Organization has implemented the *End TB Strategy* to reduce the global incidence of tuberculosis. The goal is to reduce the global incidence of the disease from the rate

of 110 per 100,000 in 2015 to 100 per 100,000 or less by 2035 (WHO, 2019). Data from 2017 demonstrated that there were 1,796 cases of active TB in Canada, amounting to an incidence of 4.9/100,000 (LaFreniere et al., 2019).

SPECIFIC AREA OF INTEREST

Ensuring Compliance with Medical Surveillance

The proportion of the foreign-born population in Canada is continuing to rise, with immigration rates slowly approaching levels last seen in 1913. The 2016 Canadian census indicated that 7,540,830 people had come to Canada through the immigration process, which represented 21.9% of Canada's population at the time (Statistics Canada, 2017). Ensuring the positive health status of these is an important objective for IRCC.

Although the incidence of TB in Canada is low within the general population, this contrasts with the incidence in nations from which foreign nationals arrive. The World Health Organization's *Global Tuberculosis Report* (2019) states that most TB cases occur in Southeast Asia (44%) and Africa (25%). The report also reveals that the 30 highest TB burden countries constitute 87% of all estimated incident cases worldwide (World Health Organization, 2019). India, China, Indonesia, the Philippines, Pakistan, Nigeria, Bangladesh, and South Africa have the largest TB burden (Exhibit 1). Asia continues to remain the top source continent from which recent immigrants arrive to Canada, with 2016 data revealing that 61.8% of newcomers arriving here between 2011 and 2016 were from this geographic location.

The challenge that exists for IRCC, and particularly for the Migration Health Branch in improving the prevention and management of tuberculosis within the foreign national population in Canada is the appropriate integration of the IMS procedures with provincial/territorial TB control programs. The other challenge is, although immigration numbers are increasing, the resources allocated to effectively guide foreign nationals through the medical screening and surveillance processes are not. This creates an additional burden on the key stakeholders and the current medical surveillance system in ensuring screening and surveillance programs are effective. Transition to more effective and efficient IME and IMS procedures will be challenging.

The PHLU is a critical point of contact for many newcomers to Canada who must undergo medical surveillance. The PHLU is responsible for creating a supportive environment for foreign nationals who may have recently been diagnosed with active or latent TB. Because many individuals are unaware of their health status until they undergo the IME, it is essential that the PHLU be involved in creating lines of communication that is not stigmatizing to immigrants. Medical screening and surveillance should be viewed as a stepping stone in achieving integration into Canada and its health care system with the eventual step of taking on citizenship. Negative attitudes and fear about the surveillance process can further impact the number of people who are able or willing to comply with this requirement. This is why the messaging around medical surveillance and the manner in which surveillance is conducted are critical to its success.

Back to the Tasks at Hand

Mia stared at her computer feeling slightly dejected. It was only the middle of the afternoon and the emails flooding her inbox showed no signs of slowing down. There were many client concerns and varied inquiries related to a variety of stressors. Many new immigrants were not sure if they required medical surveillance or if they were responsible for contacting their local public health units. Some clients wondered what the examinations would cost. Others did not

know what to do when they relocated to different provinces, and many immigrants had difficulties understanding the terminology used by IRCC.

Mia was concerned that, at this rate, the PHLU would not be able to manage the task of guiding clients through their concerns while fulfilling its other roles and responsibilities. She realized that if the volume of migrants continued to increase, there would be even more client concerns to address in the near future. Mia also recognized that as challenging as it was keeping up with client correspondence, behind these emails were people who had valid concerns about the medical requirements pertaining to their visa applications. Mia needed to find a solution to the repeat client concerns that required her attention. She wanted to identify a way to change certain barriers within the medical surveillance system to make it more client centric, but she didn't know where to start. She first had to analyze at what points stressors were occurring for clients. Only after understanding this could changes then be proposed.

SPECIFIC PROBLEM OF DECISION
In the upcoming weeks, the Migration Health Branch's strategic plan was going to be discussed. This strategic plan focused on targets and goals for the next four years. If proposing to make the medical screening and surveillance system more client-centric was a priority, this was the opportune time to add this proposal to the agenda. Mia flipped open her calendar to next week's team meeting.

The weekly meeting held on Thursdays would be the ideal time to propose the notion of tackling client challenges within the medical surveillance system. With her colleagues' support, Mia felt she could take the first essential step to evaluating the barriers to client compliance. Without doing this, program changes could not be proposed and implemented. Mia knew she needed more people on board. Taking on an initiative of this scale with limited resources would be challenging but possible if it was well structured. Mia did not want to start this project without being able to truly assess client needs and deficiencies within the program. Without doing her due diligence, this evaluation would not lead to any long-term change.

Mia wondered how, as a mid-level employee of the PHLU, she could best take on this initiative. How could she perform an effective evaluation that incorporated the perspectives of the various stakeholders involved? This would mean taking note of perspectives from the Migration Health Branch, the PHLU, the P/T PHAs, and those working regionally at the frontline of client care. She began jotting down all the stakeholders involved along the client's journey through medical surveillance. To understand the deficiencies in the surveillance program, she needed the stakeholders' perspectives as well as the clients' testimonials about their experiences.

Mia knew that the team did not have additional funds to spend on hiring someone to put together an evaluation of client challenges within the medical surveillance system. This was her shot at creating a valuable resource that could then be used to implement positive change at the client level. She reminded herself that behind every file was a story. This was an opportunity to capture it and make an impact by representing it fairly.

CONCLUSION
Mia began thinking about the process. She had just under a week to develop an outline of what was needed to create a comprehensive evaluation of the medical surveillance system in regard to client-centred deficiencies. She began by writing down the input she required from stakeholders, the resources needed, and her timeline to make this assessment happen. Next week when she walked into the weekly team meeting, she would bring forward her plan to begin

addressing client challenges within the medical surveillance system. The process would not be easy, but she knew her Master of Public Health education, public health training, and experience would help her draw on appropriate resources and create an initiative grounded in its structure. This would hopefully be enough to demonstrate the importance of this idea and have it incorporated into the strategic plan. Mia let out another deep breath and eagerly got to work. She knew she was adding one larger task to her list, but she couldn't wait to see the results of her ambition.

EXHIBIT 1
Estimated TB Incidence in 2018 for Countries with at Least 100, 000 Incident Cases
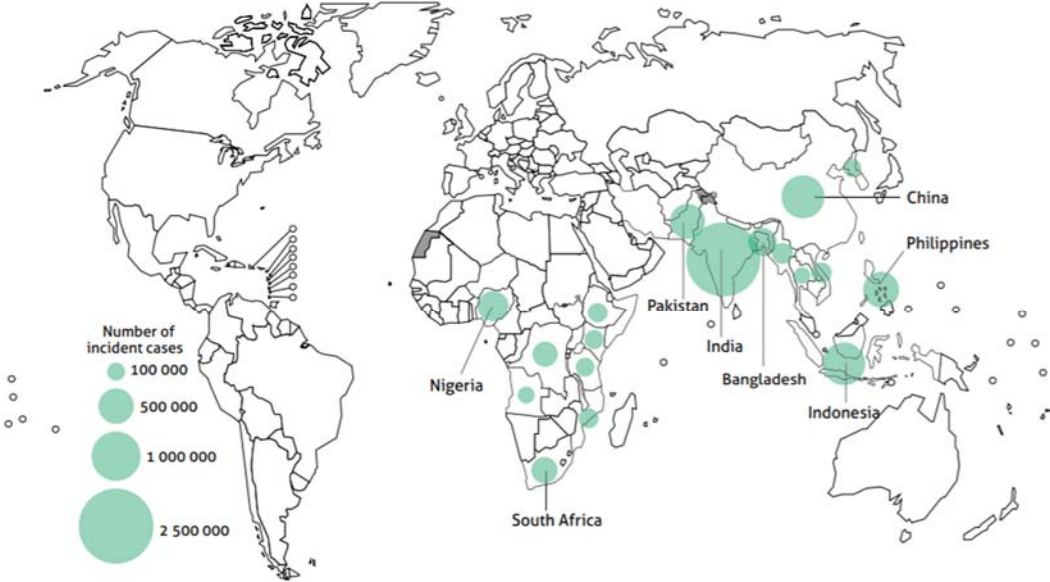
Source: World Health Organization, 2019.

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INSTRUCTOR GUIDANCE

Is it too Late to Re-evaluate? Creating Client-centered Changes within Canada's Medical Surveillance System

Fatema Jamaly, BA, RDH, MPH (Class of 2019)
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BACKGROUND

Mia is a program officer in the Public Health Liaison Unit at Immigration, Refugees, and Citizenship Canada's Migration Health Branch. Mia works with her team to oversee medical surveillance notifications related to tuberculosis. Mia and her team identify migrants arriving to Canada who require tuberculosis testing and care, and connect them with the appropriate Provincial/Territorial Public Health Authority in the province or territory they want to reside in. Lately, Mia has noticed that the number and type of client concerns filling up her email inbox are increasing. These client concerns range from knowledge, language, and interpretation barriers, to difficulties understanding where to report for medical surveillance. Mia wants to conduct a program evaluation to determine exactly where client barriers exist within the medical surveillance system. She wants to use this information to suggest transformation to areas that require change.

OBJECTIVES

1. Use an understanding of disease incidence, prevalence, and surveillance to influence the development of programs or interventions for targeting and eliminating disease transmission.
2. Select quantitative and qualitative data collection methods that are appropriate for conducting a program evaluation. Determine which stakeholders and resources are required to do this.
3. Discuss the means to achieve health equity for foreign nationals by specifically looking at how immigrants undergo medical surveillance in Canada.
4. Design a population-based policy, program, project, or intervention that keeps the end user in mind.

DISCUSSION QUESTIONS

1. How does the Public Health Liaison Unit help facilitate medical surveillance?
2. What is the main challenge identified by the protagonist Mia in the case?
3. What are the challenges endured by immigrants who arrive in a new country? How might this impact their ability to complete medical surveillance?
4. What factors need to be considered when conducting a program evaluation?
5. How can successful program evaluations be used to transform programs and interventions?

KEYWORDS

Client-centered program evaluation; foreign nationals; medical surveillance; tuberculosis.

CASE 9

A Knot of Contradictions: Systems of Intersectionality and Muslim LGBTQ+ Mental Health Programs[1]

Nour Kachouh (نور قشوع), BSc, MPH (Class of 2019)
Harvir Sandhu, BA, MPH (MPH Class of 2019)
Amardeep Thind, MD, PhD (Professor, Western University)

To Sara (سارة): I'm sorry we couldn't find you sooner and I'm sorry we weren't there for you. Rest in Peace, you will not be forgotten.

On the flight back to Ottawa, Yasmin Baytar's mind is racing. She has never experienced such an intense connection to a project before. Yasmin, a policy analyst in the Canadian Centre for Health Equity (CCHE or the Centre) a research arm for a top Canadian East Coast University, is returning from Vancouver after attending the Women Deliver 2019 conference. Women Deliver is an organization that advocates for gender equity and the health and rights of girls and women worldwide. Every three years Women Deliver holds a conference to address ongoing global, inequity-based issues affecting women and girls. Because the conference was held in Vancouver this year, Yasmin was able to fly there to represent the CCHE.

Yasmin distinctly recalls the workshop she attended that sparked her interest. She cannot remember the name of the organization that hosted it, but she certainly remembers what they do, which is support and address the unique mental health needs of the Lesbian, Gay, Bisexual, Transgender, and Queer plus (LGBTQ+) Muslim community in Vancouver. She is excited and re-energized by the work being done and by what she has learned.

Yasmin has been at CCHE for several years after completing her Master of Public Policy degree, and has worked at several projects over the years. This time, she felt different; she was excited about the next project she wanted to focus on – a community-based intervention aimed at addressing the mental health needs of the Muslim LGBTQ+ community. Through her unique lived experience, Yasmin knows what it is like to feel as if you are a small minority in the world and to feel like you do not belong. After all, she does belong a small minority of people who openly identify as being both Muslim and LGBTQ+. The vast majority of Muslim LGBTQ+ individuals hide their true identities, afraid of speaking out on their faith in LGBTQ+ community and of openly identifying as LGBTQ+ in their Muslim communities. They live in a knot of contradictions that allows them to see the world through a unique lens. Only after attending this workshop did she finally feel seen and understood. Yasmin has not worked in a community capacity before, but she has read about it and knows she can apply her comprehensive

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[1] *This is a fictitious case. Unless otherwise indicated, all the names, characters, businesses, places, events and incidents in this case are either the product of the author's imagination or used in a fictitious manner. Any resemblance to actual persons or organizations is purely coincidental.*

knowledge to developing such an intervention. Plus, she knows that her lived experience will help. Remembering her recent Sex- and Gender-based Analysis Plus (SGBA+) (Exhibit 1 & 2) training and thinking about the possibility of a multisectoral partnership through CCHE, Yasmin decides to use her background knowledge to develop an intersectional intervention that addresses her community's mental health concerns. SGBA+ is an analytical tool and process that ensures that policies, programs, and initiatives are planned, implemented, and evaluated through an intersectional lens. SGBA+ supports program organizers in assessing how their programs may impact diverse populations beyond sex and gender (Women and Gender Equality Canada, 2018b).

Currently, very little programming exists in Canada to address the very specific mental health needs of the Muslim LGBTQ+ community. LGBTQ+ Muslims face hardships and stigma because of their intersecting identities, which can contribute to negative health outcomes. Unfortunately, literature on this marginalized population is sparse, making it difficult to evaluate which public health interventions would support this community best. In Canada, there is a growing need to address negative health outcomes in the Muslim LGBTQ+ community, which continues to be under researched, underserved, and rendered invisible. Yasmin is inspired by the work the Vancouver organization is doing and decides to bring this information back to CCHE with her, having identified a service gap in her LGBTQ+ Muslim community. She needs to design and implement a program that will fit the needs of the LGBTQ+ Muslim population across Canada.

BACKGROUND
Intersectionality
In 1989, Kimberlé Crenshaw coined the term "intersectionality" and described the underlying theory behind it (Crenshaw, 1989). The theory emerged from concepts debated in critical race theory circles. Crenshaw's paper delves into three legal cases that simultaneously deal with sex and racial discrimination (Coaston, 2019). In her paper, Crenshaw argues that the courts need to recognize that Black women face discrimination both because they are female and because they are Black, with discrimination sometimes "intersecting" on those margins so that these women experience a combination of both systems of marginalization (Crenshaw, 1989). Viewing discrimination in silos, either on the basis of gender or on the basis of race, does not address the intersection and interplay of these systems of power.

Since then, the concept of intersectionality has evolved, and its use has expanded beyond its original meaning. It is now used to describe the way people's identities intersect diversely, thereby impacting their everyday lives as a result of their identities. However, according to Crenshaw, the mere recognition of intersecting identities is not enough to describe the way intersectionality should be used. Rather than merely focusing on people's individual identities, and the way people exist through their individual identities, intersectionality moves to recognize the intersecting systems of power and how they impact the groups who lack this power (Coaston, 2019). Intersectionality can help us understand not only how systems of power can interconnect, thereby affecting populations in a multitude of ways on various axes of power and discrimination, but also how to mitigate those impacts by addressing the root cause of the discrimination.

Yasmin wants to make sure she was not focusing her program only on individual identities, but rather on how these identities are affected by existing systems of power in society. She needs to understand both individual and community level impacts of discrimination and power dynamics.

The Social Ecological Model
The Social Ecological Model or Socio-Ecological Model (SEM) (Exhibit 3) is a concept that considers the complexity of interaction between various levels in society (Centers for Disease Control and Prevention [CDC], 2019). These levels include societal, community, relationship, and individual level factors (CDC, 2019). The model posits that, in order to implement successful public health interventions using an upstream approach, the four different levels need to be addressed simultaneously (CDC, 2019). For example, when thinking about health inequity at the individual level, important factors to consider include biological and personal factors such as age, gender, sexuality, income, and other determinants of health. At the relationship level, social support networks, including close family and friends, need to be considered. At the community level, interventions that include social settings that define who we are and what we do are important. The fourth and broadest level is the societal level, which looks at factors in society that influence health inequity, such as systems of power.

As a tool, the SEM provides the ability to think about how these different levels act on their own, as well as how they may influence each other. Yasmin knows that for her program to be a success, she needs to think of ways to implement her program to include these different levels.

Equality, Equity, and True Equality
The concepts of equality, equity, and true equality (Exhibit 4) are closely related but represent different ways of understanding and addressing different population needs. Equality assumes that in order to achieve positive health outcomes for different populations, everyone from diverse backgrounds and populations should be treated the same (Women and Gender Equality Canada, 2018a). Equality does not recognize that varying populations experience different forms of discrimination and power dynamics that may have differing outcomes on their health.

Equity, on the other hand, builds on the concept of fairness, wherein individuals are provided with different treatments and supports depending on what barriers they encounter (Women and Gender Equality Canada, 2018a). This allows them to receive the supports they need, depending on their requirements and circumstances. Equity recognizes that different populations experience power dynamics and discrimination in different ways, depending on their identities and the systems of power they face.

In order to truly address the needs of diverse populations, the systems that enforce and maintain the barriers should be broken down and removed (Women and Gender Equality Canada, 2018a). The third concept, true equality, looks to improve health needs by breaking down systemic barriers that keep different populations marginalized. SGBA+ is a tool that can be used to help recognize and address these systemic barriers (Women and Gender Equality Canada, 2018a).

Sex- and Gender-Based Analysis Plus
By signing the 1995 United Nations Beijing Platform for Action declaration during the Fourth World Conference on Women (United Nations, 1995), Canada committed to utilizing SGBA+ in all projects and programs. SGBA+ supports program organizers in assessing how their programs may impact diverse populations beyond sex and gender (Women and Gender Equality Canada, 2018a). By incorporating Crenshaw's theory of intersectionality into the tool, Canada recognizes that people's identities and experiences involve more than their sex (biological) and gender (social and cultural). SGBA+ allows government branches and agencies to address health inequity for diverse populations across their policies, programs, and initiatives.

Since its inception, CCHE has been incorporating SGBA+ into its internal and external work. Through internal capacity-building efforts, the Center is working to build internal capacity by incorporating SGBA+ into its diverse programs and portfolios. Further, by collaborating through multisectoral partnerships, the Center supports analyzing the way SGBA+ is used to inform each community partner's program, depending on their population of interest.

The process of conducting SGBA+ begins by identifying the issue being faced (Women and Gender Equality Canada, 2018b). Once the issue is identified, SGBA+ asks to examine assumptions and challenges them depending on the issue raised (Women and Gender Equality Canada, 2018b). The identified assumptions can then be challenged through researching, consulting, and gathering facts about the population of interest (Women and Gender Equality Canada, 2018b). Through this, options and recommendations are developed based on the research findings, and progress is continually tracked and evaluated (Women and Gender Equality Canada, 2018b). Although this may seem like a linear process, SGBA+ can be utilized in a cyclical fashion. SGBA+ also requires that the people using the tool document and communicate findings to stakeholders to ensure transparency and accountability (Women and Gender Equality Canada, 2018b).

Yasmin has supported multisectoral SGBA+ partnerships through her work at the Center and she hopes she could do the same with her new project.

SPECIFIC AREA OF INTEREST
Mental Health Disparities in the LGBTQ+ Population
From her research, Yasmin knew the systems of oppression such as homophobia that impact LGBTQ+ people contribute to negative health outcomes for this population (CDC, 2017). Discrimination and violence resulting from homophobia account for higher rates of bullying and harassment at school among LGBTQ+ people (CDC, 2017). When interacting with other systems of oppression and marginalization, such as discrimination based on gender identity or discrimination based on race or culture, these systems of oppression begin to intersect, creating more harmful impacts for those vulnerable populations. Yasmin knew the harsh realities – LGBTQ+ youth are about 14 times more likely to die by suicide, a leading cause of death for this population, than non-LGBTQ+ youth (Canadian Mental Health Association [CMHA], n.d.; National Alliance on Mental Illness, 2018). Furthermore, in Ontario, LGBTQ+ people are over-represented in lower socioeconomic status brackets, with approximately half of transgender individuals living on less than $15,000 a year (CMHA, 2019). Transgender people are also more at risk of death by suicide and suicidal ideation; an Ontario-based survey of trans respondents showed that 77% of Ontario's transgender population had considered suicide and 45% had attempted it (CMHA, 2019). This population is further marginalized when LGBTQ+ identities intersect with other forms of oppression and marginalization (CMHA, 2019). The systemic inequalities experienced by LGBTQ+ people because of their identities points to the importance of providing mental health support for the LGBTQ+ population.

Over the past few years, research has shown the importance of community engagement for populations that experience systemic violence and marginalization (Kulick et al., 2017). For marginalized populations, community engagement not only supports their ability to heal together from traumatic experiences linked to systemic oppression and marginalization, but it also supports individual self-efficacy by mitigating the impacts of these systemic barriers (Kulick et al., 2017). However, it is important to note that community engagement takes time and energy, and this often manifests in the form of unpaid labour. When the communities experiencing the brunt of systemic marginalization are highly involved in community engagement, this

engagement can have negative rather than positive effects (Kulick et al., 2017). As such, to understand the connection between community engagement and mental health and wellbeing for LGBTQ+ populations, a nonlinear association must be used. This is because low and high levels of community engagement are associated with higher rates of depression, whereas a moderate level of community engagement results in lower rates of depression and benefits individual mental health and wellbeing (Kulick et al., 2017).

Moderate levels of community engagement support LGBTQ+ populations in their efforts to develop social support networks without detrimental impacts on mental health and wellbeing (Kulick et al., 2017). For LGBTQ+ people who also have other identifying factors such as race and culture, being involved in LGBTQ+ community engagement mitigates the impacts of depression (Kulick et al., 2017). Yasmin wanted to ensure community engagement was built into her program while making sure to recognize that everyone has different accessibility barriers and different time and energy capacities.

To ensure her program fit the needs of the community, she had to find balanced community engagement programming that achieved a moderate level of engagement.

Mental Health Disparities in the Muslim Population
Because the North American Muslim population is rapidly increasing, there is a growing need for culturally competent mental health interventions that are specific to this community (Mir et al., 2015). Of the nearly one million Muslims residing in Canada, approximately half live in Ontario (Warsi, 2019). Research has shown that ethnocultural immigrant groups have low rates of mental health consultations, with the Canadian Muslim population having half the rate of mental health consultations with physicians compared with the Canadian-born population (Islam et al., 2017). This gap in service, coupled with the stress of migration and relocation and their negative impacts on mental health, requires that a specialized mental health intervention focused on Muslims be developed (Islam et al., 2017).

Research suggests that developing population-specific interventions and incorporating religious and cultural practices into mental health interventions can render better health outcomes, especially for ethnically marginalized groups (Mir et al., 2015). For many Muslims, the use of religion and faith as part of a holistic mental health intervention is vital to ensure positive health outcomes (Warsi, 2019). Muslims in Canada need special consideration when mental health interventions are designed because they observe varied religious practices that could affect their daily wellbeing. For example, during Ramadan, the Islamic month of fasting, different religious practices and customs need to be considered when clients who have mental health concerns are treated (Furqan et al., 2019). These could include accounting for medication intake timing if patients are taking medication for their mental health, and incorporating different spiritual group activities to ensure that social networks allow for support and social integration (Furqan et al., 2019). Yasmin needs to determine a way to incorporate religious and cultural practices, when appropriate, into the planning of her intervention.

Mental Health Disparities in the Muslim LGBTQ+ Population
Unfortunately, there is a lack of published literature on the mental health needs of the Muslim LGBTQ+ population. This is going to make it more complicated for Yasmin to make her case for funding a mental health pilot program. Determined to find answers, Yasmin sat at her computer typing furiously, searching for answers to the questions whirling around her head. She has not investigated this topic for a while, the last time being a few years ago when she was trying to find answers about herself and her own identity. Holding a coffee in one hand, she skims through the literature to find the most recent articles on the topic, first focusing on the

intersection of spirituality and LGBTQ+ identity. She finds a study showing that spiritual LGBTQ+ people who are condemned by mainstream religious sects can be negatively impacted by this condemnation (Beagan & Hattie, 2015). Further, depending on the degree of intolerance from the religious sect, the harm experienced can be emotional, mental, and/or spiritual (Beagan & Hattie, 2015). Yasmin changes direction, searching now for any research that discusses the intersection of Islam and LGBTQ+ identity. An article catches her attention. She sighs because it is the same article she found years ago when she was trying to find answers about her own contradictions and identity struggles.

The article explores the influence of Islam on people who are Muslim and LGBTQ+ in North America who access a support organization called Al-Fatiha Foundation (Minwalla et al., 2005). Al-Fatiha was a North American grassroots organization founded in 1997 ("Al-Fatiha Foundation," n.d.). The name Al-Fatiha refers to the first *Surah,* or chapter, from the Qur'an, and means "the opening". The organization is predominantly online and has various regional offices across North America. It supports Muslim LGBTQ+ individuals by connecting them with other Muslim LGBTQ+ people across North America, and by running annual events that explored the intersection of Islam and LGBTQ+ identity (Minwalla et al., 2005; "Al-Fatiha Foundation," n.d.). Unfortunately, because of unsustainable leadership and ongoing pressures from conservative Muslim sects, including threats to safety and the issuing of a *fatwa* (Islamic ruling issued by a religious leader) against the organization and its members, the organization dissolved in 2011 (Minwalla et al., 2005; "Al-Fatiha Foundation," n.d.). Although the findings from the original research article are valid and could potentially be replicated in a different study, the context in which it existed has changed.

This article is one of the first to document the Muslim LGBTQ+ experience in the North American context and to explore what it means for Muslim LGBTQ+ members to live this intersection (Minwalla et al., 2005). Minwalla and colleagues (2005) state that, although some Muslim scholars are moving toward accepting homosexuality as part of Islam, the stress and anxiety that LGBTQ+ Muslims carry, because they are unable to reconcile their sexuality or gender identity with their faith, can cause negative mental health outcomes. Minwalla et al. (2005) stated that Muslim LGBTQ+ people initially reject their religious identity and traditions during the early coming out stage, but eventually accept and own both their sexual/gender identity and their religious identity and find there is a need to incorporate both identities. On a fundamental level, the study proved that Muslim LGBTQ+ people exist, and that their experiences with religion and sexuality or gender identity should not be seen as irreconcilable differences, but rather as coexisting identities that should be integrated (Minwalla et al., 2005). This meant that Yasmin has to think about what this might mean for the mental health and emotional and spiritual wellbeing of Muslim LGBTQ+ people.

Yasmin decides to explore the grey literature on this topic. If she could not find the results in peer-reviewed literature, maybe she could find out what Muslim LGBTQ+ people were saying online and in other contexts. Yasmin comes across a TEDx talk by Blair Imani, a Black, Muslim, bisexual historian, writer, and activist (Imani, 2019). Imani, standing on a lit stage, speaks passionately and unequivocally about being Black and Muslim and queer, and how those identities exist within her, finding that she needs to reconcile nothing between them because she herself exists (Imani, 2019). Yasmin realizes that for her program to be successful, she needs to integrate Islam and queerness rather than attempt to see them as differences that need to be reconciled. This realization brings up intersectionality for her all over again. Intersectionality posits that we cannot simply add the varying systems of oppression and marginalization that populations experience, but rather that these must be understood from a

more contextual perspective (Kulick et al., 2017). Yasmin needs to figure out a way to incorporate intersectionality into her program design while keeping in mind that to address the mental health needs of the Muslim LGBTQ+ community, religion and queerness need to coexist as identities.

SPECIFIC PROBLEM OF DECISION

Yasmin faces several issues. She has a growing concern for the mental health needs of her Muslim LGBTQ+ community members, minimal programming to support the Muslim LGBTQ+ population, a lack of evidence to help her inform her work, and a program to plan with no idea where to start. She needs to find robust evidence to show the unique health disparities that this population faces. She knows support for this community is needed urgently. How is she going to show this is truly a public health issue when the published literature on this topic is essentially nonexistent? How is she going to capture the diversity of experiences, genders, sexualities, and people in this population? Where is she going to find this evidence? How is she going to prove the need for funding? Should she jump into her pilot program? At what level of intervention should she direct her program? Where should she start planning this program? Most important, how is she going to reach such an invisible and diverse population?

CONCLUSION

The Muslim LGBTQ+ community is a unique and often unseen population. There is a serious need for a community program that addresses the mental health needs of the Muslim LGBTQ+ community in Ottawa. Yasmin is excited to plan this program, but she is overwhelmed and not sure where to start. She wants to jump right in, but she knows that taking time to consider all the angles will help make this program a success. Yasmin has a lot to think about. How and where was she supposed to start?

EXHIBIT 1
Sex and Gender Based Analysis+ Flower

Source: Women and Gender Equality Canada, 2018a.

EXHIBIT 2
Sex and Gender Based Analysis+ Process

Source: Women and Gender Equality Canada, 2018b.

EXHIBIT 3
The Social Ecological Model
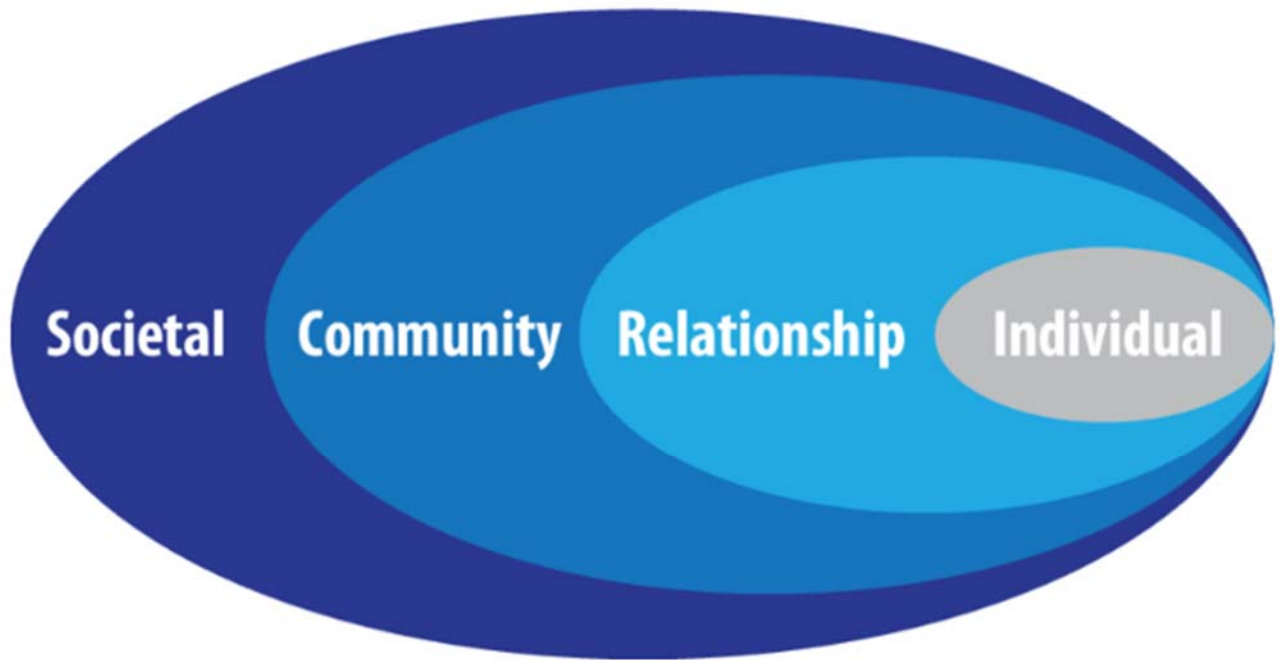
Source: Centers for Disease Control and Prevention, 2020.

EXHIBIT 4
Equality, Equity, and True Equality

Equality   Equity   True Equality
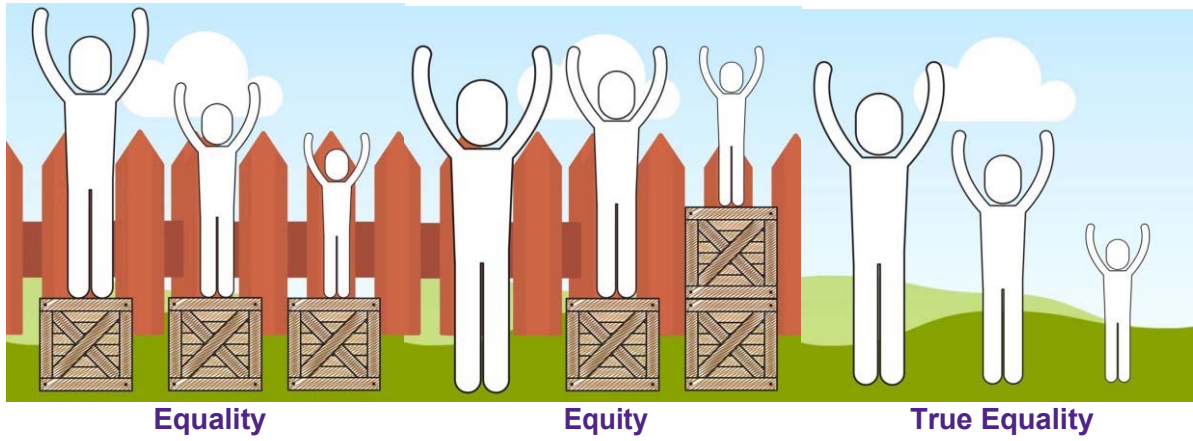
Source: Adapted from Craig Froehle's image, and inspired by Anti-Oppression Workshop by Anna Soole, with wording revised.

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INSTRUCTOR GUIDANCE

A Knot of Contradictions: Systems of Intersectionality and Muslim LGBTQ+ Mental Health Programs[1]

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Harvir Sandhu, BA, MPH (MPH Class of 2019)
Amardeep Thind, MD, PhD (Professor, Western University)

BACKGROUND

The case involves the protagonist, Yasmin Baytar, a queer Muslim woman who returns from the 2019 Women Deliver conference with the goal of implementing a community mental health program focusing on the LGBTQ+ Muslim population in Ottawa. She has extensive Sex- and Gender-Based Analysis Plus training and knowledge about intersectionality that she can use to develop a program that embraces true equality. However, she also needs to figure out how to obtain funding for her program and collaborate with different stakeholders while making sure she is keeping her population of interest involved and at the centre of her work.

Students must use systems thinking approaches and recognize the importance of intersectionality when building the community mental health program. Incorporating an element of cultural sensitivity/competency into the program will show the students' ability to critically think about an issue while taking intersecting identity factors into account. Furthermore, recognizing the importance of various levels of intervention, students will use the Social Ecological Model to ensure a multipronged, multileveled approach is included as the program is built. Students will be able to collaborate with a variety of experts/stakeholders to ensure the success of the intervention.

OBJECTIVES

1. Adopt and implement the health planning process, which includes completing the planning cycle for health planning and conducting a needs assessment.
2. Understand and apply intersectionality and a Sex- and Gender-Based Analysis Plus lens throughout the health planning process. Use and apply learning from the Master of Public Health course "Social Determinants of Health".
3. Apply stakeholder engagement and collaboration knowledge from the Master of Public Health course "Leading People and Organizations in Public Health".

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[1] *This is a fictitious case. Unless otherwise indicated, all the names, characters, businesses, places, events and incidents in this case are either the product of the author's imagination or used in a fictitious manner. Any resemblance to actual persons or organizations is purely coincidental.*

DISCUSSION QUESTIONS

1. What is intersectionality? What makes this an intersectional case?
2. What factors and systems are intersecting that make it more challenging for planning a health program? What challenges will arise?
3. What does Yasmin require to plan this program? How is she going to find evidence to demonstrate the program need for her population of interest?

KEYWORDS

Cultural competency/cultural safety; health inequities; systems; systems of power; Muslim LGBTQ+ identity; mental health; SGBA+

CASE 10

Changing the Service Delivery Model: How to Make it Happen?

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Yoshith Perera, MBBS, MPH(2SLGBTQ+ Programs Manager, Moyo Health & Community Services)
Mark Speechley, PhD (Professor, Western University)

It was a warm summer afternoon in Yorkville, Ontario as Ruksana Kadam left the board meeting of the HIV/AIDS Caring Communities (HACC). As the 2SLGBTQ+ Programs and Community Engagement Manager, Ruksana had been chosen to carry out a momentous task. The board and the senior leadership team had a meeting one week ago where they had decided to make the service delivery model of the organization more streamlined and client-centric to better reflect the needs of the population they serve. They felt the programs and services currently provided to their clients were not optimal because they functioned in silos, which lead to duplication of services and substandard client care.

A new executive director, Tracy McLaughlin, had joined the organization six months earlier and had arrived with innovative ideas. At the meeting, she had shared her vision for the organization with the board in an effort to find ways to better serve clients and optimally utilize resources. According to the executive director, the current delivery model failed to recognize that some of the clients had complex needs, and that these clients were not being referred from one program to the other, presenting an opportunity for innovation in service delivery. Ruksana learned the board agreed with the executive director and had decided to dissolve the various teams based on priority populations within the organization. The board wanted to recognize the needs of the clients and put them at the front and centre of care. All the programs provided to their priority population would be integrated into two teams: a health promotion team and a community engagement team.

Ruksana was chosen as the lead because her public health education and her work with AIDS service organizations over the past six years gave her a unique and relevant perspective. The HACC was supposed to be relaunched as with a new name in three months, and Ruksana had to create the initial plan to restructure the organization by the next board meeting in two weeks. She was conflicted in terms of how she felt about the change. She was happy to carry out this reorganization but she was also worried about the lack of evidence behind the transformation. Where could she turn to learn more about organizational change? Have any similar agencies faced such a large change and how did they accomplish it? Are there known pitfalls that she should avoid with such an undertaking?

DEMOGRAPHICS

The region of Yorkville has one of the most diverse populations in Ontario, and 56% of its people are immigrants. Additionally, almost 75% of Yorkville's inhabitants are racialized people. The South Asian community comprises 54%of this group, and 16% of the region's racialized

community is from the African diaspora. The region is culturally diverse and requires specific and targeted care for the members of its different communities. This involves providing culturally appropriate care to members who have diverse needs. The mean annual household income after tax in the Region of Yorkville is estimated to be $72,000, and the prevalence of low-income households in the region is 14% Therefore, it is important to provide accessible care to all members of the population, particularly to low-income individuals. The geographic, socioeconomic, and cultural diversity of the region makes it challenging to provide equitable services to all members of the community.

Five public health nurses and two community champions conducted a needs assessment in the Region in 1994 when they realized there was a gap in the regions's HIV/AIDS counselling services. The needs assessment resulted in the formation of the HACC in 1995. The HACC has been serving the communities of Yorkville for more than two decades now. The HACC is the leading AIDS service organization in the Region of Yorkville, and provides health promotion, community engagement, and client support programs to the area.

The HACC provides services to clients from priority populations; the priority populations are communities who are most affected by HIV in Ontario. These include: people living with HIV/AIDS; African, Caribbean, and Black communities; people who use drugs; gay, bisexual and other men who have sex with men, including trans men; and women at risk living in the region (Ontario Advisory Committee on HIV/AIDS, 2016). Women at risk are "cis and trans women, including African, Caribbean, and black women, women who use drugs, Indigenous women, and other women who face systemic and social inequities, more likely to be exposed to HIV through a sexual or drug using partner" (Ontario HIV Treatment Network, n.d.). The HACC also provides workshops and capacity-building training to the region's service providers about making their spaces more inclusive both to clients and staff. Ruksana was sitting at her table and looking at the binder that outlined the vision, mission, and current organizational structure of the HACC. She had read about the organization's mandate multiple times. Change was finally happening and Ruksana could not be more excited. She picked up the binder once again and started reading through the services provided by the HACC.

Current Services Provided by the HIV/AIDS Caring Communities
1. African, Caribbean, and Black (ACB) Health Promotion Program: ACB communities comprise 16% of the racialized populations in the region and are one of the HACC's priority populations. The organization provides health promotion and community engagement activities for the ACB communities residing in the region to increase their knowledge and awareness regarding HIV/AIDS prevention and treatment. Activities are focused primarily on young ACB women, ACB youth, and ACB people living with HIV/AIDS. The program also provides HIV training and capacity building to service providers in the region pertaining to the ACB population.

2. Living with HIV: The organization provides case coordination, counselling, and referral services for people who have HIV/AIDS. The program also provides services to partners, caregivers, friends, and family members of people who HIV/AIDS. Additionally, the organization provides skills development, peer learning, and mentorship programs for people who have HIV/AIDS. This provides people with a social support network and the opportunity to engage with their community. The educational and support programs are supposed to improve access to services for people who have HIV/AIDS. The organization also provides training and capacity building workshops to the service providers in the region. The organization undertakes outreach activities at different service provider locations to reach people who find it difficult to access the services provided at the HACC site.

3. Harm Reduction: The HACC provides harm reduction supplies and health promotion activities to people who use drugs in the Yorkville region. The organization started its injection drug users outreach program in 2002. This involves community outreach activities in the form of presentations, supply distributions, seminars, and health education activities. HACC sits on a committee of service providers that support a regional response to support substance users.

4. 2SLGBTQ+ Programs: The 2SLGBTQ+ programs provided at the HACC operate within an antiracist and antioppressive framework. The main objective of the programs are to reduce the stigma and discrimination against members of 2SLGBTQ+ communities. The organization provides leadership and capacity building programs for 2SLGBTQ+ youth and young adults living in the region. Additionally, a free workshop series called "Gender Journeys" is provided to trans and nonbinary people in the region who want to share stories and start the process of healing. The agency also participates in a regional community of practice to support the health of queer and trans communities in Yorkville.

INTERSECTIONALITY

The term intersectionality was first coined in 1989 by legal scholar Kimberlé Crenshaw. The roots of intersectionality are deeply entrenched in Black feminist theory. Intersectionality is largely used in critical theories, especially Feminist theory, when discussing systematic oppression. In her 1989 paper, Crenshaw described how black women were excluded from feminist theories and antiracist policies because the discrimination faced by them was overlapping the two and hence unique (Crenshaw 1989). She wrote: "Because the intersectional experience is greater than the sum of racism and sexism, any analysis that does not take intersectionality into account cannot sufficiently address the particular manner in which Black women are subordinated" (Crenshaw 1989).

Over the last thirty years, the use of intersectionality has expanded to talk about identities beyond race and gender such as class, sexual orientation, religion, sex, education, age, and disability. According to Bowleg, intersectionality is defined as "a theoretical framework for understanding how multiple social identities such as race, gender, sexual orientation, SES, and disability intersect at the micro level of individual experience to reflect interlocking systems of privilege and oppression" (Bowleg, 2012, p.1267). By applying the lens of intersectionality, we can better understand the social inequities and structural bias faced by marginalized communities. The concept of intersectionality helps to understand how multiple forms of oppression can interact and impact the health and wellbeing of marginalized individuals (Etherington, 2015).

Many of the clients currently receiving services at HACC belonged to one or more of the priority populations that the organization served. A client who came in to collect harm reduction supplies could also be a member of the 2SLGBTQ+ communities. Having coordination between the different teams would allow for that individual to get the maximum benefit from their single visit. Hence providing services through an intersectional lens was recognized as an important component by the board, the leadership team as well as the front line staff.

THE NEED FOR CHANGE

Ruksana put down the binder and reflected on her conversation with Tracy. They both agreed that, despite the number of services provided by the HACC, most clients were not aware of the diversity of the programs offered by the organization. The lack of coordination among different departments resulted in clients unable to receive timely care or access the services they needed. This had led to the failure in providing streamlined service delivery to the clients

accessing care at the HACC. All the programs worked in silos and hence there was an opportunity for cross pollination of programming.

Tracy stated that Ruksana would be leading the charge of changing the organization's service delivery model. The service delivery model needed to be client-centred and applied through the lens of health equity. Additionally, a decision was made to improve the communication among different programs so that better, more coordinated care could be provided to clients. The new service delivery model was supposed to achieve the following objectives:

- Provide integrated and coordinated care to clients
- Provide client-centric care
- Improve access to care for clients
- Improve capacity of service providers to provide care to priority populations
- Support clients by providing them with information about programs in the organization and service providers in the region
- Increasing transparency in the organization among the different programs

Another important discussion at the board meeting was about rebranding the organization. After listening to suggestions from clients and staff over the past few years, it was finally decided that the organization's name should change. There were three main reasons for this proposal. The stigma still associated with HIV/AIDS prevented some clients from using the services provided by the HACC. Many clients felt hesitant to visit the organization for fear of being stigmatized because the agency's title referenced HIV/AIDS. Additionally, some of the service providers working in the Region of Yorkville did not feel comfortable forming partnerships with an organization that referred to HIV/AIDS in its title. Finally, because of the advancement in treatment options for HIV/AIDS, it is now a manageable chronic condition and people can live a long and productive life after being infected. With this shift in the narrative about the disease, the organization wanted to have a name that better represented this change and was more inclusive of its diverse clientele and the services it provided. The HACC realized that they needed a name that was less stigmatized and better represented their diverse clients.

Ruksana now had two weeks until the next board meeting to design the new service delivery model and develop a plan on how it should be implemented. Her training in public health had made her the ideal candidate to take on this task. Ruksana wanted to provide a service delivery model that was not only evidence based but also considered the local context and addressed the needs of the region's very culturally diverse and marginalized population. Ruksana understood that these factors can be a huge barrier for people accessing health promotion services, and that this lack of access can lead to poorer health outcomes.

COLLABORATION AND FUNDING

The HACC is a member of the 2SLGBTQ+ Community of Practice and is working with other agencies across Yorkville to further increase the capacity of this program. The Community of Practice was created to increase leadership and care coordination among service providers in the Region of Yorkville working in the field of health and human services.

The HACC also supports the regional Harm Reduction Strategy for Yorkville. This group is responsible for bringing together different stakeholders so that they can help each other develop solutions that will minimize the harms related to using substances/drugs. The Drug Strategy also strives to create policies, laws, and programs in the Region Yorkville that represent the values of public health. In addition, the HACC also helped establish the Yorkville Harm

Reduction Society. The aim of this group is to strengthen partnerships and collaborations among social service agencies across the region with the goal of providing better service delivery related to substance use. The Yorkville Harm Reduction Society acts as a platform for sharing information related to substance use and provides harm reduction-focused education and training on substance use in the region.

With almost twenty five years of work in the Region of Yorkville, the HACC receives funding from a number of regional, provincial and federal agencies. The organization also receives funding from different governing bodies that serve priority populations such as people who use drugs, 2SLGBTQ+ populations, people living with HIV and the African diaspora. Every funding organization has their own priority population and specific mandates. The HACC has to follow the mandate of these funding organizations to keep receiving funding for their programs.

Ruksana soon realized that the newer service delivery model would have to take into account the mandates of the various funding organizations and collaboratives they worked with. The newer model would have to meet the needs of these funding organizations, which could prove to be challenging. If the service delivery model was not implemented in an evidence-based manner, the HACC may not meet its funding requirements and this could negatively impact relationships HACC had developed with external stakeholders over the years.
Ruksana stared at her computer for a few seconds, took a deep breath, and then typed *implementation science* on the screen.

IMPLEMENTATION SCIENCE
Implementation science is defined as "the scientific study of methods to promote the systematic uptake of research findings and other evidence-based practices into routine practice and, hence, to improve the quality and effectiveness of health services" (Eccles & Mittman, 2006). It currently takes, on average, almost 17 years to incorporate best evidence-based practices into our general health care system (Bauer et al., 2015). Only 14% of research evidence enters day-to-day practice in the health care system (Westfall, Mold, & Fagnan, 2007). There are different reasons for this gap in knowledge translation (Bullock, 2018):

Awareness	Organizations are not aware of the existing research and evidence.
Comprehension	The research is not presented in a usable way, or the user lacks the capacity and skills to process the information.
Relevance	The existing research does not provide solutions to the issues faced by the organizations.
Recognition	The source of the evidence is not viewed with high regard.
Implementation	There are barriers present to achieving change in the organization.
Behaviour change	It is difficult to change the behaviour of the individuals, despite all other issues being addressed.

Active implementation of evidence-based research is guided by five frameworks as identified by the National Implementation Research Network (Bullock, 2018):

What	Usable Intervention—the intervention needs to be "teachable, learnable, doable, and readily assessed".
When	Implementation Stages—conducting activities at all stages is important for successful system change.

How	Implementation Drivers—competency drivers, organizational drivers and leadership are the three implementation drivers that support change.
Who	Implementation Teams—implementation teams can be external or internal to the organization. They are champions of the intervention and follow tasks and timelines to confirm that the process of implementation is focused.
How	Improvement Cycles—the change is supported by improvement cycles. It is based on the plan, do study, act process, and is used by the implementation teams to be informed of the changes made to the intervention.
	The implementation of a study can be tested by the plan, do, study, act process. It involves planning about the change process, implementing the change, studying the change by evaluating it, followed by reflecting on the change process - did it work, did it not, what can be done to improve it and returning back to the plan phase (Agency for Healthcare Research and Quality, 2015).

The National Implementation Research Network explains the four stages of implementation (Metz & Bartley, 2008). It is important to realize that the stages are not linear and significant overlap occurs within them. Additionally, sustainability is an important piece that needs to be practised at all stages (see Exhibit 1) (Centre for Addiction and Mental Health, 2014).

1. **Exploration stage.**
   The exploration stage is used to examine whether the program, intervention, or change is feasible and meets the needs of the population the organization serves. It is important to assess the requirement of change and the facilitators and barriers to this change. The stage involves identifying and operationalizing the core implementation components required for change. During this stage, champions of change need to be developed and important stakeholders need to be identified.

2. **Installation stage**
   This stage is often ignored during implementation. The installation stage consists of creating flowcharts and descriptions, and developing and assessing the resources the organization has, including its human resources, finances, technical equipment, and knowledge expertise.

3. **Initial implementation**
   The change or innovation is introduced to the real world setting during the initial implementation stage. It is important to recognize that mistakes and errors can happen during this stage, but it is important to find rapid cycle solutions and promote constant improvement to the system. Data collection, therefore, forms an important aspect of this change because it helps in making evidence-informed decisions.

4. **Full implementation**
   Full implementation occurs when the modified system and structures are fully assimilated and the clients are served skillfully by the service providers. The change must be incorporated into all levels of the organization and there should be policies and procedures in place to support it.

Ruksana understood that any new service delivery model would have to be chosen carefully during the exploration stage before they could move further. Selecting a service delivery model that did not meet the needs of the clients, the funders, the different collaboratives, and the organization would lead to an unsuccessful change. She looked at the screen again to understand more about the components of the exploration stage.

1. Needs validation – To understand that an evidence based change is required based on the needs of the population (Fixsen et al., 2013).
2. Selection criteria and prioritization – It is a toolkit that helps the organization to think whether there is an evidence base to support the change (Fixsen et al., 2013).
3. Hexagon decision making (Exhibit 2) (Metz & Louison, 2019) – This tool helps the organization during the exploration stage to evaluate the evidence based options.
4. Health Equity Impact Assessment – The health equity impact assessment tool helps to identify unintended health impacts of the change, both positive and negative, and how to address them (Ontario Ministry of Health and Long-Term Care, n.d.).
5. Practice profiles – Innovations that are "teachable, learnable, doable and assessable" are important to reach desired outcomes and create effective supports for implementation (Metz, 2016).
6. Communication plan – It is important to have frequent and accurate communication between the implementation team and the other members of the organization, as well as the external stakeholders to facilitate the process of change (Fixsen et al., 2013).
7. Exploration stage tracking tool – The exploration stage tracking tool is used to support the planning for the Exploration stage (Fixsen et al., 2013).

It had been two weeks since Ruksana had started working on the change process and she was excited to share her plans at the board meeting tomorrow. She had shared her proposal with Tracy yesterday and was waiting for her feedback. The entire plan would take about two years to implement, but Ruksana was confident that the change would provide care to the clients through a health equity and intersectional lens, and she was excited to play an important role in the organization's structural reform. Just then, Ruksana received an email notification and she panicked – Tracy was informing her that the board is giving them only three months to implement the new delivery model which would coincide with their relaunch with a new name. Several questions were running through Ruksana's mind at this moment – would she able to complete this in time? What would the coordination between the leadership team look like? Has any other organization done it before and where should she look for help? Ruksana thought she would need all the help she can get from her colleagues and partners to make this happen.

EXHIBIT 1
Tools to Support Moving Through Implementation Stages

EQUITY * ONGOING COMMUNICATION * PROGRESS MONITORING

EXPLORATION

NEEDS VALIDATION
A tool to support evidence-informed decision-making. Focusing on the application of practice-based evidence, the tool is used in the identification of local system gaps and population needs.

SELECTION CRITERIA AND PRIORITIZATION
Comprised of criteria to support gap selection and are intended to prompt thinking about whether there is an evidence-base to support possible interventions.

HEXAGON DECISION-MAKING
A planning tool that has been used by Service Collaboratives to evaluate evidence-based programs and practices during the Exploration Stage.

HEALTH EQUITY IMPACT ASSESSMENT
An assessment tool to identify and address potential unintended health impacts (positive or negative) of a policy, program or initiative on specific population groups.

PRACTICE PROFILES
A tool used to operationally define what the selected intervention will look like if implemented as intended.

COMMUNICATION PLAN
A tool to support identification of key stakeholders, messages, communication vehicles, and communication schedules.

EVALUATION FRAMEWORK
A tool to support identification of client, staff, intervention and community level objectives, indicators, measures and data collection process.

INTEGRATED IMPLEMENTATION PLAN
A tool to support development of community and agency-level implementation plans.

IMPLEMENTATION DRIVERS: GUIDE TO PLANNING
A tool to provide implementation teams with an opportunity for in-depth conversations about each driver in preparation for planning.

INSTALLATION

EXPLORATION STAGE TRACKING TOOL
A tool used to support team planning for Exploration Stage activities.

INSTALLATION STAGE TRACKING TOOL
A tool used to support team planning for Installation Stage activities.

INITIAL IMPLEMENTATION

AGENCY ACTION PLAN
A tool to support development of a detailed agency action plan that aligns with the community implementation plan.

COACHING AND CONSULTATION PLAN
A tool to provide coaching elements that can be adjusted over time with the goal of improved service to clients.

EVALUATION PLAN
A tool to support development of the evaluation and analysis plan, including local and provincial indicators and preliminary interpretation of results.

INITIAL IMPLEMENTATION STAGE TRACKING TOOL
A tool used to support team planning for Initial Implementation Stage activities.

FULL IMPLEMENTATION

Source: Centre for Addiction and Mental Health, 2014.

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EXHIBIT 2
The Hexagon: An Exploration Tool

The Hexagon can be used as a planning tool to guide selection and assess the fit and feasibility of potential programs and practices for use. It includes three **program indicators** and three **implementating site** indicators.

NEED
- Identification of focus population and subpopulations
- Use of multiple data sources and disaggregated data to understand needs and assets
- Community perception of needs and assets

SUPPORTS
- Expert assistance
- External resources for implementing sites

EVIDENCE
- Outcome, fidelity and cost effectiveness data
- Strength of evidence: for whom and in what conditions

CAPACITY
- Implementation costs
- Resources needed and available for implementation

USABILITY
- Well-defined program
- Adaptations for context and populations

FIT
- Fit with community values, culture and history
- Impact on other initiatives
- Alignment with other priorities of the implementing site

Source: Metz, A. & Louison, L. (2018).

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INSTRUCTOR GUIDANCE

Changing the Service Delivery Model: How to Make it Happen?

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BACKGROUND

The case follows Ruksana Kadam, the 2SLGBTQ+ Programs and Community Engagement Manager at the HIV/AIDS Caring Communities (HACC). She has been tasked with developing and implementing a new service delivery model to be adopted at the HACC. The board and executive director are seeking change in order to improve services and care for its diverse clients. The new service delivery model would involve dissolving the current teams, which focused on priority populations such as people who have HIV/AIDS, 2SLGBTQ+ individuals, those who need harm reduction services, and African, Caribbean, and Black communities. The plan would involve creating two new teams – a health promotion team and a community engagement team. Where can Ruksana turn to learn more about organizational change? Have any similar agencies faced such a large change and how did they accomplish it? Are there known pitfalls that she should avoid?

The goal of the case note is to allow students to understand the perspectives of stakeholders such as community members, funding organizations, and partnering organizations in a region with a very diverse population. The students will also be given an opportunity during class to formulate the exploratory stage of implementation.

OBJECTIVES

1. Adopt a systems-thinking approach to understand the contextual factors influencing HACC's decision to change their service delivery model.
2. Understand the perspectives and motivations of different internal and external stakeholders who may promote or oppose this change.
3. Apply implementation science principles to formulate a plan that will help the organization in transitioning from working in silos to providing collaborative care.

DISCUSSION QUESTIONS

1. Was there a need to change the service delivery model of the organization? How will the new model address intersectionality?
2. How would the demographics of the Region of Yorkville play a part in the creation of a new service delivery model?
3. How would the different external stakeholders and funding organizations influence the change in the service delivery model?
4. What are the potential facilitators and barriers to the change during the exploration stage?

CASE 11

Going Beyond the Virus: Understanding the Drivers of the Ebola Virus Outbreak

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Infectious diseases remain one of the biggest risks facing humankind. Few events are capable of equal damage to human lives and livelihoods. Yet the global community spends relatively little to protect populations from the risks of pandemics. Compared with other high-profile threats to human and economic security… we are underinvested and underprepared. This is the neglected dimension of global health security.

— Commission on a Global Health Risk Framework for the Future

Jason sighed, trying to not let his frustration show. Marissa was lying in a bed in the Ebola Treatment Centre (ETC). Jason had asked Marissa a question. As he waited for her to respond, a bead of sweat rolled down his forehead. It was extremely hot inside the ETC and he was wearing full protective gear; he was feeling very frustrated. Jason Fitzgerald was an epidemiologist from the Public Health Agency of Canada, responsible for contact tracing to address the Ebola Virus Disease (EVD) outbreak in the Central African country of the Democratic Republic of the Congo (DRC). This meant tracing the virus's spread by tracking down the people, or 'contacts', who had come into contact with an Ebola-infected person. According to the World Health Organization, contact tracing has three components: i) identifying people who have come in contact with an infected person by asking questions, ii) creating a list of all contacts and informing them; and iii) following up with contact (Exhibit 1). The experimental Ebola vaccine, the vesicular stomatitis virus-based Ebola virus vaccine (VSV-EBOV), would then be made available to them. In a way, Jason and other epidemiologists were disease detectives, trying to identify the human interaction network of the Ebola virus in order to halt it from being transmitted further.

In theory, contact tracing seemed easy enough. Once an EVD case was confirmed, Jason would interview that person to determine their contacts. From there, contacts would be assessed twice each day for a total of 21 days (the incubation period of the virus) to look for EVD symptoms. Any listed contacts would also be offered the VSV-EBOV vaccine. However, many factors complicated contact tracing. To name a few: many contacts were suspicious of the vaccine and questioned whether the Ebola virus really existed; many refused to list their contacts; and contact tracing was additionally hampered by the large number of locals who mistrusted foreigners.

Although Jason made every effort to do his job well, at times it was clear to him that his European ethnicity increased the difficulty of performing his duties in the DRC. Knowing the importance contact tracing played in controlling an outbreak, Jason became increasingly frustrated when his work did not go smoothly, and this happened a lot. It was difficult to piece together the path of the contagion's spread when people provided very little information, or provided conflicting or confusing information, leading to an incomplete and unreliable assessment.

Marissa Kayembe was an elderly lady who had begun exhibiting symptoms of EVD one week earlier. Although Marissa had listed only a handful of contacts, after having spoken with these contacts, Jason was informed by another member of the community that Marissa may have attended a large birthday party six days earlier. However, Marissa had not mentioned this during her previous conversation with Jason. If this was true, it was highly probable that Marissa had exposed others at the party to the Ebola virus. As such, anyone attending the party needed to be listed as a contact, monitored, and offered the VSV-EBOV vaccine. The first step in this process was confirming that the party had actually happened.

In response to Jason's probing questions, Marissa seemed unwilling to provide more information. Jason could sense her annoyance and resentment building toward him, and he wondered whether he should risk angering her further by asking her a few more questions. He still had not confirmed whether the party had occurred. Before he could decide, Marissa yelled, "You have already invaded my privacy by tracking me down and questioning me once before! You have no right to do so and you don't belong here!" Surprised by her sudden outburst, Jason opened his mouth to respond, but he was immediately ushered out of the room into the ETC's triage centre by a nurse who had been watching nearby.

EBOLA VIRUS DISEASE OUTBREAKS

EVD is a highly infectious, yet somewhat rare, zoonotic virus. The first cases of Ebola were discovered in 1976 proximal to the Ebola River in the DRC (Feldmann et al., 2003). The local incidence of hemorrhagic fevers, most commonly Lassa fever, motivated health professionals in the region to specialize in these types of diseases to adequately meet the unique needs of the local population. The EVD virus is endemic to regions within Africa, and several small outbreaks have been managed and contained there over the past few decades, often in isolated rural communities. A person with an EVD infection typically presents with fever, headaches, nausea, and overall weakness in the first two to 21 days after infection. Because these are all nonspecific symptoms, it is difficult to diagnose Ebola during the early stages of infection. As time progresses, the symptoms worsen and become more specific. Although social media reports have led much of the general public to associate Ebola infection with blood pouring from bodily orifices, this symptom is in fact rare. When a patient presents with EVD symptoms, including nonspecific symptoms, that patient is infectious.

BACKGROUND
Regional History of Ebola Outbreaks
On August 1, 2018, the DRC declared an EVD outbreak, occurring this time in the rural North Kivu and Ituri provinces. This was the 10th outbreak to occur in the DRC since Ebola was discovered in 1976. Still an active, ongoing outbreak, as of December 1, 2019, the number of Ebola cases (both confirmed and probable) had surpassed 3,398 (Médecins Sans Frontières [Doctors without Borders], 2019a). Based on the total number of cases, this is the second largest Ebola outbreak to occur in the world. The largest outbreak occurred in the West African countries of Sierra Leone, Guinea, and Liberia from December 2013 to June 2016, commonly referred to as the 'West African outbreak'. The unspeakable horrors that occurred during the

West African outbreak were still recent in the memory of local communities and responders. Thus, the current outbreak prompted massive domestic and international action aimed at containing the epidemic. Despite on-the-ground action in the DRC since August 2018, in mid-2019, the number of people infected was still rising. Although it took 224 days to reach 1000 infected patients, it took just another 71 days to reach 2000 cases. By early June 2019, the virus had spilled over from the DRC into the neighbouring country of Uganda and, by the middle of July 2019, the first case of Ebola emerged in Goma, a large, urbanized city in the DRC with a population of one million people. The spread of Ebola from DRC's rural provinces into more urbanized areas prompted the World Health Organization (WHO) to declare the Ebola outbreak in the DRC a Public Health Emergency of International Concern (PHEIC) on July 17, 2019. The declaration of a PHEIC indicates that a threat to global health security exists (World Health Organization, 2016a).

GLOBAL HEALTH SECURITY

Many believe that the state has an obligation to protect its citizens from the threat of infectious diseases. Global health security is defined as "the activities required to minimize the danger and impact of acute public health events that endanger the collective health of populations living across geographical regions and international boundaries" (WHO, 2019a). Investments in global health security can help prevent the spread of infectious diseases across borders and ensure preparedness in the case of a cross-border infectious disease threat. Global health security allows countries to "prevent, detect, and respond to infectious disease threats at the source… [helping to] reduce morbidity and mortality" (Kashef, 2018)). A lack of global health security infrastructure can leave populations vulnerable and open to emerging and re-emerging diseases.

In addition to undesirable health outcomes, an outbreak leads to troublesome economic and social burdens (Huber, Finelli, & Stevens, 2018). For example, during the first outbreak in West Africa, approximately 4.7 million children were unable to attend school for more than six months in the affected countries as a direct result of the epidemic (Huber, Finelli, & Stevens, 2018). The World Bank estimated that, in 2015 alone, the three affected countries lost $2.2 billion USD in combined gross domestic product because of the Ebola outbreak (Centers for Disease Control, 2019a). Less noticeable to those outside of the affected regions, but still profoundly devastating, is how an outbreak can result in dire consequences to individuals suffering with conditions unrelated to the virus. Although Ebola caused a high number of deaths in affected countries during the first outbreak, another 10,700 preventable deaths occurred from Malaria as a result of diminished health service capacity. When considering other prominent diseases of concern that took a backseat to EVD, such as HIV or tuberculosis, the number of preventable, non-Ebola-related deaths that occurred during the outbreak is immense. The social, economic, and health burdens associated with outbreaks underscore the need for greater global health security, especially in resource-poor environments.

For many in developed countries, the threat of infectious disease is not a primary concern, however infectious diseases do not discriminate between boundaries or borders. Recent infectious disease outbreaks attest to this – the H1N1 swine flu, Zika virus, and the West African Ebola outbreaks, all classified as PHEICs by the WHO, were not constrained just to underdeveloped countries, but instead impacted many countries on an international scale.

Global health security is essential to ensure that all countries, and the people who live in them, are safe from the destructive forces of infectious diseases. Countries that are recovering from civil wars and political instability have notably inadequate health systems and significant limitations in government health capacity. Many countries in Africa and South Asia have

experienced war, and combined with the prevalence of a large number of tropical diseases, this means that infectious disease outbreaks have an increased likelihood of originating in these countries (Lobo et al., 2011). Countries at risk have inadequate capacity to invest in global health security and require external aid. Without assistance, these countries are at a greater risk of succumbing to infectious disease threats and subsequently compromising national health security (Connolly & Heymann, 2002). As the international leader in the area of global public health, the WHO is committed to ensuring that the health security of its member states is maintained.

HISTORICAL CONTEXT OF THE DRC AND EBOLA VIRUS OUTBREAKS

Perhaps the most important factor in responding to the current Ebola outbreak is an understanding of the DRC's historical context of colonialism, governmental corruption, and postcolonial conflict. Armed conflict and ongoing political turbulence have forced many Congolese citizens to endure gross infringements on their human rights. In addition to witnessing years of military conflict, citizens underwent decades of colonizing rule. In 1870 European foreigners came to and eventually took forcible control of the nation. The DRC was once known as the "Belgian Congo" (Banza et al., 2009), and became the DRC after Congolese forces overthrew the foreigners in 1960 (Office of the Historian, 2017). In 1960, the country gained independence. Political instability grew out of the economic and social destruction that had been caused by colonialism. For decades, the DRC endured corruption, abuse, and armed conflict. Despite multiple reports of state- and rebel-sponsored rape, murder, violence, and other abuses occurring in the region over the past 50 years, limited international support was provided compared with the influx of international assistance available to help with the current EVD outbreak. The number of foreigners present to help with the modern Ebola epidemics, but not with the past civil wars or other DNC conflicts, left these communities to face a difficult reality – the rest of the world only offers help when they too are threatened. Without the risk to the Western world's health security, many in the DRC believe that they would not have been helped. This belief was reinforced during the first EVD outbreak, when Western nations selectively helped the DRC only when their own vulnerability became apparent (Sabeti & Salahi, 2018). A local responder said about the global community's initial lack of response: "besides witnessing the Ebola cases, realizing the world was waiting for West Africans to die off" was the worst aspect of the Ebola outbreak (Sabeti & Salahi, 2018). Only when the outbreak worsened, and a serious global health security risk was evident, did powerful countries choose to intervene. For communities in the DRC, the historical framework is a distressing reminder of foreign oppression, exploitation, and inequity. Juxtaposing the history of the region with the international aid response makes it clear why many local citizens distrust foreign nationals.

Instead of working *with* communities, organizations seem to work *on* communities by demanding, rather than asking, that they take action. For example, people are ordered to visit the ETCs or stop cultural practices involved with traditional burial rituals. Some communities, who had already endured great suffering losing members of their community to Ebola, were told *they* had caused the deaths as a result of traditional cultural or religious practices. Because these communities have been conducting these practices for decades, without experiencing an EVD epidemic, they presumed these deaths were, in fact, some form of politically motivated genocide. Community members were told by foreign organizations to visit ETCs if they were feverish, but this intervention failed to account for the fact that some local people rely on home-based remedies rather than seeking conventional medical care from a health facility. Additionally, communities quickly realized that many who entered ETCs never returned; thus, ETCs became associated with death instead of therapy, and people avoided going to them to receive care. Some people believe Ebola is a conspiracy to punish the

Congolese to achieve political and financial gain. Local people who do believe Ebola is real may be shunned or stigmatized for siding with foreigners (Sabeti & Salahi, 2018). Unfortunately, some community members have attacked the people working to contain the Ebola outbreak. For example, a WHO epidemiologist delivering care at an ETC was shot and killed in April 2019, and in November 2019, three EVD responders and a police officer guarding an EVD coordination office were killed and another six were injured.

Médecins Sans Frontières is one of the few active humanitarian aid organizations involved in the DRC's Ebola response that has provided on-the-ground aid to the region for other medical crises as well. However, to protect the lives of its staff and patients, the organization was forced to suspend delivering life-saving health care in its ETCs, which allowed the virus to be transmitted freely and left individuals infected with Ebola with limited medical support. During the West African outbreak, there were reports of nurses in Sierra Leone who treated patients at ETCs and then had to sleep there at night because they were shunned by their communities for taking part in the Ebola response. In reference to community mistrust a local responder said of her experience of Ebola in Beni:

> My husband was killed in a massacre in Beni. At that time, all I wanted was some organization to come protect us from the killings, but no international organization came. I have had three children die of malaria. No international organization has ever come to work in this area to make sure we have access to health care or clean water. But now Ebola arrives, and all the organizations come…if you cared about us you would ask us our priorities. My priority is security and making sure my children don't die from malaria or diarrhea. My priority is not Ebola. That is your priority (Médecins Sans Frontières, 2019b).

Local distrust and suspicion deters local health care workers from responding to Ebola. This reduces the levels of community ownership of, and commitment to, the Ebola response, and leaves foreign aid groups to manage the emergency. Médecins Sans Frontières has stated that "it will not be possible to end the [Ebola] outbreak if there is no trust built between the response and the affected communities", highlighting that medical expertise alone will not be sufficient to end the outbreak (Médecins Sans Frontières, 2019a).

Public perception plays a large role in outbreak response, and the West African Ebola outbreak was no exception (Sabeti & Salahi, 2018). During the peak of the outbreak, the public perception of the international community caused another type of epidemic – an epidemic of fear. West African students were not permitted to return to European universities where they had been studying, and Black people were denied entry into a restaurant in South Korea (Sabeti & Salahi, 2018). The epidemic of fear created an environment that facilitated the propagation of incorrect Ebola-related information, leading to an increased yet misconstrued awareness about Ebola in the general public. For example, *The New York Times*, considered a reputable news source, published an article in June 2019 that states Ebola is "transmitted through physical contact" and that "symptoms take days to manifest themselves, elevating the risk of infection" (Gladstone, 2019). Both statements are inaccurate. Ebola is transmitted through contact with infected fluids*,* not physical contact such as touching elbows. Also, a longer incubation period does not mean that an individual is "more infectious" (Centers for Disease Control, 2019b). If someone is asymptomatic, they are not able to spread Ebola. Within the global community, the word *infectious* has become synonymous with *contagious*, even though an infection refers to the pathogenic cause of a disease and contagious refers to how it is spread. All contagious diseases are infectious, but not all infectious diseases are contagious. Although Ebola is an infectious (viral) disease, it is only moderately contagious.

This is a result of how the disease spreads, which is through contact with infected bodily fluids. Because fluids such as stool, tears, and blood are not generally exposed to the environment, and because EVD is not an airborne pathogen, the virus is considered moderately contagious. However, if a person comes into contact with any of these fluids from an infected patient, the probability of contracting the disease is very high, making the virus highly infectious. This subtle difference is important to note because misuse of the two terms (among other factors) led to unwarranted quarantining, stigma, and overall global hysteria during Ebola outbreaks (Sabeti & Salahi, 2018).

Around the world, the unwarranted epidemic of fear moved the focus of the response away from healing the suffering individuals and communities in West Africa to protecting people in developed nations who had a very low probability of contracting the disease. As Michiel Hofman and Sokhieng Au point out, "fear of the disease and fear of the diseased became one, as Ebola became the poor, sick, black African, further conflated with the continent of Africa itself, continuing the 'long and ugly tradition of treating Africa as a dirty, diseased place'" (Hofman & Au, 2017).

The current outbreak rages on, leaving significant social and economic consequences and highlighting major health system deficits in the region. Many people wonder why the current epidemic is difficult to manage despite the experience gained from the West African outbreak. The narrative of the DRC outbreak is still unfolding, and its future remains to be seen, with many experts stating that the end of this PHEIC is nowhere in sight.

INTERNATIONAL HEALTH GOVERNANCE

Infectious diseases do not recognize international borders. Although any one country may have a policy to prevent the spread of infectious diseases, it is necessary to have a global governing body that works with each of these nations. The WHO has long been recognized for its positive contribution to global public health and international governance, particularly in the area of managing the spread of infectious diseases.

The WHO is one of 17 United Nations agencies and comprises 194 member states. The decision-making body of the WHO is called the World Health Assembly, with representatives from each WHO member state meeting annually at the WHO headquarters in Geneva, Switzerland. Dr. Tedros Ghebreyesus, the Director-General of the WHO, has a vision of ensuring that everyone, everywhere can lead a healthy and productive life. Dr. Tedros hopes to bring this vision to fruition by focusing on five priority areas during his five-year term – universal health coverage, health emergencies, women's, children's, and adolescents' health, health impacts of climate and environmental change, and a transformed WHO (WHO, 2019b). The current EVD outbreak in the DRC generally falls under the umbrella of health emergencies, but it is relevant to the other thematic areas as well. The WHO's response to infectious disease threats is conducted in collaboration with member states in accordance with the International Health Regulations ([IHR] 2005), the universal treaty that governs global health security threats related to infectious diseases.

International Health Regulations (2005)

Action taken to protect nations from international disease threats have come to be known as global health security. A country's role in ensuring the health of the public, in conjunction with ensuring global health security, emphasizes that public health and health securitization are inextricably linked. Before adopting the global health security strategy, the WHO had adopted an international health strategy focused on advocating for health as a human right for people in low and middle-income countries. However, there was limited political interest in having

member countries allocate resources to this intervention. With increasing international trade and travel, the political discourse surrounding disease threats began to focus on the risk of disease to people, instead of examining the reality for people who already had these diseases. This subtle shift in the political discourse on global infectious disease governance led to the development of the IHR in existence today. The global focus shifted from achieving human health rights in developing countries to considering the risk, or potential risk, of infectious disease threats in all countries. The latter "appealed to the national security, economic, and foreign policy interests of nations [and] powerful states" (Fidler, 2015), and sought to increase collective health security instead of just focusing on building capacity within developing nations.

Thus, the IHR aims to ensure global health security via protection against infectious disease threats (Fidler, 2015). The 2005 regulations achieve this by setting standards, or regulations, that are legally binding for all nations. Countries must adhere to these standards to allow for improved global health security. These regulations are the international framework in existence today that is designed to govern infectious disease threats and prevent the international spread of disease.

The political will to protect nations from the threat of pandemics and infectious diseases in general was developed over 150 years of discourse on this topic and culminated in the current IHR. Beginning in 1851, the first International Sanitary Conference was held in Paris, France, with those in attendance attempting to agree on a global strategy to combat the more serious infectious diseases of the time: cholera, plague, and yellow fever. However, no global agreements were reached. The fourth World Health Assembly in 1951 resulted in the adoption of the International Sanitary Regulations, the predecessor to the IHR. The 22nd World Health Assembly, held in 1969, led to the International Sanitary Regulations being replaced by the IHR (1969) to help countries increase their capacity to respond to the six prominent infectious diseases of the time: cholera, plague, smallpox, typhus, yellow fever, and relapsing fever (WHO, 2016a). The IHR (1969) stipulated that member states were required to notify the WHO about any cases of the aforementioned six diseases within their respective country, but they were not required to notify them about other diseases. However, the subsequent increase in international trade and travel in the latter half of the 20th century, in conjunction with the 2003 occurrence of severe acute respiratory syndrome, also known as SARS, prompted an update of the IHR to better address concerns surrounding global disease threats. The IHR expanded mandatory notification beyond six infectious diseases. The IHR (2005) was adopted at the 58th World Health Assembly and included a *global health security* resolution and notification of any disease threat to the WHO. Specifically, the IHR (2005) requires that the WHO is notified of any "existing, new, and re-emerging disease" that could be considered a PHEIC.

Public Health Emergency of International Concern
A PHEIC is a public health emergency occurring in any country that could impact countries other than the affected state and have global reach and consequences. The declaration of a PHEIC serves as a universal indicator that a nation's global health security is at risk and that the affected country is in critical need of support. A PHEIC reinforces political resolve and increases financial support to manage and control the threat (Gostin & Katz, 2016), especially when other countries are worried that the threat will reach their borders (Fidler, 2015).

Under the IHR (2005), member states are required to follow Annex 2 of the IHR (2005) (Exhibit 2) to gauge whether the WHO should be notified of an event such as an infectious disease outbreak. The decision for a country to notify the WHO of an event that may constitute a PHEIC is based on four criteria (World Health Organization, 2006):

1. Seriousness of the public health impact of the event.
2. Unusual or unexpected nature of the event.
3. Potential for the event to spread internationally; and/or
4. The risk that restrictions to travel or trade may result because of the event.

When the aforementioned criteria are met, the WHO can subsequently take measures to "ensure appropriate technical collaboration for effective prevention of such emergencies or containment of outbreaks and, under certain defined circumstances, inform other states of public health risks where action is necessary on their part" (World Health Organization, 2016a). An IHR Emergency Committee, consisting of international experts, is assembled to provide guidance and technical expertise to the Director General of the WHO in order to aid in their decision-making process of declaring a PHEIC. The declaration of a PHEIC depends on the discretion of the Director-General of the WHO, based on the evidence and recommendations presented by the IHR Emergency Committee. The purview of the IHR Emergency committee includes (World Health Organization, 2016b):

a) Whether the event constitutes a PHEIC;
b) The Temporary Recommendations that should be taken by the country experiencing an emergency of international concern, or by other countries, to prevent or reduce the international spread of disease and avoid unnecessary interference with international trade and travel; and
c) The termination of a PHEIC.

If the WHO Director-General decides that the event in question does indeed constitute a PHEIC, the temporary recommendations put forth are upheld. These recommendations expire every three months, and new recommendations are provided depending on the status of the situation, as assessed by the IHR Emergency Committee (WHO, 2016b). In the case of an outbreak, a PHEIC is declared to be over when the four criteria outlined above are no longer satisfied.

The threshold for declaring a PHEIC is ambiguous. As the primary leader in global public health, the actions of the WHO are under intense scrutiny from the entire world. WHO decision-making during the first West African Ebola outbreak were heavily criticized. Dr. Margaret Chan's decision to declare a PHEIC for this outbreak was deemed to be too late by much of the global community and, in hindsight, Dr. Chan agreed (Fidler, 2015). Similarly, the WHO was criticized for unexpectedly refraining from calling a PHEIC during an IHR Emergency Committee meeting on June 14, 2019 regarding the ongoing outbreak in the DRC. Dr. Tedros has stated on numerous occasions that there is a "shared responsibility to end this outbreak" and that "the impact on public health and the economic ramifications [of Ebola] can expand far beyond one country or continent" (WHO, 2019c). His decision to declare a PHEIC on July 17, 2019 was welcomed by the global health community.

Declaring the ongoing outbreak in the DRC as a PHEIC will increase the necessary political action, financial support, and overall response efforts needed to contain the outbreak. Although a PHEIC does not mandate increased support to address the outbreak, the declaration of a PHEIC creates intense political pressure for countries to support the response.

CONCLUSION
Jason knew that the contextual nature of the outbreak was complex and challenging, and responding to it required innovative and perhaps unconventional strategies that were still

evolving. It was an irrefutable fact that medical expertise alone would not be able to resolve the outbreak. The high volume of newly confirmed EVD cases that were not listed as contacts, on some days totaling 80% of newly confirmed EVD cases, substantiated this suspicion. Every day, a new, confirmed EVD case that was not previously listed as a contact compromised the outbreak response, and increased the risk to the Congolese people. Jason was certain the biggest factor impeding the entire Ebola response was the existing community mistrust and suspicion toward nearly anything that related to a foreign national presence. It seemed likely that the best way forward for combatting community mistrust was to involve the community in every aspect of the Ebola response. This would mean listening to the community's needs and concerns, respecting their choices when it came to managing health, and working *with* communities, not on them.

Jason had been hoping to leave the ETC with additional information on Marissa's contacts to add to the contact database he was working on. Feeling dejected and frustrated, he headed back to the headquarters to provide a final update to his supervisor before going to his hotel for the night. As he walked along, he was uncomfortably reminded of the luxury he was afforded as a foreign EVD response worker; if he got sick, he would be repatriated and receive the best medical care back in Canada. Local people such as Marissa would experience no such intervention. Since Marissa had gotten sick she was forced to stay in the ETC, and once discharged would be heavily stigmatized. Jason's frustrations paled in comparison to the difficulties faced by Marissa, other community members, and local community health workers. Community health workers, including nurses and doctors, were risking their lives to continuously deliver care with a workday that extended beyond 6pm. As Jason walked on the dirt path, deep in thought about how to improve community ownership and participation in the Ebola response, the words of David Fidler echoed in his head.

David Fidler, a lawyer specializing in international law, had commented on the predictable nature of the Ebola outbreak (Fidler, 2015):

> …what happened was anticipated: a dangerous virus spreads across borders and thrives in urban and rural environments in developing countries that lack health-sector capacities and struggle with the pathologies that afflict post-conflict societies. The outbreak was not a global health riddle wrapped in a mystery inside an enigma. It was an epidemiological probability wrapped in public health expectations inside a purpose-built governance strategy. Yet, tragedy ensued, measured by the dead, the infected, the stigmatized, and the social and economic costs rippling through societies least able to bear setbacks to their development (p. 181).

EXHIBIT 1
Contact Tracing Components

CONTACT IDENTIFICATION	CONTACT LISTING	CONTACT FOLLOW-UP
Once someone is confirmed as infected with a virus, contacts are identified by asking about the person's activities and the activities and roles of the people around them since onset of illness. Contacts can be anyone who has been in contact with an infected person: family members, work colleagues, friends, or health care providers.	All persons considered to have contact with the infected person should be listed as contacts. Efforts should be made to identify every listed contact and to inform them of their contact status, what it means, the actions that will follow, and the importance of receiving early care if they develop symptoms. Contacts should also be provided with information about prevention of the disease. In some cases, quarantine or isolation is required for high risk contacts, either at home, or in hospital.	Regular follow-up should be conducted with all contacts to monitor for symptoms and test for signs of infection.

Source: World Health Organization, 2017.

EXHIBIT 2
Annex 2 of the International Health Regulations (2005)

Events detected by national surveillance system

A case of the following diseases is unusual or unexpected and may have serious public health impact, and thus shall be notified:
- Smallpox
- Poliomyelitis due to wild-type poliovirus
- Human influenza caused by a new subtype
- Severe acute respiratory syndrome (SARS)

Any event of potential international public health concern, including those of unknown causes or sources

An event involving the following diseases:
- Cholera
- Pneumonic plague
- Yellow fever
- Viral haemorrhagic fevers (Ebola, Lassa, Marburg)
- West Nile fever
- Other diseases that are of special national or regional concern, e.g. dengue fever, Rift Valley fever, and meningococcal disease.

Is the public health impact of the event serious?

Is the event unusual or unexpected? ←Yes— —No→ Is the event unusual or unexpected?

Yes

No

Is there a significant risk of international spread? ←No— Is there a significant risk of international spread?

Yes — Yes

No — Yes — No

Is there a significant risk of international travel or trade restrictions? —No—

Yes — Yes

Yes

Not notified at this stage. Reassess when more information becomes available.

Event shall be notified to the World Health Organization under IHR 2005

Source: World Health Organization, 2006.

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INSTRUCTOR GUIDANCE

Going Beyond the Virus: Understanding the Drivers of the Ebola Virus Outbreak

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BACKGROUND

The protagonist, Jason Fitzgerald, faces challenges performing contact tracing during an Ebola outbreak in the Democratic Republic of the Congo. This represents a small fraction of the many difficulties in responding to the 2018-2020 Ebola outbreak. Despite the best efforts of national and international organizations, the outbreak isn't close to being contained. In fact, the virus threatens to spread to neighbouring countries, triggering the World Health Organization to declare the outbreak a Public Health Emergency of International Concern (PHEIC) on July 17, 2019. The Ebola outbreak is a dangerous, complex, and ongoing public health concern with serious national and international implications. The case illustrates important factors involved in outbreak response.

As such, this case discusses the stakeholders involved in international health governance and the role of global health security in the political and international discourse on infectious disease control. The case illustrates the challenges of outbreak responses and sheds light on the role of regional sociocultural factors in fuelling the ongoing Ebola outbreak.

OBJECTIVES

1. Analyze global health governance and global health security and discuss the roles of organizations in epidemic management.
2. Adopt a systems-thinking approach to understand complex and multifaceted challenges in outbreak responses.
3. Formulate alternative solutions to current practices in global outbreak responses.

DISCUSSION QUESTIONS

1. List the factors involved in the ongoing Ebola outbreak in the Democratic Republic of the Congo.
2. Define global health security and describe the World Health Organization (WHO) International Health Regulations. How does the WHO determine when a PHEIC is declared?
3. What are the implications of declaring a PHEIC?
4. Why is medical intervention inadequate to reduce the number of Ebola infections and end the outbreak?
5. How can the outbreak response be improved?

CASE 12

Prioritizing Emerging and Re-Emerging Non-enteric Zoonotic Infectious Diseases: What Should we be Afraid of Next?

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Blake O'Neil sat down at her newly located desk, now three pods from her previous cubicle and directly across from Brock Jansen's cubicle. She started her desktop computer, logged into her Government of Canada public servant account, and opened her email inbox. She clicked on the most recently received email.

SUBJECT: Weekly Update
Sent: 04-29-2019 0823
From: Connor Jack
To: PHAC-CFEZID

Dear Colleagues,

Please see below the updates and reminders for this week at the Centre for Food-borne, Environmental, and Zoonotic Infectious Diseases (CFEZID). Additionally, I am excited to announce some of the changes occurring at CFEZID this spring.

First, CFEZID's theme for the upcoming season is "Climate Change and Human Health". Therefore, any new projects, presentations, or educational sessions produced by CFEZID should consider incorporating this theme. Please see our editorial team's most recent edition of the *Canada Communicable Disease Report*, which contains peer-reviewed articles related to the new theme. Additionally, feel free to walk around the Centre and check out the informational posters on display that reflect the theme. Thank you to our creative design and strategic communications teams for their hard work on this project!

Second, I would like to officially announce the addition of a new department within CFEZID – the Health Professionals Guidance Unit (HPGU), which will be located at our Ottawa site. Blake O'Neil, one of our very own nurse consultants, will be transitioning from her position with the Creutzfeldt-Jakob Disease Surveillance System to the HPGU. Brock Jansen, a medical advisor with the Outbreak Management Division, will also be accompanying Blake in the transition. Together, Blake and Brock will be initiating an emerging and re-emerging non-enteric zoonotic infectious disease (zoonoses) prioritization exercise to determine what we should all be most afraid of next. As time progresses, new zoonoses come to the forefront in the media, in our projects, in our healthcare systems, and in our personal lives, much like Canadians' response

during the surge of the West Nile Virus in 2002. However, with the results of this prioritization exercise, we will have the advantage of knowing which zoonoses we need be most prepared for. Further, they will be developing tools and guidance documents to assist Canadian health professionals in the prevention, early diagnosis, and clinical management of the identified priority zoonoses. Thank you both in advance for your contributions to the HPGU and CFEZID!

Third, please be mindful of the upcoming federal election. Candidate campaigning is expected to begin late summer and continue through the fall. To ensure our public resources are not used for partisan advantage, any stakeholder engagement will need to be paused until a Prime Minister has been elected and the Senate and House of Commons resume their work. Please be alert and prepare your stakeholders for any changes to your projects. For more information on this, please refer to the *CFEZID Policies and Procedures Manual*, section 14, subsection 11.

Fourth, a friendly reminder that *Aedes albopictus*, the mosquito species typically known for carrying the Zika, Chikungunya, and Dengue viruses, has been isolated in Windsor, Ontario. Therefore, our colleagues working with the Canadian Notifiable Disease Surveillance System will be extremely busy in the upcoming spring and summer months. If you happen to be walking in that area of the Centre, please keep the noise to a minimum.

Fifth, there will be server updates occurring this Friday between 0800 and 1000 at our Guelph and Ottawa locations. Expect some delays when sending or receiving your emails and accessing the intranet. Please refrain from scheduling any video conferences at this time.

Regards,
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Director General | Directeur general
Centre for Food-borne, Environmental, and Zoonotic Infectious Diseases |
Centre des maladies infectieuses d'origine alimentaire, environmentale et zoonotique
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After reading Connor's email, Blake felt a sense of satisfaction with her newly accepted position. Not surprised by the recently isolated *Aedes albopictus*, she was reminded how pertinent her work was for protecting the health of Canadians. She was aware of the large amount of effort that would be required to have the project running smoothly before the fall federal election. Therefore, she began writing her project task list for the upcoming month. Blake started every month with a task list to help her remain organized while carrying out her daily activities. She knew the most difficult task ahead would be selecting the prioritization criteria that would be applied to a list of emerging and re-emerging non-enteric zoonotic infectious diseases. These criteria will be crucial when determining which diseases are of highest priority while developing guidance documents and tools for health professionals. Knowing this, she wrote a task list to help manage her time:

1. Review previous internal and external prioritization exercises.
2. Discuss the need for stakeholder consultation within the prioritization exercise.
3. If there is a need for consultation, create a list of potential stakeholder organizations and personnel to be included and contacted.

4. Decide on a prioritization exercise format and which zoonotic infectious diseases to include or exclude.
5. Develop and test the prioritization criteria to be used in the exercise.

BACKGROUND

Centre for Food-borne, Environmental, and Zoonotic Infectious Diseases

CFEZID is a division of the Infectious Disease Prevention and Control Branch at the Public Health Agency of Canada (PHAC). CFEZID offices are located in two different cities – Ottawa and Guelph, Ontario. Between the two locations, and across the province, teams work to meet CFEZID's priorities through policy integration, surveillance, research, outbreak management, program planning, knowledge mobilization, emergency preparedness, and now the development of health professional guidance under the HPGU. CFEZID (2018b) is mandated to "Improve the health of Canadians by monitoring and managing infectious diseases arising from food-borne, water-borne, environmental, and zoonotic illnesses in Canada."

Employees of CFEZID work to reduce the transmission of Canadian and international infectious diseases from food, water, animals, or the environment to humans (Government of Canada, 2013). To reduce international transmission, CFEZID collaborates with the World Health Organization, the European Centre for Disease Prevention and Control, the United States Centers for Disease Control and Prevention (CDC), and the Pan American Health Organization (Government of Canada, 2013). CFEZID's main activities include collecting, appraising, and distributing information about zoonoses; investigating the incidence and distribution of zoonoses; developing national guidelines to reduce to the risk of zoonoses; identifying and developing new tools to predict the impact of climate change on emerging and re-emerging zoonoses; defining the link between humans, animals, and the ecosystem; and providing travel health recommendations and information (Government of Canada, 2013; CFEZID, 2018b). The outputs from the work conducted at CFEZID are used by the federal, provincial, territorial, and local governments to aid in evidence-based policy and program development (Government of Canada, 2013).

Health Professionals Guidance Unit

Canada is subject to an increase in transmissibility and incidences of emerging and re-emerging non-enteric zoonotic infectious diseases (CFEZID, 2018a). This is attributable to globalization, travel, climate change, and shifts in human demography and behaviour (CFEZID, 2018a). However, as a result of competing expenditures, there are an extremely limited number of health professional resources that provide education and awareness with respect to zoonoses prevention, diagnostics, and clinical management (CFEZID, 2018a). In addition, because of the lack of guidance provided by the federal government, inconsistencies in evidence review and data collection exist across the provinces and territories (CFEZID, 2018a). With these limitations in mind, members of the HPGU have envisioned that: "Health professionals have timely access to evidence-informed guidance to inform public health practice and action in order to protect the health of Canadians from emerging and re-emerging infections" (CFEZID, 2018a).

The purpose of the HPGU is to strengthen CFEZID's current approach to developing and providing Canadian health professional guidance documents and tools while ensuring the priorities of the PHAC and the Government of Canada have been met (CFEZID, 2018a). Guidance documents and tools refer to educational materials, tool kits, fact sheets, professional guidelines, standards, protocols, and advisories pertaining to emerging and re-emerging non-enteric zoonotic infectious diseases. In turn, guidance documents and tools developed by the HPGU aim to inform health professional practice, ultimately protecting the health of Canadian

residents through prevention activities and accurate diagnosing (CFEZID, 2018a). To do this, the HPGU has two objectives: support strategic decision-making for CFEZID's health professional guidance work and communicate protective actions against emerging and re-emerging non-enteric zoonotic infectious diseases to associated stakeholders and Canadian residents (CFEZID, 2018a). With these objectives in mind, actionable items required by Blake and Brock to accomplish this include (CFEZID, 2018a):

- Determine the priority zoonoses and assess the need for health professional guidance;
- Identify timelines for modifying current, or creating new, documents and tools;
- Participate in outreach activities and stakeholder engagement to promote HPGU products; and
- Provide educational awareness communication to health professionals.

SPECIFIC AREA OF INTEREST
Climate Change and Emerging and Re-Emerging Non-Enteric Zoonotic Infectious Diseases

Approximately 60% of all known infectious diseases are zoonotic, with 75% of emerging or re-emerging agents being zoonotic in nature (Kulkarni et al., 2015). Zoonotic infectious diseases are those that can be transmitted from vertebrate animals to humans under natural conditions (Kulkarni et al., 2015). Causal agents for zoonotic infectious diseases include viruses, parasites, bacteria, fungi, and prions (Kulkarni et al., 2015; CDC, 2017). Emerging infectious diseases are those that have been recognized as new infections as a result of an evolving pathogen and its change in host, pathogenicity, range, vector, or strain and have increasing incident cases (Vallat, n.d.). Whereas, re-emerging zoonotic infectious diseases are considered 'already known' and have an increase in prevalence through their expanding geographical host or vector range (Vallat, n.d.; Kulkarni et al., 2015). Non-enteric zoonotic infectious diseases refer to the diseases that do not cause gastrointestinal illness as result of contaminated food or water consumption (Kulkarni et al., 2015). Non-enteric zoonotic infectious diseases may be vector-borne (e.g. Lyme disease or West Nile virus), environmentally mediated (e.g. Anthrax or Leptospirosis), or directly transmitted (e.g. Rabies or Hantavirus) (Kulkarni et al., 2015).

The rising rate of zoonotic infectious disease emergence and re-emergence is attributable to increased travel, changes in human demographics and behaviour, evolving agricultural practices, alterations in land use, and animal habitat encroachment (Kulkarni et al., 2015). In addition, the rate of emergence and re-emergence may be partly an artefact of an increased situational awareness of zoonoses (Kulkarni et al., 2015). However, environmental and socioeconomic shifts, such as climate change and urbanization, have further created particularly favourable conditions for zoonotic pathogens (Kulkarni et al., 2015).

Of greatest concern to CFEZID and the HPGU is the relationship between emerging and re-emerging non-enteric zoonotic infectious diseases and climate change. During the period between 1880 and 2017, the overall annual air temperature increased by nearly 1°C globally (Ogden & Gachon, 2019). More specifically, the past three decades have been warmer than any other decades since 1850 (Ogden & Gachon, 2019). Unfortunately, the Arctic and sub-Arctic regions of Northeastern Canada are experiencing faster and greater warming as a result of melting snow and ice (Ogden & Gachon, 2019). It has been predicted that by the 2070s, most of Canada will be 5°C warmer than the period between 1971 and 2000, leading to an increase in precipitation and heat waves (Ogden & Gachon, 2019). Such environmental changes act as direct drivers for non-enteric zoonotic infectious disease emergence or re-emergence. Climate change affects a pathogen's survival ability; arthropod vector reproduction cycles; the

abundance of hosts or reservoirs; and the biodiversity of pathogen, reservoir, or host ecosystems (Ogden & Gachon, 2019).

Climate change also indirectly drives non-enteric zoonotic infectious disease emergence or re-emergence. For example, climate change may negatively influence a country's economy by limiting the number of exports grown or produced within the country (Ogden & Gachon, 2019). This can trigger conflict and refugee migration, which can prompt reduced use of infection control practices and an increased number of infectious diseases being imported into another country (Ogden & Gachon, 2019). Together, these direct and indirect effects of climate change stimulate non-enteric zoonotic infectious disease emergence and re-emergence through an increased introduction and/or endemic transmission of exotic infectious diseases, an increased spread of diseases endemic in southern areas to northern regions, and an increased number of cases of diseases already endemic to the geographic area (Ogden & Gachon, 2019). Furthermore, climate change poses a significant risk for non-enteric zoonotic infectious disease emergence or re-emergence in Canada (Exhibit 1).

Prioritizing Emerging and Re-Emerging Non-Enteric Zoonotic Infectious Diseases
The prioritization of emerging and re-emerging non-enteric zoonotic infectious diseases plays a key role in the HPGU's contributions to public health as a whole. The prioritization exercise will provide a short, targeted list of non-enteric zoonotic infectious diseases for developing health professional guidance documents and tools. This will also alert health professionals and other public health practitioners to which zoonoses are the biggest threat to the health of Canadians. With an increased awareness of priority zoonoses, behavioural changes and preventative measures can be implemented, and resources can be effectively allocated to limit the impact or spread of infectious diseases. The prioritization exercise will be constructed to ensure replicability. This will allow for a list of priority zoonoses to be produced as required and that best reflects novel pathogen mutations and an ever-evolving climate. By completing the prioritization exercise and subsequently developing educational resources, the HPGU aims to build public health capacity and strengthen collaboration among health-related sectors.

As Blake and Brock perform the prioritization exercise, Blake maintains a weekly activity log to track the progress of the project. The weekly activity log ensures that she manages her time effectively for particular tasks and recalls the tasks required to meet process outcomes from the project's start to finish.

Blake's Weekly Activity Log

Week 1	We conducted an environmental scan to determine whether any internal or external prioritization exercises have been completed. To date, only the National Microbiology Lab (NML) in Winnipeg, Manitoba has conducted an internal prioritization exercise. The NML is an affiliate organization to the PHAC. The NML specifically prioritized vector-borne infectious diseases most likely to surge in Canada due to the current and projected climate. I found a contact name for the NML project. I contacted Jane Murphy, a Risk Assessor for the NML, via email. Jane agreed to provide consultation while we conduct our prioritization exercise.
	Externally, the CDC and the Ontario Ministry of Agriculture, Food, and Rural Affairs (OMAFRA), in collaboration with the University of Guelph, have conducted prioritization exercises. We were unable to find contacts for these exercises. Consultation was not confirmed with the CDC or the OMAFRA. We reviewed the

	methodology of the three projects. It was noted that each project had varying prioritization criteria. I scheduled a teleconference with Jane and Brock for next week and a meeting agenda has been circulated to both attendees.
Week 2	I had a consultation with Jane and Brock – it sounded promising. Jane has provided next steps for the prioritization exercise: 1. Conduct a literature review focusing on only non-enteric zoonotic infectious diseases; compile a list of all of the non-enteric zoonotic infectious diseases pertinent to the health of Canadians 2. Assemble an advisory committee to review the list of zoonoses before prioritization occurs and ask the committee to provide their expert opinion 3. Create the prioritization criteria; consider the literature review, the advisory committee's expert opinion, and the needs of Canadian health professionals; we should have small number of criteria that best fit the project goals 4. Schedule another consultation with Jane to discuss the future steps for data collection, weighing criteria, and zoonoses scoring Brock and I created a list of 10 potential external and affiliate organizations whose expert opinion would be highly valued during the prioritization exercise (Exhibit 2). We chose organizations from different health-related specialities. The NML was included in the advisory committee to assist in directing the focus during group discussions. Brock found contact information for all of the organizations. Brock and I emailed the organizations to express our need for advice with prioritization and the opportunity for collaboration. We suggested that we have a teleconference in two weeks for those interested in discussing the expectations of the advisory committee and the direction of the prioritization exercise. I explained the short timeframe we have for stakeholder engagement due to the upcoming federal election campaigning.
Week 3	Brock and I performed a literature review to determine which zoonoses should be included in the prioritization exercise (Exhibit 3). We included zoonoses identified in only Government of Canada and other Canadian literature sources. Enteric zoonoses, duplicates, or diseases that were not specified in Canadian literature sources were excluded. A total of 62 zoonoses were retained after the literature review. We received responses from all 10 stakeholder organizations and confirmed a teleconference date and time with the respondents. Brock and I distributed the list of zoonoses "retained" and "not retained" for the prioritization exercise. We encouraged stakeholders to review the list prior to the meeting and to bring forth any suggestions for the removal or addition of zoonoses from the lists. Also, we asked stakeholders to brainstorm potential prioritization criteria which could be used for scoring the zoonoses. The meeting agenda was distributed to all prospective attendees.
Week 4	The teleconference with the advisory committee went well. All 10 stakeholder organizations participated. There was consensus between the stakeholders that Mayaro virus should be moved from the "not retained" list to the "retained" list because of its mode of transmission and relationship with the climate. Otherwise, the stakeholders were satisfied with the lists. We discussed the potential for another meeting after the prioritization criteria have been confirmed.

Brock and I approved the list of "retained" zoonoses (Exhibit 4) and "not retained" zoonoses (Exhibit 5).

I discussed the development of prioritization criteria with Brock. We agreed five criteria for the exercise would be appropriate and would maintain simplicity. However, we were unable to come to consensus on what the five criteria would be. We did decide to measure incident cases within Canada for each zoonoses as a criterion for the exercise. We will use the following formula:

$$Incidence = \frac{\# \ of \ new \ cases \ during \ a \ specific \ time \ interval}{the \ population \ at \ risk \ during \ the \ time \ interval} \times multiplier$$

We did not reach a conclusion on what the value of the multiplier should be or what the time interval should be when measuring incidence. Brock suggested that the time interval should be longer than two years.

Brock and I discussed using the severity of illness as another criterion. However, we would need to clarify what the severity of illness would entail and how it would be measured. We both agree severity of illness is an extremely challenging criterion to define.

We still need to identify and define other measures or units of analysis that could be used as prioritization criteria.

SPECIFIC PROBLEM OF DECISION
Prioritization Criteria

Time is quickly running out. Blake and Brock are feeling the pressure as a result of the need to complete the project prior to federal election campaigning. They are both aware that they will have to end their interactions with the advisory committee relatively soon. However, Blake and Brock feel the advisory committee's advice would be an asset when developing health professional guidance documents and tools after the priority zoonoses list is generated. Therefore, it is imperative that they choose and define the prioritization criteria.

To determine which emerging and re-emerging non-enteric zoonotic infectious diseases are of the greatest threat to the health of Canadians, the diseases need to be scored using explicit and appropriate prioritization criteria. Blake and Brock have unanimously agreed that five prioritization criteria would be effective while maintaining feasibility. However, before they can move any further with the prioritization exercise, or begin developing health professional guidance documents and tools, within the next week they will need to determine the three additional prioritization criteria, aside from incidence and severity of illness. They must then define what each criterion entails and how each criterion will be measured.

In terms of severity of illness, Blake and Brock need to further discuss the definition and which units will be used to measure it. In addition, they must identify a multiplier and time interval for incidence. The prioritization criteria must complement and consider CFEZID's mandate, the needs of Canadian health professionals, the relationship between emerging and re-emerging non-enteric zoonotic infectious diseases and climate change, and the working objectives of the HPGU. The criteria should include measures that can be repeated in future years because the

epidemiology of the zoonoses will evolve with climate change and globalization. Once the remaining three criteria have been identified, the severity of illness has been defined, and the incidence formula has been tailored, Blake and Brock can move forward with the project. The steps following the initial prioritization exercise have not yet been determined.

CONCLUSION

Blake and Brock have recently transitioned to new positions with the HPGU. They are working together to develop health professional guidance documents and tools which will aid in the prevention, early diagnosis, and clinical management of various emerging and re-emerging non-enteric zoonotic infectious diseases in Canada. To maintain efficiency and add value for health professionals, Blake and Brock have commenced a prioritization exercise to determine which emerging and re-emerging non-enteric zoonotic infectious diseases are of greatest threat to the health of Canadians. To date, they have reviewed previously conducted internal and external prioritization exercises, received consultation from the NML regarding the methodology, undertaken a literature review exploring zoonoses relevant to the Canadian context, and facilitated the development of an advisory committee. With the advice and feedback they have received from various stakeholder organizations, Blake and Brock have confirmed a list of non-enteric zoonotic infectious diseases to be included in the prioritization exercise (Exhibit 4).

Consequently, due to the upcoming federal election, Blake and Brock have a limited timeframe for engaging with stakeholders external to the PHAC. Prior to the election, Blake and Brock must produce a list of priority emerging and re-emerging non-enteric zoonotic infectious diseases so they can begin developing health professional guidance documents and tools. The pair has only been able to identify two prioritization criteria thus far: measuring the number of incident cases within Canada for each zoonosis and measuring the severity of illness associated with each zoonosis. However, because severity of illness is relatively challenging to define, the pair continues to search for a unit of analysis that adequately represents the criterion. In addition, they must tailor the incidence formula to sufficiently capture the status of each zoonosis in Canada. Blake and Brock are now at a standstill in terms of identifying three additional prioritization criteria, defining what each criterion entails, and how each criterion will be measured.

EXHIBIT 1
A summary of climate change effects on infectious disease risk for Canada[1]
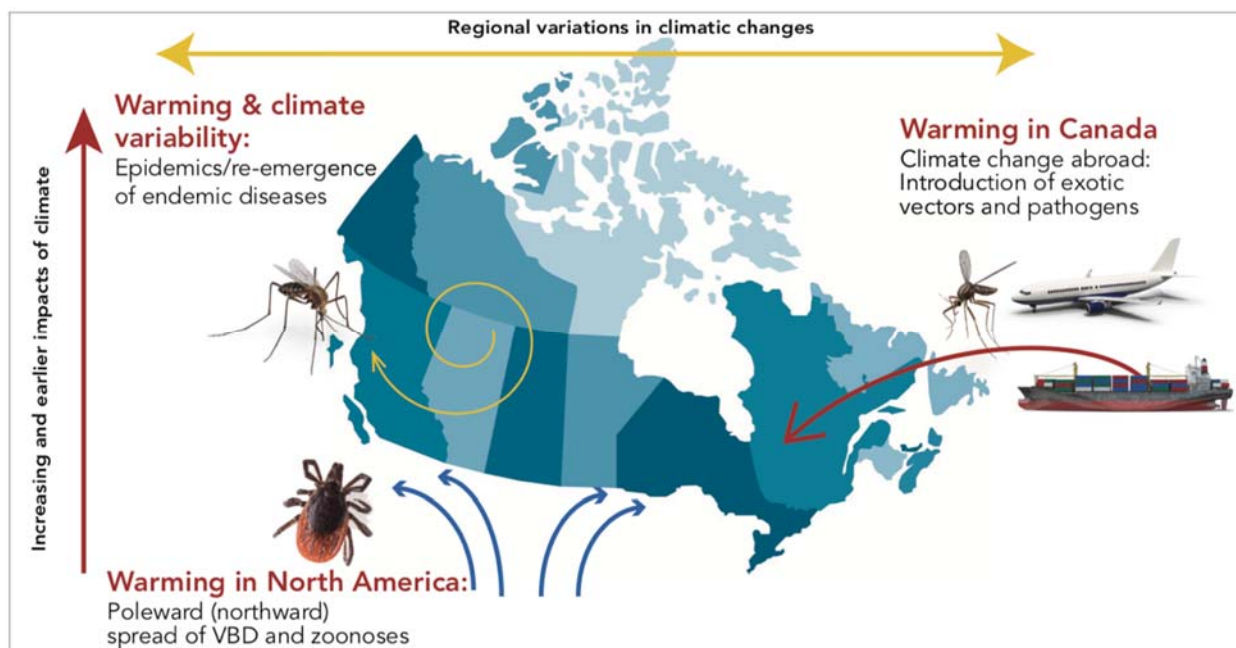
Source: © All rights reserved. CCDR Volume 45-4: April 4, 2019 – Climate changes and infectious diseases: What can we expect? Public Health Agency of Canada. Adapted and reproduced with permission from the Minister of Health, 2020.

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[1] Vector-borne diseases (VBD) are those that are transmitted to humans or animals through the bite of an infected arthropod species such as a mosquito, tick or fly (European Centre for Disease Prevention and Control, 2019).

EXHIBIT 2
Prioritization Exercise Advisory Committee Organizations[2]

National Microbiology Lab	Association of Medical Microbiology and Infectious Diseases Canada
Canadian Nurses Association	College of Family Physicians Canada
Canadian Paediatric Society	Public Health Physicians of Canada
The Society of Obstetricians and Gynecologists of Canada	Canadian Notifiable Disease Surveillance System
Canadian Society for Epidemiologists and Biostatistics	Canadian Foundation for Infectious Diseases

Source: Author created.

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[2] The author acknowledges that the advisory committee organizations listed in the case do not precisely reflect those used in the PHAC's consultations and the work to date on this project.

EXHIBIT 3
The Inclusion and Exclusion of Zoonoses for Prioritization[3]

Government of Canada Sources

Evaluation of the Public Health Agency of Canada's (2016a) Non-Enteric Zoonotic Infectious Disease Activities
Number of Zoonoses (n) = 59

Prioritization of vector-borne diseases in Canada under current climate and projected climate change (Otten et al., 2019).
n = 43

Infectious Diseases (PHAC, 2016b).
n = 36

Pathogen Safety Data Sheets (PHAC, 2018).
n = 74

Travel-Related Diseases (Government of Canada, 2019).
n = 19

Disease Prevention and Control Guidelines (PHAC, 2019).
n = 46

Biological Hazards (Canadian Centre for Occupational Health and Safety, 2020).
n = 15

Other Canadian Literature Sources

A Quantitative Approach to the Prioritization of Zoonotic Diseases in North America: A Health Professionals' Perspective (Ng & Sargeant, 2013).
n = 62

Major emerging vector-borne zoonotic diseases of public health importance in Canada (Kulkarni et al., 2015).
n = 24

Emerging infectious diseases: prediction and detection (Ogden et al., 2017).
n = 6

Prioritizing Zoonotic Diseases: Differences in Perspectives Between Human and Animal Health Professionals in North America (Ng & Sargeant, 2016).
n = 62

Surveillance for Emerging Infectious Diseases: A Canadian Perspective (Roth, 2011).
n = 9

Priorisation des zoonoses au Québec dans un contexte d'adaptation aux changements climatiques à l'aide d'un outil d'aide à la décision multicritère (Simon et al., 2018).
n = 25

Non-duplicate, non-enteric zoonoses identified in both, Government of Canada and other Canadian literature, sources
n = 61 (retained)

Total number of zoonoses that did not meet initial inclusion criteria
n = 52 (excluded)

Total number of zoonoses after review by advisory committee for inclusion in the prioritization exercise
n = 62 (retained)

Total number of zoonoses excluded after review from advisory committee
n = 51 (excluded)

Total number of zoonoses for inclusion in the prioritization exercise
n = 62 (retained)

Source: Thériault & Ahmad, 2019.

[3] The sources used in the literature review to collect zoonoses for prioritization have been included in the list of references located at the end of the case.

EXHIBIT 4
List of zoonoses retained for prioritization after review from the advisory committee

Anthrax	Cutaneous larva migrans	Lyme disease	Snowshoe hare virus
Argentine hemorrhagic fever	Cyclosporiasis	Malaria	Saint Louis encephalitis virus
Avian influenza virus type A	Dengue viruses (1,2,3,4)	Marburg virus disease	Tick-borne encephalitis virus
Babesiosis	Eastern equine encephalitis virus	Mayaro fever virus	Toxocariasis
Bartonellosis	Ebola virus	Middle Eastern respiratory syndrome coronavirus	Toxoplasmosis
Bovine tuberculosis	Echinococcosis	Monkeypox virus	Tuberculosis
Brucellosis	Ehrlichiosis	Nipah virus	Tularemia
Cache valley virus	Hantavirus	Plague	Murine typhus (endemic typhus)
California encephalitis	Hendra virus	Powassan virus	Venezuelan equine encephalitis virus
Chagas disease	Human granulocytic anaplasmosis	Psittacosis	West Nile virus
Chikungunya virus	Jamestown canyon virus	Q fever	Western equine encephalitis virus
Coccidioidomycosis	Japanese encephalitis virus	Rabies	Yellow fever virus
Creutzfeldt-Jakob disease	La Crosse encephalitis virus	Rickettsialpox	Zika virus
Crimean–Congo hemorrhagic fever	Lassa hemorrhagic fever virus	Rift Valley fever virus	Zoonotic diphtheria
Cryptococcosis	Leishmaniasis	Rocky mountain spotted fever	Leptospirosis
Cryptosporidiosis	Louse-borne relapsing fever		

Source: Thériault & Ahmad, 2019.

EXHIBIT 5
List of zoonoses not retained for prioritization after reviewal from the advisory committee[4]

Actinobacillus spp.	Herpesvirus simiae	Omsk hemorrhagic fever virus	Schistosomiasis
African trypanosomiasis	Histoplasmosis	Onchocerciasis	Scrub typhus
Bolivian hemorrhagic fever	Ilheus virus	O'nyong-nyong fever virus	Semliki Forest fever virus
Borrelia relapsing fever	Kyasanur forest disease	Orf virus	Seoul virus
Bovine spongiform encephalopathy	Legionellosis	Oropouche fever virus	Simian foamy virus
Capnocytophaga spp.	Louping iLL virus	Paracoccidioidomycosis	Sindbis virus
Colorado tick fever virus	Lymphatic filariasis	Rat-bite fever	Sporotrichosis
Cuevavirus	Lymphocytic choriomeningitis virus	Ringworm	Trench fever
Chlamydophila abortus	Mediterranean spotted fever	Ross River virus disease	Usutu virus
Epidemic typhus	Melioidosis	Roundworm	Valley fever
Erysipeloid	Murray valley encephalitis virus	Sabia virus	Venezuelan hemorrhagic fever virus
Fusobacterium spp.	Naegleria fowleri	Sandfly fever	Vesicular stomatitis virus
Glanders	Nontuberculous mycobacteria		

Source: Thériault & Ahmad, 2019.

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[4] Listed in italics are the names of zoonotic organisms or species that can cause illness but may not be associated with one specific and/or identified disease process.

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    zoonoses/?l=1&cHash=fb06c65b1d

INSTRUCTOR GUIDANCE

Prioritizing Emerging and Re-Emerging Non-enteric Zoonotic Infectious Diseases: What Should we be Afraid of Next?

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BACKGROUND

As time progresses, new zoonoses make their way to the forefront in the media, in healthcare systems, in government projects, and in the daily lives of Canadians. Prioritization exercises carried out by public health experts can provide an indication for which zoonoses we should be most afraid of next, and ultimately most prepared for, especially in light of impeding changes in climate. Blake O'Neil and Brock Jansen have recently transitioned to new positions with the Health Professionals Guidance Unit at the Centre for Food-borne, Environmental, and Zoonotic Infectious Diseases. Together, they plan to develop health professional guidance documents and tools to aid in the prevention, early diagnosis, and clinical management of various emerging and re-emerging non-enteric zoonotic infectious diseases. To maintain efficiency when creating guidance documents and tools, Blake and Brock have commenced a prioritization exercise to determine which emerging and re-emerging non-enteric zoonotic infectious diseases are of the greatest threat to the health of Canadians as a result of climate change.

To date, Blake and Brock have reviewed previously conducted internal and external prioritization exercises; received consultation from the National Microbiology Lab in Winnipeg, Manitoba; undertaken a literature review to explore zoonoses relevant to the Canadian context; and organized an advisory committee composed of external stakeholders from various health-related specialties. With the results from the literature review and the input from various stakeholder organizations, Blake and Brock have developed a list of zoonoses to be included in the prioritization exercise. The upcoming federal election tenders a very constrained timeframe for Blake and Brock, specifically for engaging with stakeholders external to the Public Health Agency of Canada. As public servants, Blake and Brock need to ensure government resources are not used for partisan advantage. Therefore, any stakeholder engagement would need to be paused when electoral campaigning begins until a Prime Minister is elected and the Senate and House of Commons resume.

Furthermore, prior to the federal election, Blake and Brock must produce a list of priority emerging and re-emerging non-enteric zoonotic infectious diseases so they can begin developing health professional guidance documents and tools. The pair has only been able to identify two prioritization criteria thus far: measuring the number of incident cases within Canada for each zoonosis and measuring the severity of illness associated with each zoonosis. However, because severity of illness is relatively challenging to define, the pair continues to search for a unit of analysis that adequately represents the criterion. In addition, they must tailor

the incidence formula to sufficiently capture the status of the zoonoses in Canada. Blake and Brock are now at a standstill in terms of identifying three additional prioritization criteria, defining what each criterion entails, and how each criterion will be measured.

OBJECTIVES

1. Define, list, and explain basic epidemiology terms and concepts relevant to the case (i.e., case definition, risk and protective factors, prevalence, incidence, and health-related states and events).
2. Define and apply epidemiological units of analysis relevant to the case (i.e., incidence, mortality rate, case fatality rate, life expectancy at birth, years of life lost, etc.).
3. Recall the indications for a prioritization exercise and the process required to determine a list of priority zoonotic infectious diseases.
4. Explain the current and predicted relationship between climate change and human health.
5. Discuss the relevance of the social, cultural, political, and economic determinants of health with respect for the indirect effects of climate on emerging and re-emerging non-enteric zoonotic infectious diseases.

DISCUSSION QUESTIONS

1. Why did Blake and Brock choose disease incidence as a definite prioritization criterion?
2. Is there something Blake and Brock should do before calculating the incidence rates for each retained zoonosis?
3. How should Blake and Brock define severity of illness and what measures, or units of analysis, should be included for this?
4. Drawing from your previous experiences or from other course material, describe different measures or variables that could be used as prioritization criteria in the exercise.
5. How would changes in the current and projected climate impact endemic versus non-endemic zoonotic infectious diseases? Describe the relationship between climate change, disease transmission, and the risk to human health.

KEYWORDS

Climate change; current and emerging public health issues; infectious disease prioritization; measures of occurrence; severity of illness; emerging and re-emerging non-enteric zoonotic infectious diseases; units of analysis; stakeholder engagement.

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.

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
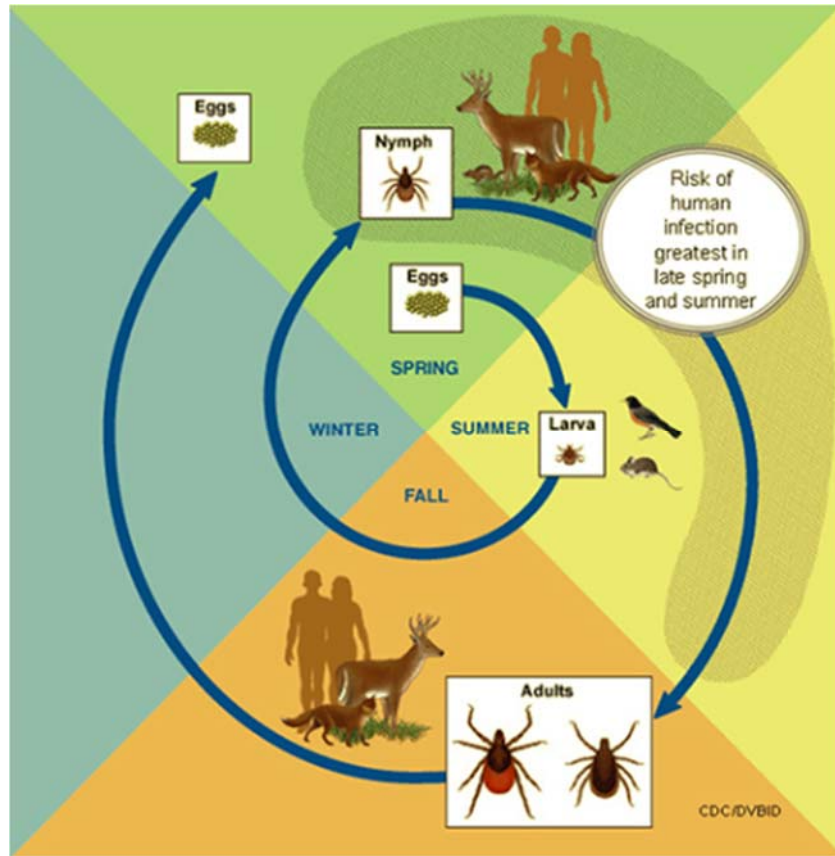
Source: Centers for Disease Control and Prevention, 2020.

EXHIBIT 2
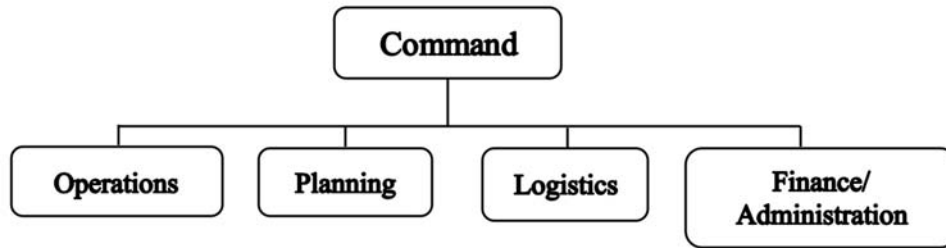**Ontario Lyme Disease Map 2018 Estimated Risk Areas**
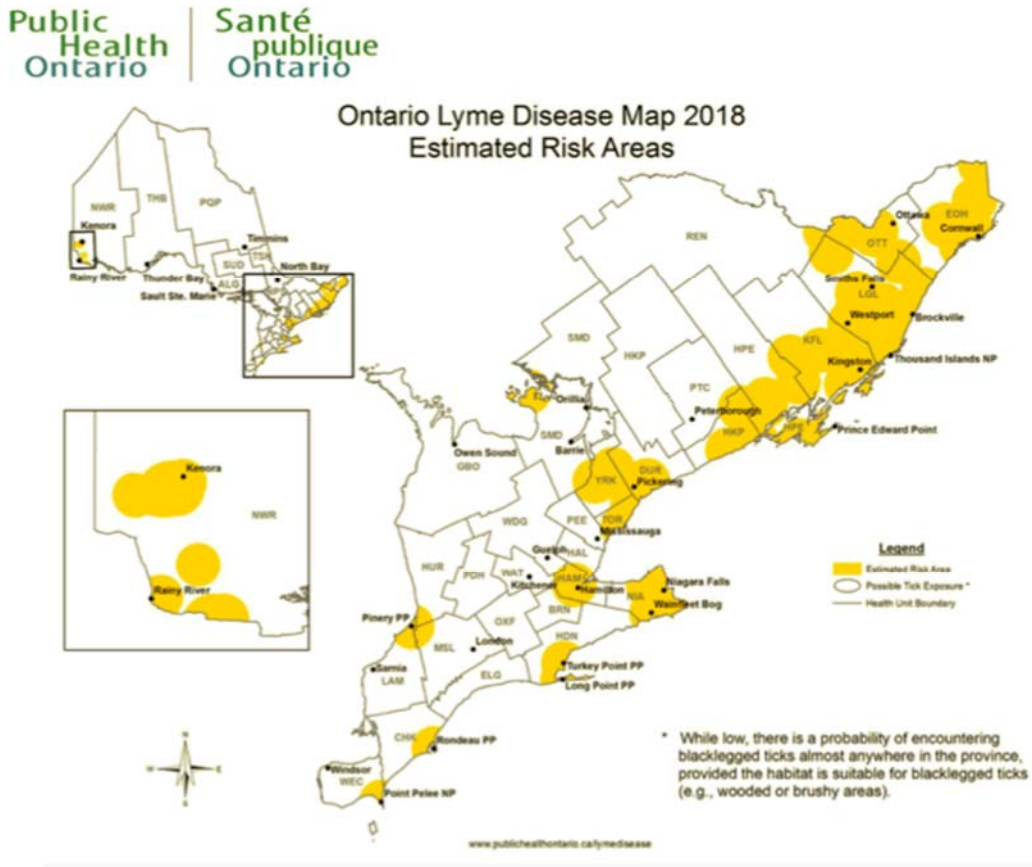
Source: Public Health Ontario, 2018a.

EXHIBIT 3
Active Surveillance Dragging

Source: Middlesex-London Health Unit, 2019.

EXHIBIT 4

Source: Emergency Management Ontario. (2008b).

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Schulich Interfaculty Program in Public Health

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.

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

CASE 14

A Sticky Situation:
A Medical Problem with a Social Solution

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Mark Twain once noticed that "a lie can get halfway around the world before the truth can even get its boots on" (Heath & Heath, 2007). When it comes to public health, his observations are shockingly true. Stories about public health scares tend to spread like wildfire, whereas people with the correct information struggle to make their message 'stick'.

Lisa Walters could barely see the cameraman as the bright key light shone on her face. He seemed to ignore her uneasiness as he toyed with the angle of the camera to find the perfect shot. As Lisa sat anxiously in the chair, she thought to herself, "how could we let this happen? Where did we go wrong?" Normally the Chief of Immunization Research within the Province would address the media but due to unforeseen circumstances, she was not available. The provincial public health agency had hired a Public Health Consultant, Lisa Walters, to provide advice to the Minister of Health about immunizations, working with other organizations to provide expert opinion about vaccines, and relaying information to health professionals about communicable disease issues affecting the population's health. But she did not expect to be speaking directly to the public about the subject. As a Public Health Consultant, Lisa's expertise was in providing support, not interacting with the media.

Lisa recited her answers to herself as the cameraman indicated the five-minute mark. She had prepared for weeks in anticipation of this public interview. She had been given all the questions beforehand, and her answers were tailored to perfectly debunk any myths that the newscaster might try to throw her way but what if that was not enough? What if she could not get her message across? Or even worse, what if the general public interpreted her message the wrong way? With the recent increase in the imbalance of media coverage on immunization, her message on the effectiveness of vaccines might get lost in the media noise. As she waited on stage with the make-up artist dabbing the sweat off her upper lip, she thought about her main message – parents have such a difficult task navigating the increasingly complex media landscape regarding vaccination information. There are too many conflicting claims about vaccines competing for the attention of parents who are hesitant about immunization, and the mass influx of divergent recommendations is shaping the public perspective about vaccinations. Lisa knew she had to help set them straight.

With barely any media training, she was faced with a challenge. When trying to make her message stick, she often remembered the importance of her delivery and knowing her

audience, particularly knowing their point of view and knowing what they care about. Although Lisa was well aware of her usual tactics for communicating public health concerns to the media, the topic of vaccines poses a very difficult challenge. How was she to explain the risk? As a veteran at public health consulting, Lisa was well versed in creating risk communication plans but interviewing with the media was a new venture for her. How should she address the issue? Was she addressing the right audience? If so, what message should she share with them? Complicating matters further, Lisa knew she only had one shot to make the media care about her story and her expert opinion. Lisa was faced with the challenge of ensuring that her message resonated with her audience. She was constantly combatting the spread of misinformation throughout the province as she tried to find the best method of risk communication. Lisa began her uphill battle of addressing risk perception and risk communication. How could she increase the public's knowledge about the science of vaccines? How could she improve public confidence in vaccines? How could she change the public's perception about them?

BACKGROUND

The World Health Organization (WHO) listed vaccine hesitancy as one of the top 10 threats to public health in 2019, along with Ebola and climate change (WHO, 2019). Vaccine hesitancy is "the reluctance or refusal to vaccinate despite the availability of vaccines" (WHO, 2019). Public health interventions have made significant progress on establishing herd immunity and protection against infectious disease. To this date, public health professionals have worked hard to eradicate smallpox through mass vaccination and surveillance of the disease. Initially, the objective of the program was to mass vaccinate at risk populations, yet due to herd immunity, surveillance and containment of infected individuals was surprisingly more effective than mass vaccination. Altering the strategy, smallpox was declared eradicated in 1980 (Lane, 2006). There were similar efforts to eradicate polio after the success of smallpox, but vaccine hesitancy posed a serious threat to these advances. The reasons behind vaccine hesitancy are plentiful and complex. The WHO identified the main rationales underlying vaccine hesitancy as complacency, barriers to access, and lack of confidence (WHO, 2019). Vaccines work in an amazing way. They can create years of immunity for those who receive them and can protect people who have not received them through herd immunity. Vaccines protect people from disease by allowing their bodies to build the defenses it needs to stay healthy. The immunity of the underlying population is contingent on maintaining high levels of immunization coverage within the population. With high levels of coverage, a population can defend itself against disease.

Immunization Research and Evaluation Team

This provincial public health agency collaborates with partners in the health care system to provide expert guidance and provides research evidence on policies and practices to support a healthier population, through disease surveillance and by specifically addressing the health needs of the population. They provide public health practitioners, frontline health care workers, and public health researchers with the best science and evidence-based knowledge to keep the population healthy. The Immunization and Research Evaluation team provides scientific evidence and support to prevent and control vaccine-preventable diseases while promoting public health knowledge about immunization. They develop and highlight public health research programs that aim to provide information to enhance the well-being of the provincial population. Additionally, the team bridges the gap between evidence and action in public health.

Vaccine Hesitancy

As one of the leading research organizations in the province, this agency is responsible for the task of combatting the new movement against vaccines. There are two main end points on the

immunization belief spectrum: vaccine acceptance and vaccine refusal. To add to the complexity of the problem, between these end points lie a wide range of vaccine-hesitant assumptions (Exhibit 1). Vaccine hesitancy arises because of many different reasons, including people's concerns about vaccine risks and side effects (Macdonald, 2015), and confusion about how and when children should be immunized. Some parents agree to some vaccines but not to all, whereas other parents agree to have their child receive the first scheduled vaccination but fail to return for subsequent doses if needed (Macdonald, 2015). Although a relatively low percentage of Canadian parents (3%) are strongly anti-vaccination, there is an increasing cause for concern about the 35% of parents who fall somewhere along the vaccine-hesitancy continuum (Greenberg, Dubé, & Driedger, 2019). The ambiguity and uncertainty with the vaccine-hesitant spectrum "represents a complex risk communication problem" for public health professionals (Greenberg et al., 2019). For most members of the public, there is a unanimous agreement that childhood vaccination is a critical public health intervention. However, there is a large concern about the lack of consensus in terms of vaccine efficacy, creating a need for increased public health communication with parents to address their unease (Greenberg et al., 2019).

Looking at the larger picture, this issue can be perceived as a problem of risk communication. Scheufele (1999) argues that frames are both cognitive constructs (stories and lived experiences that we keep in our mind) and elements of public discourse (patterns of media and public communication). There are two main framings of the vaccine hesitancy population that the media tends to highlight. The first is a knowledge gap issue – if only parents had more knowledge about how vaccines work then surely they would choose to immunize their children (Greenberg et al., 2019). The second is irrational thinking – if only people were not so easily influenced by fake news and celebrity influence then they would choose to immunize their children (Greenberg et al., 2019). Although these accounts are compelling, they are not truly the real frames of the actual issue. Vaccine hesitancy is driven by a complex web of issues, such as limited health awareness, faulty perceptions of risk, cultural norms, access to large amounts of conflicting information, and declining trust in health experts (Greenberg et al., 2019). The problem is primarily influenced by how the media and health care professionals communicate the risk. The current struggles associated with how best to make the message stick involve addressing parental worries, concerns, and refusal behaviours. Vaccine-hesitant parents – people who are on the fence about the safety of vaccines but are not fully against vaccines – are the main target of the risk communication message. The goal is to create the right message from the correct sources to influence parental decisions to vaccinate.

Risk Perception
In terms of vaccine hesitancy, risk can be understood as the probability of an individual acquiring or dying from a vaccine-preventable disease. Risk approaches differ depending on a person's life experience and expertise on a given topic. An expert may view risk as the probability of an event happening and the severity of the results (Fiske et al., 2017), whereas a nonexpert's perception of risk can be influenced by a variety of external characteristics beyond that of an expert's (Fiske et al., 2017). Fiske et al. (2017) suggest that there is an additional factor, considered the *dread* factor, that implies feelings and emotions have a role in risk perception. Risk perception is a key factor in the existence of vaccine hesitancy. The chance of acquiring a vaccine-preventable disease is based on the individual's ability to weigh the evidence, understand the effectiveness, and use reasoning and logic to reach conclusions (Fiske et al., 2017).

The issue is rooted in the fact that vaccines have worked so well to prevent the spread of certain diseases that many modern communities have not had to deal with a vaccine-

preventable disease outbreak (Velan, 2011). As a result of vaccine efficacy, some communities have not endured the devastation of vaccine-preventable diseases. Individual risk perception about vaccines can be altered by claims that adverse neurological disorders can occur after vaccination, even though many of these claims lack scientific validity (Velan, 2011). These claims tend to have a larger impact on an individual's perceptions of vaccines than does the absence of adverse events after vaccinations. For example, the media does not report about the absence of an event. "My child got vaccinated and nothing happened" is not an appealing story. These skewed tales have a high impact on the cognitive and emotional aspects of individual risk perceptions (Velan, 2011). In summary, people tend to underestimate the symptom severity and probability of acquiring a vaccine-preventable disease, whereas they tend to overestimate the risk of being immunized (Velan, 2011).

Risk Communication
Risk communication can be defined as the translation of evidence-based information between experts, community leaders, or officials, and the individuals who are at risk (WHO, 2017). Risk communication provides the information necessary to enable people at increased likelihood of death or illness to acknowledge expert opinion so they can protect themselves and those around them. Risk is closely linked to individual behaviour and influencing a change in individual behaviour has become an important strategy for change in public health (Fiske et al., 2017). Improved risk communication is necessary to influence people about their individual health behaviours. Individual risk perception is a complicated concept and requires a variety of underlying theories to understand it.

How to Create an Effective Message There is no formula to make an idea stick; rather, there is a set of key traits shared among the best communicated messages. These six principles work together to best express an effective message (Heath & Heath, 2007).

Simplicity: The skill of exclusion and prioritization must be mastered to strip an idea down to its core – not necessarily shortening anything but ensuring the meaning behind the message is delivered in the clearest way without excessive explanation. This principle helps plan what is said to an audience.

Unexpectedness: Engaging interest and curiosity is necessary for an idea to last. Have mystery or twists, not just a plain explanation. Have questions so that the reader is hooked and curious. This principle helps break the ordinary pattern of information and creates something unique that grabs the audience's attention.

Concreteness: Giving ideas so that the reader can visualize the point that is being made; have details and descriptions. This principle helps establish common ground with the audience.

Credibility: Messages must carry their own credentials and be given by credible people. When explaining something, add in some facts with evidence so that it is believable. This makes people more interested in the message and more likely to learn something. This principle helps speak to the logical side of people.

Emotions: It is essential to make people feel something. Humans are wired to feel things for others, not for abstractions. Adding points that will appeal to the audience's emotions, whether happy, sad, angry, or frustrated, will increase interest. Emphasizing the benefits of what they are reading can help catch people's attention. This principle speaks to emotion and feelings.
Stories: How do we get people to act on our ideas? We tell stories. People relate to each other a great deal and telling stories or sharing experiences will intrigue them and precipitate action.

This principle provides people with examples of problems and the tools to solve them.

SPECIFIC AREA OF INTEREST
The Fundamental Four
To successfully communicate the risk of vaccine hesitancy, Lisa understands that all stakeholders need to input a collaborative to dispel myths and misinformation about vaccines. The four main players influencing individual decision-making about vaccines are frontline community health care workers, government health policy makers, the media, and community members. Lisa and her team are working closely with all stakeholders to reduce vaccine misinformation, although she realizes each stakeholder has its own limitations in addressing the issues.

Frontline Health Care Workers: Lisa and her team are working hard to assist the frontline health care worker population by providing them with the resources needed to tackle the conversation of vaccine hesitancy. However, this group has expressed concern to Lisa because of the number of barriers they face. She knows that frontline health care workers are often one of the most credible influencers of personal health decisions. In addition to directly interacting with people, they are the main players in helping them understand the benefits of vaccines and risks of health-related illnesses. Although these conversations are extremely valuable, she knows they can be quite difficult when individual beliefs conflict with professional advice.
To combat confusion about vaccinations, all medical professionals must be united in their message when it comes to vaccine benefits – conflicting advice from medical professionals is especially damaging ("Vaccine Hesitancy: A Generation at Risk," 2019). To ensure that frontline health care workers are fully prepared to tackle vaccine hesitancy, they need increased training, improved communication skills, sufficient medical and epidemiological knowledge, and a reduction in their own biases and behaviours. Overall, there is a need to increase the use of the messaging from provincial public health agencies so that frontline health care workers have the tools they need to adequately address concerns about vaccines. Frontline health care workers have the most influence on vaccine-hesitant individuals because they are the ones who experience face-to-face patient interaction and are typically the first point of contact for vaccine-hesitant people in our health care system (Dubé et al., 2016). Because of the nature of the Canadian health care system, frontline health care workers feel that they have insufficient time to talk to vaccine-hesitant patients (Dubé et al., 2016). The health-care system in Canada is strained and underfunded. Physicians are left with a growing list of responsibilities while facing multiple imposed cuts to funding from the government. These limitations are resulting in physicians having to ration health care and limit the time they spend with each patient. The conversation to alter personal perspectives about vaccines requires a large investment of time and patience, and many health care providers are finding this difficult to achieve (Dubé et al., 2016). Many providers do not have the time or resources to adequately interact with vaccine-hesitant people.

In addition, health care providers find that being too persistent in their attempts to alter patient perspectives about vaccines tends to push vaccine-hesitant people toward the refusal end of the spectrum (Dubé et al., 2016). With a lack of time and resources to address this issue, health care practitioners are getting frustrated about trying to convince parents to vaccinate their children. This frustration can lead to dismissal of these vaccine-hesitant patients, which can subsequently increase the distrust between health care providers and health care consumers (Dubé et al., 2016). Frontline health care workers are sometimes struggling with their own confidence about vaccines and vaccine safety, mainly resulting in the disconnect between pharmaceutical companies and physician knowledge. Some have indicated they might not be knowledgeable enough about how vaccines are developed or regulated in Canada (Dubé et al.,

2016). Health care providers are asking for more information on these topics so that when they are faced with vaccine-related questions they can provide the correct answers.

Policy Makers: Lisa's role in the government sector ensures that she works closely with health policy makers as well. Lisa understands governments and health policy makers are key stakeholders in promoting childhood immunization, disseminating knowledge, and implementing policies that reduce the health risks associated with vaccine hesitancy. Policy is clearly not very effective because the vaccine-hesitant population continues to grow ("Vaccine Hesitancy: A Generation at Risk" 2019). The current Immunization of Schools Pupils Act allows for vaccine exemption if parents choose not to immunize their children for medical, religious or philosophical reasons (Immunization of School Pupils Act, R.S.O. 1990, c. I.1). Additionally, this policy only applies to children who attend primary or secondary school, yet there are a number of homeschooled children who do not fall under this policy. Policy makers are now being challenged to develop unconventional vaccine policies to sustain the well-being of future generations. Public health professionals need to find ways to increase communication about the consequences of policies that permit vaccine exemptions for nonmedical reasons. Government agencies play a role in this policy development, but they too are faced with public mistrust. The public sometimes perceives the government as biased because they may have close ties to pharmaceutical manufacturers (Dubé et al., 2016). Therefore, the main issues for policy makers and the government are effective communication and building trust (Dubé et al., 2016).

Media: Lisa knows that one of the main issues rooted in vaccine belief is misinformation. Partnerships with media sources are necessary to allow widespread communication about evidence-based health information. She realizes it is necessary to increase media coverage that features public health officials showing the benefits of vaccines and discussing the consequences of disease exposure. Parents who are unsure about vaccines often search for information on the internet or on social media platforms. This can make them targets for false information, promoted by antivaccination advocacy groups, about the adverse effects of immunization ("Vaccine Hesitancy: A Generation at Risk" 2019). In terms of medical news, the media tends to be a secondary source of information. Researchers are finding that people tend to trust their health care professionals first and the media second, although the issue is that the media is more accessible and is often the first contact for information (Dubé et al., 2016). The media holds a great deal of power because they can reach more people, at a faster pace, than can health care providers. It is difficult to say whether the media is assisting the spread of vaccine-hesitant information, or whether it is the public's perception of the media (Dubé et al., 2016). The media's role in the issue appears to be that they report both sides of the vaccine debate with equal measure, yet the information is not equivalent. The alternative side of the argument is receiving equal weight, but it does not have scientific backing, it lacks legitimacy (Dubé et al., 2016), and it is gaining traction in the public's perception of vaccine risk. Even if the media is reporting scientific facts and promoting pro-vaccination messaging, it is not enough to tackle the issue because the media is also giving the vaccine-hesitant population a substantial platform for projecting its opinions, and this ultimately gives their arguments more support (Dubé et al., 2016). Additionally, when reporters interview vaccine experts, they tend to bombard these experts with targeted vaccine-hesitancy questions, which require a high level of understanding and knowledge to be answered effectively. In this case, the media may be undermining these experts and fostering mistrust (Dubé et al., 2016). The objectives of the media sometimes misalign with the goal of increasing confidence in vaccines because they tend to promote the more enticing, provocative, vaccine-hesitant stories rather than science-based vaccine facts (Dubé et al., 2016).

Community Members: Parents who have vaccinated their children can play a significant role in influencing their peers. Parents who have made this choice can be advocates for immunization

if they are provided with appropriate tools and resources so they can have informed conversations with their vaccine-hesitant peers and be more vocal about the vaccine hesitancy issue. These parents are sometimes silent on the pro-vaccination topic. This may be because immunizations are routine in Canada, so they are under the impression that everyone is vaccinating their children (Dubé et al., 2016). It would be helpful if parents had more influence on other parental vaccine perceptions. If parents of immunocompromised children become pro-vaccination champions, they may be more influential in spreading the message of the consequences of vaccines than the government or health care providers. The community has the power to overcome the distrust of authorities such as the government or health care providers (Dubé et al., 2016). Because vaccine-hesitant people want autonomy over their health and the right to make their own informed decisions, being told what to do when it comes to health care can add to their mistrust of authority figures (Dubé et al., 2016).

Potential Causes and Controversies of Vaccine Hesitancy
Dubé et al. (2013) discussed the following causes and controversies as they relate to vaccine hesitancy:

1. The role of the media in spreading misinformation. The ability to freely share ideas and content with our peers on social media and the imbalance of negative vaccination messages in the media is increasing vaccine hesitancy.
2. Trust in the source of information. Public health organizations can play a large role in communicating the need for vaccines; however, the reliability of these systems is not well understood by the population or even by some health care providers.
3. Beliefs regarding the efficacy and usefulness of vaccines. A common public health problem is the lack of evidence about diseases and ill health. Vaccination programs have been so successful that many vaccine-preventable diseases are becoming less prevalent and people have no firsthand experience with these diseases.
4. Lack of provider recommendation to be vaccinated. Most health professionals support vaccinations; yet some health care professionals within this population can be classified as vaccine hesitant. There have been cases where some health care professionals tend to lean more towards vaccine hesitancy due to their own personal bias and beliefs. This has a great effect on the rate of patient immunization.
5. Personal beliefs about vaccination. The importance of immunization is associated with an individual's acceptance of vaccines. Perceptions can be easily influenced by pictures or stories that are shared through the media.
6. Skewed risk perception about vaccine-preventable diseases. Risk perceptions are based on past experiences and emotion rather than on empirical evidence. Many people have not experienced the trauma associated with vaccine-preventable diseases.

PROBLEM OF DECISION
What is the most effective way to make Lisa's message on vaccination stick? Specifically consider which stakeholder should convey the message and what shortcomings are associated with each. What is the best method of risk communication? What different forms of risk communication should Lisa produce (pictures, graphs, statistics, or stories, etc.)? Can she create a message that will make sense to people? Use the 12 steps depicted in Exhibit 2 to help Lisa create an impactful vaccine communication campaign.
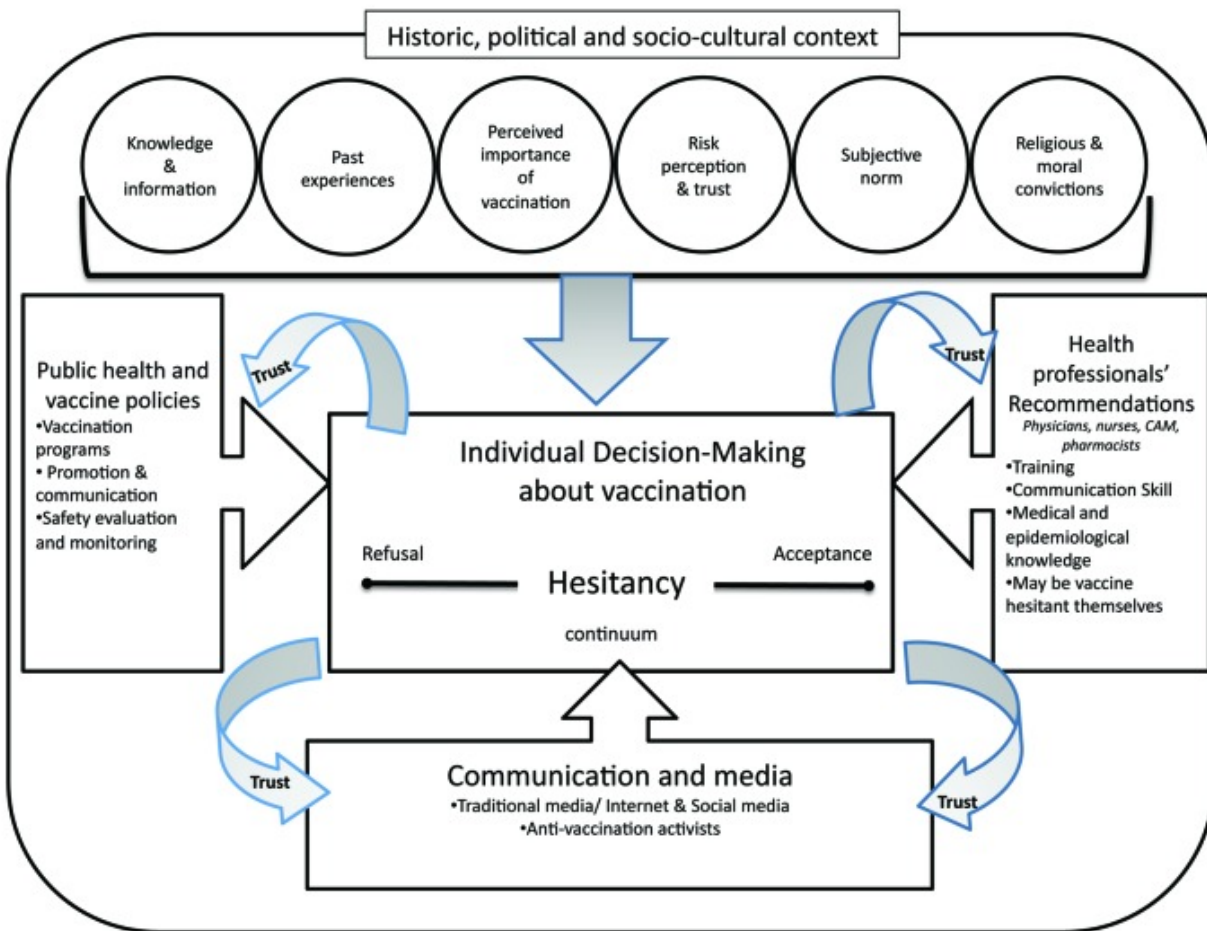
CONCLUSION
The increasing concern about vaccine hesitancy has created the need for different tools, approaches, and strategies to enhance vaccine acceptance. Many experts have proposed multipronged approaches to combat vaccine hesitancy at the population level, including

strategies such as communication campaigns and health marketing tactics. Vaccine-hesitant people are a unique group with a diverse set of justifications for their beliefs. Vaccine hesitancy is labelled as a 'wicked' risk communication problem for public health professionals because the reasons for hesitancy are complex and unique. A provincial public health agency is faced with the difficult task of combatting the miscommunication about vaccines within the province. The Chief of Immunization Research is out of the country and Lisa Walters, a public health consultant, has stepped in. Amid her inexperience, she has been working diligently to create an effective risk communication message that targets vaccine-hesitant parents. Ultimately, the problem relates to framing. Social media is overburdened with negative stories and misinformation about vaccines, which has led to a growing group of people who see vaccines as being more risky than safe (Pluviano, Watt, & Della Sala, 2017). The problem is greatly influenced by how the media and health care professionals frame the issue and communicate to the public. Lisa's goal is to plan a communication campaign by creating the right message from the correct sources to influence individual decision-making about immunization. In terms of vaccine hesitancy, framing the problem in the eyes of the targeted audience and creating a concise communication campaign can modify individual vaccine behaviour and increase vaccine acceptance by the general population.

Conceptual Model of Vaccine Hesitancy

Source: Lwembe et al., 2016.

EXHIBIT 2
12 Steps of Health Communication

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At a glance: the twelve steps to developing a health communication campaign

1 Project management	2 Health promotion Strategy	3 Audience analysis	4 Communication inventory	5 Communication objectives	6 Channels and vehicles
Develop a plan to manage stakeholder participation, time, money, other resources, data-gathering and interpretation, and decision-making throughout the planning process.	Establish or confirm a complete health promotion strategy.	Collect demographic, behavioural and psychographic information to create an audience profile.	Make a list of the communication resources in your community and organization – including alliances/relationships. Assess the strengths and weaknesses of using these to deliver your message.	Identify the bottom-line changes you hope the campaign will accomplish.	Choose vehicles that will carry your message(s).
Engage stakeholders in meaningful ways.	Ensure your project team is aware and supportive of your health promotion strategy.	Where possible, segment your audience.	Modify existing inventories and directories, for e.g., media lists from partner organizations.	Consider all four levels (individual, network, organization, society).	Choose the best channels and vehicles for the situation based on reach, cost, and effectiveness (i.e., fit to situation, audience, and objectives).
Use a clear decision-making process.	Use logic models as well as narratives to review and describe the strategy.	Use existing and new qualitative and quantitative data.	When listing your resources, consider a mix of communication strategies, including media, interpersonal, and events.	Limit yourself to two or three objectives per level.	Use a mix of short and long-term channels and vehicles.
Establish a campaign timeline.		Use a combination of less and more expensive methods.		Describe a change rather than an action step.	Consider a mix of communication strategies, including media, interpersonal and events.
Plan how you will allocate financial and human resources.		Use multiple data sources to confirm conclusions.		Ensure objectives are specific, measurable, attainable, realistic, and time-bound (SMART).	
Consider what data will be required to make decisions at each step. Include adequate time for data collection.		Ensure you have a complete and compelling understanding of your audience.		Ensure objectives address strategic priorities and your overall strategy.	

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7	8	9	10	11	12
Combining and sequencing	**Message strategy**	**Identity development**	**Production of materials**	**Implementation**	**Evaluation**
Combine and sequence channels and vehicles across timeline.	*Determine what you will "say" to your intended audience(s) to reach your objectives, and how you will say it.*	*Create an identity that will clearly communicate your image and your intended relationship with your audience.*	*Develop specifications for each desired product, select and contract with suppliers to create your products.*	*Implement campaign.*	*Gather, interpret, and act upon qualitative and quantitative information throughout the preceding 11 steps.*
Hold a big event first or build to a grand finale.	Ensure each message includes: a 'What'; a 'So what'; a 'Now what' (a clear indication of what the message is about; reasons the audience should care; clear next steps for the audience). This is a key part of creating the specifications of any communication product to guide production.	Use examples from a wide variety of sources to help determine your preferences.	Aim to produce the best materials within budget and on time.		Throughout all steps, make the effort to:
Include activities with both high and low visibility, short and long shelf life.			Manage reviews and sign-offs very carefully.		• Check in with stakeholders about expectations
Be aware of special events, and holidays, friend or foe.		Produce materials that "carry the identity" – name, position statement, logo, and images, as required.	Pre-test all material with intended audience.		• Dedicate some resources for evaluation
Build on existing events but be ready for the unexpected.					• Ensure your efforts are evaluable
Balance your timing to achieve repetition but avoid message fatigue.	Build upon information and decisions in steps 1–7, particularly audience analysis and objectives.	Manage your identity, by ensuring all connections with your audience (e.g., print, verbal, online) are consistent with your identity.			
Apply the rule: 3 messages, 3 times, 3 different ways.					
Link with issues that are capturing public attention.	To generate ideas, review materials from a variety of sources and assess what you like and don't like.				
Integrate activities when possible. A single activity can have impact at all four levels.					

Source: Public Health Ontario, 2012.

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INSTRUCTOR GUIDANCE

A Sticky Situation:
A Medical Problem with a Social Solution

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BACKGROUND

Vaccine hesitancy has been labelled as a complex risk communication problem for public health professionals because the reasons for this hesitancy are complex and unique. A provincial public health agency is faced with the difficult task of combatting the miscommunication about vaccines within the province. Lisa Walters, Public Health Consultant, has been working diligently to develop an effective risk communication message that targets vaccine-hesitant parents. Ultimately, the problem is one of framing, with the issue greatly influenced by how the media and health care professionals frame the issue and communicate with the public. The goal is to plan a communication campaign by creating the right message from the correct sources to influence individual decision-making on immunization. By using a set of six efficient risk communication principles, the most efficient risk communication message can be constructed. Finally, there are a variety of causes of vaccine hesitancy that can greatly affect the framing of the risk message. Lisa is participating in a media interview but does not feel prepared and is worried that her message will add to the negative media landscape on vaccines. The immunization team needs to create a multipronged, well-planned risk communication campaign to change individual vaccine behaviour but is having difficulty determining where to start or what approach to take. What is the most effective way to make a message on vaccination stick? Which stakeholder should be the one to convey this message and what are the drawbacks associated with using this stakeholder? What elements of risk communication are present for each stakeholder and which ones are lacking? What is the best method of risk communication? What different forms of risk communication should be produced (pictures, graphs, statistics, or stories, etc.)? Can a message be created that people will embrace?

OBJECTIVES

1. Define risk, risk perception, and risk communication from multiple stakeholder perspectives.
2. Develop modern approaches to a risk communication campaign by reflecting on the individual health belief model, the theories in health behaviour change, and the key principles in effective health messaging.
3. Evaluate multiple stages of a communication campaign to best influence behavioural changes by considering the perspectives of the individual, the community, and population level society.
4. Apply health communication and marketing skills to influence health-related behaviour changes at the individual and community level.

DISCUSSION QUESTIONS
A. Pre-class discussion/preparation questions.
In your learning teams, prepare a communication campaign to address one of the potential causes of vaccine hesitancy. Be sure to address the following questions:
1. When thinking about altering perceptions about vaccines, where should our attention be focused: at the individual, the community, or the societal level? Why?
2. Consider all stakeholders. Which group would best communicate vaccine risks to the public? Why?
3. What are some of the potential challenges associated with health communication?

B. In-class discussion questions:
1. What is the problem in the case?
2. How should we solve the problem?
3. What stakeholders will be involved in the campaign? Should we use all stakeholders?
4. Who is our target audience?
5. What is our main goal?
6. What is our main objective?
7. What do we know about our audience? Demographics? Behaviour? Personal beliefs?
8. What communication resources can we use? What is the best option?
9. What are some specific and measurable communication objectives?
10. What channels and vehicles should we use?
11. What should our message be?
12. What is the identity of our campaign?

C. Further discussion questions (if time permits):
1. What other health communication campaigns can you develop? What do you like about them? Can you think of any campaigns that have failed?

KEYWORDS
Risk communication; health and the media; behavioural change; communication campaign; health marketing; risk perception; vaccine hesitancy.

CASE 15

Recovery Through Education: An Integrative Approach to Mental Health for the People, by the People

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Gerald McKinley, PhD (Assistant Professor, Western University)

BACKGROUND

As Janet Brown sips her Monday morning coffee and plans her upcoming meeting, she reflects on how an individual's journey recovering from mental illness varies from person to person, with no journey being alike. Janet contemplates how she could use these ideas to direct the stakeholder meeting and how the various stakeholders at the table might react to what she was going to say.

Janet is the Manager, Program Development at Toronto Hospital, where she is currently looking to expand mental health services for clients and community members to meet the demands of mental health service users. Janet wants to try a new concept for the program that incorporates client participation. She saw the success of recovery colleges in England and noticed these programs were starting to appear in Canada and elsewhere in the world.

Recovery colleges are programs and services cocreated and codeveloped with individuals with lived mental health experience with a focus on community integration and improving well-being. Janet thinks it is also time for her hospital to participate in this initiative for its clients and community. Janet is excited to bring this idea into fruition and to be part of this mental health innovation. She saw the success of the recovery college at Ontario Shores Centre for Mental Health Services in Whitby, Ontario and wants to recreate the initiative to suit the needs of her hospital (Exhibits 1 and 2). Janet reflects on other initiatives developed in Ontario, such as the CANMAT Health Options for Integrated Care and Empowerment in Depression (CHOICE-D) project, which utilized the same ideals of cocreation and engaging individuals who have relevant lived experience to create a consumer treatment guide. The CHOICE-D project was developed by people with this experience to describe the various depression treatment options that are available in Canada (Canadian Biomarker Integration Network in Depression [CAN-BIND], n.d.).

Janet realizes the amount of time, work, and collaboration required for this type of cocreation and coproduction may be overwhelming because she is not familiar with it and she does not have previous experience in the field. She does not have a template or guidelines to follow for developing this program. As Janet finishes her coffee, she takes a deep breath and starts planning her meeting.

RECOVERY COLLEGES

Recovery colleges originated in England in 2009, with the first college established at the South West London Recovery College in London (Perkins et al., 2018). As recovery colleges have

garnered global adoption, there have been increasing variations of the development and implementation of the system, all falling under the generalized definition of a recovery college. Currently, there is no consensus or definitive standard about what constitutes a recovery college, only suggested frameworks on what should be included in the development of a college. The primary focus is to provide a safe space where people with mental illnesses and substance use concerns can be leaders in their own journey to recovery. The curriculum and courses offered are determined by the participants and the needs of the community. The key foundations to creating are cocreation and coproduction. These core concepts allow participants to focus on the recovery aspect of a mental health service, providing people a way to move forward and grow from their mental illness (Perkins et al., 2018). Recovery colleges provide a chance for them to discover more about themselves while exploring new possibilities (Perkins et al., 2018).

The resulting programs and courses mainly focus on increasing community integration and improving the well-being of individuals who have mental health concerns (Exhibits 1 and 2). Family members, community members, and people with relevant lived experience are all involved in deciding which courses to create and develop. Courses can also be taught and co-facilitated by individuals with lived experience (Perkins et al., 2018). Recovery colleges have shifted the focus of mental health recovery from therapy to education-based learning, unifying professional expertise and knowledge from people who have lived experience (Perkins et al., 2018).

Eight components are used to define a recovery college (Perkins et al., 2012):

1. Co-creation and coproduction are incorporated at every level, bringing in the expertise of health care practitioners, individuals with experience, and service users.
2. All programs and courses are delivered from a physical location.
3. The programs and courses operate on college principles; this includes having students select their courses from the course guide, not based on their diagnosis.
4. The courses are inclusive and open to all, and can include family members, staff, community members, and service users.
5. There are personal tutors or peer workers who can help offer information to the students.
6. Recovery colleges are not a substitute for treatment and traditional assessment.
7. Recovery colleges are not a substitute for mainstream colleges.
8. The operations and culture of the recovery college should reflect recovery principles.

There is a growing need for increased and more streamlined primary mental health care in Canada. Psychiatric appointments for mental health concerns are often long and costly for the health care system. Lengthy wait times for clinical and psychiatric care are significant barriers to individuals receiving appropriate mental health care and can result in poorer health outcomes (Loebach & Ayoubzadeh, 2017). According to the Canadian Institute for Health Information, the average wait time for mental health treatment and counselling services is 45 days (Loebach & Ayoubzadeh, 2017). The need for mental health care and treatment is growing, and the current health care system is unable to keep up with the demand. The intended concept of a recovery college is to offer both an upstream and downstream approach to this public health need. As mentioned in the eight features that define recovery colleges, these colleges are not to replace clinical assessments or treatment; however, they can complement an individual's mental health recovery. A 2017 evaluation of United Kingdom recovery college service use outcomes indicated that participants who had mental health concerns and took recovery college courses had an improved quality of life and improved recovery outcomes (Bourne et al., 2018). The

evaluation also suggested that recovery colleges offer positive benefits for participants and service providers, including a decreased usage of mental health services, fewer days spent in hospital, and fewer hospital admissions (Bourne et al., 2018).

COCREATION COMPARED WITH COPRODUCTION
The terms cocreation and coproduction have been used interchangeably to describe the notion of working with service users or customers to create programs, products, or content. However, both terms are distinct, and have their own meaning, but also have some overlap (Exhibit 3).

Cocreation involves a high level of customer or service user participation in the design of the product or service (Chathoth et al., 2013). There is extensive collaboration so that businesses work with the intended target market to create and customize the final product/service. This process shifts away from the traditional business-centric model of selling to a customer and instead focuses on customer participation and interaction for the development of the product/service (Chathoth et al., 2013). Cocreation is directly tied to consumption and usage, with the value in consumption defined only by the customer/service users (Chathoth et al., 2013). Cocreation organizations do not view their customers or service users just as consumers or users of their product; rather, they are considered partners that the organization can consult and learn from to help create experiences that add value (Chathoth et al., 2013).

Coproduction also involves customers and service user participation but not to the same extent seen with cocreation. With coproduction, customer and service user opinions are also considered, but in a more passive way. Customers are portrayed as a resource rather than as a partner (Chathoth et al., 2013). The development of the product or service is still company centric and based on the organization's own needs and abilities (Chathoth et al., 2013). The opinions and insights from customers and service users are heard but not always considered or used (Chathoth et al., 2013).

THE CANMAT HEALTH OPTIONS FOR INTEGRATED CARE AND EMPOWERMENT IN DEPRESSION PROJECT
The CHOICE-D project is another initiative that has successfully utilized the principle of cocreation to develop programs in collaboration with clinical experts, stakeholders, and people who have applicable lived experience. The CHOICE-D project was developed for consumers so they have a guide to the various treatment options available for depression in Canada (CAN-BIND, n.d.). The project was created as a partnership between the Canadian Network for Mood and Anxiety Treatment (CANMAT), the Mood Disorders Association of Ontario, and the CAN-BIND (CAN-BIND, n.d). The main leaders of this project were CANMAT and the Mood Disorders Association of Ontario, along with a team of people who have lived experience with depression (CAN-BIND, n.d).

The guide was written by people who have depression for other people who experience depression. These individuals include patients and clients, caregivers, and support workers (CAN-BIND, n.d.). By engaging individuals with lived experience, the goal of the guide is to create a product that is relevant for the people who need it the most (CAN-BIND, n.d.). The information in the guide was developed by using evidence-based information based on CANMAT's 2016 updated clinical guidelines on the management of adults with major depressive disorder (CAN-BIND, n.d.). A plain text version of this clinical guideline was then created to ensure it was easy to understand for a wider audience (CAN-BIND, n.d.). This educational tool was developed to allow consumers to take a more active role in their own care through engaging in shared decision-making with their health care provider (CAN-BIND, n.d.).

SPECIFIC AREA OF INTEREST

Janet realizes the need for a recovery college in her hospital and in her community. She is aware of the extensive waitlists for people just trying to see a psychiatrist, let alone the waitlist for people trying to access treatment and ongoing care. Other mental health programs do exist; however, the waitlists for these programs are normally quite long as well, making it difficult for patients to access them. Janet appreciates how recovery colleges are cocreated and allow clients to participate in, and take charge of, their own recovery.

As Janet researches more about recovery colleges, and how these programs could greatly benefit her hospital's mental health unit, new concerns also enter her mind. She understands that finding stakeholders, including local organizations, hospital members, community members, clients, and people with lived experiences, will be a huge feat, and perhaps an even greater feat will be getting these stakeholders to agree to work together. As Janet starts reaching out to organizations and planning her initial meeting, a few questions stick with her:

- How many stakeholders should be included in the planning? Janet knows the importance of being thorough with stakeholder engagement, but how many stakeholders are considered too many?

- How can she ensure all the stakeholders involved are participating for the right reasons? Various organizations and community members will have varying agendas. How can she ensure agendas will align and that everyone can agree on the overarching goal?

- How can clients and people with lived experiences be heard? How can Janet ensure the people with the most important contributions will be taken seriously and not feel intimidated?

Janet also realizes the regulations and evaluations surrounding recovery colleges are lacking. How can she develop and implement a program when there are no standard guidelines or regulatory bodies to ensure proper programming development? Janet must research how she can best access the tools for creating a community recovery college but keep it hospital based. She is aware that new recovery colleges are being developed that do not embrace the intended concept of a recovery college yet still use the term in order to participate in this new mental health recovery trend. Janet must ensure her program will be developed and created properly with no ties to these illegitimate recovery colleges.

As of 2019, there were eight recovery colleges operating in Canada. Two of these programs are hospital based, whereas the other six operate through a national mental health nonprofit organization[1]. Many more recovery colleges are being planned throughout Canada. Aside from the six recovery colleges created under the national mental health organization, there is little consultation among organizations for developing these colleges. The lack of consistency and

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[1]One of Canada's hospital-funded recovery colleges is at Ontario Shores Centre for Mental Health Services in Whitby, Ontario, and the other hospital-based recovery college is at St. Michael's Hospital in Toronto, Ontario. The remaining recovery colleges across Canada operate through the Canadian Mental Health Association. CMHA (it is not called the centre, as the centre normally refers to CAMH, which is a hospital, while CMHA is a national nonprofit org) s planning to open more recovery colleges in various provinces. Quebec also has one francophone recovery college in Montreal that operate through Centre national d'excellence en santé mentale.

siloed approach to the development of these programs is due to the absence of a governing body to regulate and direct what is expected of a recovery college. The abundance of recovery colleges emerging throughout Canada and the rest of the world, including those in Australia, Italy, Uganda, Singapore, and Poland (Perkins et al., 2018), has made it even more difficult to track and regulate new recovery college programs. These new recovery colleges have expanded so quickly that they are being created into something very different from their original purpose.

Janet notes that cocreation has not only been utilized successfully in recovery colleges but that it has also been applied successfully in the CHOICE-D project. She notices the guidelines for creating the CHOICE-D project are similar to those used for developing recovery colleges. The significance of cocreation, lived experience, and stakeholder engagement are all acknowledged important aspects of developing the CHOICE-D guide. This development makes her feel hopeful about moving forward with her plans, knowing collaboration and shared expertise can strengthen program development.

SPECIFIC PROBLEM OF DECISION

Janet needs to create a game plan before her meeting to ensure all stakeholders at the table feel comfortable and heard. She must ensure she follows a strict agenda that allows all stakeholders to speak. These important factors will determine stakeholder dynamics and help shape the meeting environment. Some other thoughts come to Janet's mind about this stakeholder meeting. Should she lead the engagement meetings because she is the one who wants to develop the program? Or should the clients and people with lived experience helping to cocreate the program lead the meeting?

How can she develop and create a program that follows guidelines and offers courses that are insightful and cover the required competencies? Because recovery colleges are now being used as a brand to attract clients and patients, Janet must be vigilant about cocreation and about developing a program that aligns with the context and intentions outlined in the eight-point framework for these colleges.

Janet will also have to engage all stakeholders to understand the difference between cocreation and coproduction. With so many stakeholders involved, the meetings could easily become a coproduction environment because the main service providers and funders might want a greater say in program development to meet their own organizational goals. Who can she rely on for the development of this program?

As Janet vigorously jots down all her thoughts and questions, she knows she will have to use a needs assessment and stakeholder engagement matrix to understand all stakeholder roles in terms of this meeting and the development of the recovery college. She tries to narrow the stakeholder list to a select few to start the stakeholder engagement matrix, but she is still at a loss as to who she should approach initially.

CONCLUSION

To move forward with any needs assessment planning or stakeholder engagement, community research should be the first step. Janet should conduct research with hospital clients and community members to ensure she obtains reliable information about their needs and what they want to see in a recovery college. This information will be important for moving forward and understanding what is needed for developing a program that can complement a variety of treatment plans. The completion of a stakeholder engagement is crucial to understand key

players and how the stakeholders interact with each other. This information is beneficial prior to moving forward with stakeholder analysis. The importance of cocreation and listening to all voices at every level is crucial. Program development cannot be rushed and it must be carefully thought out from all sides. Ongoing evaluations will also ensure the effectiveness, improvement, and successful development of the programs, and these evaluations should be conducted as part of this development. All stakeholders, partners, and collaborators involved should understand the main focus of a recovery college. This focus is to cocreate and coproduce courses and a curriculum that allows clients, patients, and community members to improve their own well-being through education and self-discovery, ultimately increasing community integration, autonomy, and better recovery outcomes.

EXHIBIT 1
**Sample six-session course offered at the Ontario Shores Centre
for Mental Health Sciences Recovery College (Fall 2019)**

Recovery College: Course Guide | **Fall 2019 Courses**

De-Stress Kits

Facilitator(s):
Julie Murray,
Recreation Therapist

Course Type:
Self-Discovery and
Identifying Strengths

Start / End Date:
October 22, 2019 -
November 26, 2019

Start / End Time:
2:00 PM - 3:30 PM

Number of Sessions:
6

What will we do?
In times of distress we need something we can reach for to help us feel at ease. Within this group we will take a look at various techniques that help calm our life's daily stressors and put them together in an individualized compact tool kit ready to take on the go. Each week a new de-stress technique will be introduced through discussion and creative construction of each tool.

Weekly breakdown of this course as is follow:
Week 1: Creating your own tool kit bag
Week 2: Positive affirmation stones
Week 3: TIP skill hot & cold Sensory Bean Bags
Week 4: Individualized de-stress cards
Week 5: Stress balls/slime
Week 6: Share your own de-stress technique

What will you learn?
- Participants will explore a variety of techniques used to assist in de-stressing
- Participants will have the opportunity to socialize with others who share skills they have learned
- Participants will engage their creativity while creating their individualized tool kits
- To help enhance self-esteem and self-worth

Location:
Recovery College Group Room, Building 3, Level 1

Source: Ontario Shores Centre for Mental Health Sciences, 2019.

EXHIBIT 2
**Sample courses offered at Ontario Shores Centre
for Mental Health Sciences Recovery College (Fall 2019)**

Recovery College: Course Guide | Fall 2019 Courses

Everything Pumpkin Spice- Fall Center Piece

Facilitator(s):
Amanda O'Keefe,
Recreation Therapist

Course Type:
Leisure, Health and
Wellness

Date:
October 30, 2019

Start / End Time:
10:00 AM - 11:30 AM

Number of Sessions:
1

What will we do?
If fall is your favourite season, then this workshop is right for you!

Fall is such a beautiful time of year. All the colours and leaves changing
outside really puts creativity into perspective.

During this one hour and thirty minute workshop you will have the
opportunity to create a fall center piece. We will provide a variety of
materials which will encompass all the colours and beauty of the fall
season.
To help inspire ideas, references and examples will be provided.
Light refreshments will be provided.

What will you learn?
Socialization, creativity, foster an appreciation for nature

Location:
Drop-in Center, Canteen, Building 1, Level 1

Unchartered territory: Navigating the Return to Work Road

Facilitator(s):
Nicole Meens Miller,
Vocational Instructor

Lori Lane-Murphy

Course Type:
Self-Discovery and
Identifying Strengths

Start / End Date:
September 11, 2019 -
October 16, 2019

Start / End Time:
11:00 AM - 12:00 PM

Number of Sessions:
6

What will we do?
To fill the gap between treatment and an actual return to the work world.

What will you learn?
- Brainstorming for passion
- Setting short and long term goals
- Organizing those goals into tasks
- Getting and remaining focussed (which can be tricky while
  managing a chronic illness - suggestions on how to deal with that
  reality

Location:
Recovery College Group Room, Building 3, Level 1

Source: Ontario Shores Centre for Mental Health Sciences, 2019.

EXHIBIT 3
Coproduction versus cocreation: a process-based continuum in the hotel service context (2013)

Comparing co-production with co-creation.

	Co-production	Co-creation
(1) Value creation	Extraction of economic value Quality products and services	Creation of unique personalized experiences
(2) Customers' role	Passive (rely on the physical environment provided) Perceived as a resource	Active (provide input to service provider before, during, and after the service) Information provider Value creator
(3) Customers' participation	Mainly at the end of the value chain	Repeated interactions and transactions across multiple channels Serves as an operant resource
Customers' expectations Key actors	Suit their needs to what is available Managers and employees	Co-create products and services with customers Customers, managers and employees
(4) Focus	Production and company centric	Customer and experience centric Engaging customers High level of information processing
(5) Innovation	Led by the firm	Co-innovate and co-design with customers Learning from customers (opinion leaders and trendsetters) and the process
(6) Communication	Listening to customers Less transparent	Ongoing dialogue with customers Open and transparent communication

Source: Chathoth et al., 2013.

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INSTRUCTOR GUIDANCE

Recovery Through Education: An Integrative Approach to Mental Health for the People, by the People

Qi (Che) Xue, BCR, MPH (Class of 2019)
Andrew Johnson, BA (Manager, Client and Family Education,
Centre for Addiction and Mental Health)
Gerald McKinley, PhD (Assistant Professor, Western University)

BACKGROUND

Recovery colleges are cocreated and codeveloped programs and services that mainly focus on increasing community integration and improving the well-being of people who have mental health concerns. Recovery colleges originated in England in 2009, with the first college established at the South West London Recovery College in London. Currently, there is no general consensus about what constitutes a recovery college. The primary focus of a recovery college is to provide a safe space where people who have mental illnesses and/or problematic substance use can lead their own journey to recovery.

Eight components are used to define a recovery college (Perkins et al., 2012):

1. cocreation and codelivery with health care practitioners and service users at every level
2. delivery of programming from a physical location
3. operating the program using college principles of having students select their own courses
4. inclusive programs for all
5. personal tutors available to assist by offering information
6. not considered a substitute for treatment and traditional assessment
7. not considered a substitute for mainstream colleges
8. operations and culture of the college reflect recovery principles

Because the efficacy, literature, research, and evaluation around recovery colleges are still considerably new, there are several unknowns when it comes to creating these colleges. There are no standardized regulations or guidelines for developing such programs, which can lead to the creation of colleges that may not be suitable and programs that may have inconsistencies and gaps. The new recovery colleges emerging worldwide have expanded so quickly that many are no longer created for their initial intent and instead are being transformed into something that is very different from the original framework for mental health recovery.

This case highlights the importance of stakeholder and community engagement and collaboration in a cocreation context and will examine the positive and negative outcomes that can arise from such collaboration. The case has readers explore stakeholder and community engagement and collaboration for recovery college development by using Social-Ecological theory and cocreation theory, and by determining how these theories can shape various approaches to community and stakeholder engagement and collaboration.

Recovery Through Education: An Integrative Approach to Mental Health for the People, by the People

OBJECTIVES

1. Identify, list, and prioritize the stakeholders involved in the planning and creation of a recovery college as contributors, influencers, or beneficiaries. Be able to create a needs assessment and a stakeholder matrix (determine the most appropriate—e.g., power interest matrix, stakeholder analysis matrix, or stakeholder assessment matrix).
2. Recognize, understand, and apply a toolkit and collaboration and stakeholder engagement concepts for creating recovery colleges.
3. Identify and understand how lived experience frameworks and cocreation compared with coproduction frameworks can assist with stakeholder engagement and program development.
4. Understand how social cognitive theory can tie into lived experience and cocreation frameworks.
5. Identify power dynamics and hierarchies of engagement for all stakeholders.
6. Explore and recommend various action plans and resolutions for stakeholder engagement.

DISCUSSION QUESTIONS

1. Who are the stakeholders in this case?
2. How can stakeholder engagement mitigate conflict between various stakeholders and differing organizational agendas?
3. How can an organization collaborate with various stakeholders for recovery college development through cocreation? Who will be leading and guiding the meetings?
4. Identify and describe the hierarchy of engagement with stakeholders. What are the power dynamics?
5. What strategies can be utilized for effective engagement and development of programming?

KEYWORDS

Cocreation; coproduction; collaboration; lived experience; mental health, mental health recovery; needs assessment; public health leadership; recovery college; social ecological theory; stakeholder engagement

FACULTY CASE

CASE 16

When the Midnight Train is the first of many: Dealing with Irregular and Unsafe Railway Crossings in the City of London

Shannon L. Sibbald, PhD (Assistant Professor, Western University)

While visiting a local school, the mayor of London was asked a simple question by a grade three student: "Why aren't there flashing light barriers at all railway crossings that are close to the places where children play"?

"Great question," the Mayor responded. Why weren't there better safety measures in place in the London area? Why did parents of young children have to worry about the safety of their children when they were close to home? Why do London, Ontario and the surrounding areas have some of the highest train-pedestrian accident rates across the country?

The mayor did not have answers to any of these questions, but he knew something needed to be done. But what? And by whom?

THE CITY OF LONDON AND SURROUNDING AREA

Known as the Forest City, London was founded in 1826 and has flourished and expanded since then to reach its current population of approximately 400,000 people. London is the seat of Middlesex County (containing many other small townships) and is surrounded by Perth and Huron County to the north, by Oxford County to the east, by Elgin County to the south, and by Chatham-Kent and Lambton counties to the west. London is a regional centre of health care and education, home to Western University and Fanshawe College. London is one of the largest cities in the province of Ontario. It has an international airport as well as train and bus stations. Located in the southwest region of the province, London and the surrounding area have become natural corridors for freight and passenger trains, with many train tracks located in accessible, public areas and on residential streets throughout the city.

RAILROAD COMPANIES

There are two major freight companies currently using the London corridor: Canadian Pacific Railway (CP) and Canadian National Railway (CN). Canadian Pacific Railway stretches across Canada and its history in London dates to 1873. Canadian National Railway's tri-coastal network spans Canada from east to west with 20,000 track miles. There have been concerns about the goods these two companies carry, and it has been noted that 10% of goods shipped by CP and 14% of goods shipped by CN through London are dangerous products such as chemicals and petroleum gases (Dubinski, 2017). Although CN and CP predominantly transport goods, CP was previously Canada's largest passenger train company before VIA Rail Canada was established. VIA Rail operates the national passenger rail service on behalf of the Canadian government (Via Rail Canada, 2020). However, 98% of the passenger railroads used by VIA Rail Canada are networks owned by CP or CN (Via Rail Canada, 2020). VIA Rail Canada operates more than 475 train departures every week on a 12,500 km railroad network that connects more than 400 Canadian communities (Via Rail Canada, 2020). Some of these

trains travel through downtown London at regular intervals throughout the year. Although passenger trains tend to run on predictable and routine schedules, freight trains do not. Canadian Pacific Railway and CN trains operate 24 hours a day, seven days a week. Some rail lines in London may only carry one or two trains each week, whereas busy corridors can carry more than 30 trains per day along 65 rail crossings (Dubinski, 2017).

THE TRANSPORTATION CHALLENGE

The Transportation Safety Board of Canada is an independent agency that investigates marine, pipeline, railway, and aviation transportation occurrences with an aim to make recommendations that boost transportation safety (Transportation Safety Board of Canada, 2019a). Records from 2008 to 2018 reveal that 175 railway crossing accidents occur each year in Canada (Transportation Safety Board of Canada, 2019a). This equates to about one accident every two days. A total of 252 people have been killed since 2008, and 302 people have been seriously injured from rail crossing accidents (Transportation Safety Board of Canada, 2019a).

Because the reality of trains in London is not changing, the need to address the concerns about safety is essential. Within London there are several dangerous rail crossings that have no gates or barriers to block the road. The main concern is the safety of pedestrians at these crossings.

Rail crossings in London are typically prone to risk. Specifically, data gathered from 2000 to 2015 listed a St. George street crossing as one of the top 25 accident-prone rail crossings in Canada (Marcoux, J. et al., 2016). Accident reports from London crossings also revealed concerns about several widespread design flaws in the railway crossings, including lack of visible railway signage, lack of pedestrian gates, poor maintenance of existing crossings, and lack of adequate warning signals (Transportation Safety Board of Canada, 2019b). Problems exist with lines of sight, a lack of gates and warnings, and confusing lights (Transportation Safety Board of Canada, 2019b). Not only do these problems exist in London but they also exist across Canada. Many believe there is a lack of adequate warning systems for pedestrians and motor vehicles.

The Canadian Council of Motor Transport Administrators (CCMTA), which includes representation from provincial and territorial governments as well as the federal government of Canada, coordinates all matters dealing with the administration, regulation, and control of motor vehicle transportation and highway safety (CCMTA, 2018). The CCMTA aims to address Canadian road safety priorities to improve the safety and efficiency of Canadian passenger and goods transportation (CCMTA, 2018). According to the CCMTA, there are many pedestrian-focused solutions for rail-grade crossings, including signs encouraging pedestrians to take specific actions. These solutions can include active and/or passive devices. Active devices are those that give advanced notice of a train approaching, such as flashing light signals, bells, and automatic gates (United States Department of Transportation, 2019). Physical barriers such as fencing can be installed to encourage pedestrians to look both ways before crossing. Pavement markings can delineate the pathway to indicate where people should stop when waiting for a train. Other active systems that use auditory and visual signals, such as pedestrian gates or loud warning bells/flashing signs, can be installed to warn pedestrians that a train is approaching. In contrast, passive devices only indicate that there is a crossing and the pedestrians or people in motor vehicles must look for an approaching train and then take appropriate action (United States Department of Transportation, 2019). The United States Department of Transportation (2019) has shown that active traffic control devices are a more effective method of improving railway crossing safety and reducing collisions.

When the Midnight Train is the first of many: Dealing with Irregular and Unsafe Railway Crossings in the City of London

In Canada, however, only 17% of all 17,000 railways have gates, and the primary purpose of these gates is to control motor vehicles. An additional 22% of crossings have flashing lights and/or bells (Marcoux, J., & McDonald, J., 2016). This means that together, just slightly more than one-third of railway crossings have automated warning systems that can be classified as active devices (Marcoux, J., & McDonald, J., 2016). The remaining two-thirds have passively protected crossings that only use the white crossing "X" and/or stop signs (Marcoux, J., & McDonald, J., 2016). Efforts are needed to install more active devices at railway crossings in conjunction with passive devices to maximize railroad safety.

RECENT TRAGEDY

London residents have become accustomed to the trains but remain frustrated by the delays at rail crossings on busy commuter roads and by the lack of safety mechanisms on smaller, less travelled streets. Some residential areas have more than 12 freight trains cross their area each day. Local residents are used to the inconsistencies both in train frequency and train speed. Although train safety is promoted, it is not unusual to see pedestrians climbing through the open doors of a stopped train or running to get across the tracks before a slow train blocks the road.

In 2012, 11-year-old Kendra Cameron was struck and killed while crossing over a set of train tracks in her neighbourhood. The trains in the area where Kendra lived and played were often slow moving (Marcoux, J. et al., 2016). Kendra's mother believed Kendra thought she could outrun the train and that she could not see how close the train was because it was obstructed by brush and bushes (Marcoux, J. et al., 2016). The tragedy was followed by a call for barriers to be erected on either side of the street to dissuade pedestrians from trying to outrun the trains.

In 2014, two women were killed in a car crash in Southwest Middlesex at a VIA Rail train crossing on Melbourne road, the fourth most risky crossing in Canada ("Police Identify 2 Women Killed", 2016). The mayor called this tragedy a "wake-up call", and subsequently sought support from Middlesex County to install protective gates at the crossing to prevent future incidents ("Police Identify 2 Women Killed", 2016). In court, the lawyer representing the victims argued that, even though there had been previous crashes at the same crossing, the failure to install appropriate safety measures was an ongoing problem and a gate had not been installed when it should have (Van Brenk, 2016). At a subsequent Middlesex County council meeting, the motion to install gates was voted down. The county stated that, "it isn't up to the municipalities to correct rail safety" (Van Brenk, 2016).

KEY PLAYERS

Trains fall into a jurisdictional triangle. Many organizations, local municipalities, and provincial and federal ministries are involved in building and overseeing railways. All parties must work collaboratively to improve safety at the more than 17,000 crossings across Canada (Marcoux, J., & McDonald, J, 2016).

Transport Canada supports the safe coexistence of railways and communities (Transport Canada, 2016). It is ultimately responsible for the maintenance and safety of railway crossings, and its role includes regulating/enforcing railroad rules (Transport Canada, 2016). However, Transport Canada does not require gates at all crossings and safety standards depend on the specific crossing (traffic, location, etc.).

The Transportation Safety Board of Canada assumes a watchdog role, advocating for tougher rules and regulations. The Board recently pressured the federal government to set new standards, calling on municipalities, provinces, and railway organizations to examine each

crossing to determine necessary upgrades. It is expected that these new regulations will not be in force until 2021.

Any decision about how to move forward will be complex and requires mass consultation from government agencies such as Transport Canada, and from railroad companies such as CN, CP, and VIA Rail. The process needs to be collaborative and transparent. All parties need to show their data and work collectively to understand the pertinent information. Transport Canada needs to be more transparent with its safety investigations. Local communities and residents should also be invited to the consultation. Considering the varied logistics and differing requirements needed at individual crossings, it must be determined what comprehensive redesigns are required in order to meet the new safety standards. Widespread changes will cost hundreds of millions of dollars; for example, each full gate costs between $200,000 and $1 million (Canadian National Railway, 2016). Although the safest route is to remove road crossings and use underpasses or overpasses instead, this approach is even more costly and unrealistic.

RAIL SAFETY EDUCATION

Pedestrians should also be educated about the dangers of crossing railway tracks. School boards and public health agencies have an important role in educating children and adults on this issue. Several initiatives do exist to improve railway education in the local community. For example, Operation Lifesaver is a dedicated group of rail safety ambassadors funded by the Railway Association of Canada and Transport Canada. In cooperation with industry, government, police, unions, public organizations, and community groups, they promote awareness about highway and railway crossings in an effort to help save lives and reduce suffering incurred from railroad accidents (City of London, 2018). In 2018, London started participating in a national railway crossing safety-awareness program (City of London, 2018). The "Look. Listen. Live. Community Safety Partnership Program" developed by Operation Lifesaver works to identify locations where railroad safety signs can be implemented across the country and to raise awareness about the need to be cautious around railroad crossings (City of London, 2018). The London municipal government has also taken a step forward by asking CN and CP to identify dangerous goods (i.e., high-risk chemicals) that are being shipped across the city (Dubinski, 2017).

In addition, railway police often give presentations to children and educate them about the risks associated with public crossings and trespassing on railway property (Transportation Safety Board of Canada, 2017). These presentations are traditionally given to schools located within a mile of crossings (Transportation Safety Board of Canada, 2017). However, it is ultimately up to the school principals to decide whether these educational seminars are presented (Transportation Safety Board of Canada, 2017). Unfortunately, cuts to railway police and lack of school principal agreement limit the delivery of these workshops (Transportation Safety Board of Canada, 2017).

ENFORCEMENT AT CROSSINGS AND TRESPASSING LAWS

Because the number of railway police officers has declined in recent years, cities such as London are no longer able to have police at rail sites (Transportation Safety Board of Canada, 2017). As a result, opportunities for rail safety enforcement are lost.

TRANSPARENT DATA FOR "HIGH-RISK" RAILWAY CROSSINGS

In 2014, the Canadian Broadcasting Corporation learned that Transport Canada did not make their railway crossings database publicly available (Marcoux, J., & McDonald, J., 2016).

Transport Canada uses software called GradeX, which was developed by engineers from the University of Waterloo, as a decision-support tool to evaluate "high-risk" hotspot railway crossings across the country and to help determine which crossings need to be prioritized for safety upgrades (Marcoux, J., & McDonald, J., 2016). However, Transport Canada failed to provide these investigation reports to local and municipal communities (Marcoux, J., & McDonald, J., 2016). In fact, the mayor of Southwest Middlesex was not aware that the Melbourne road crossing was ranked the fourth highest risk crossing in the country (Marcoux, J., & McDonald, J, 2016). Similarly, other municipalities across Canada are mostly unaware of GradeX and whether their counties rank in the top 500 "hot spots" for railway incidents (Marcoux, J., & McDonald, J., 2016). In comparison, the United States uses a program called GX Dash as a tool to present a cohesive snapshot of all grade crossing collisions in the country over the past 10 years (United States Department of Transportation, 2020). This tool is publicly available and is designed to enhance the user's ability to visualize data (United States Department of Transportation, 2020). Crucial steps should be taken to improve railway safety in Canada, including having Transport Canada be more transparent with their database and publicize the GradeX decision-support tool.

POSSIBLE NEXT STEPS

To improve safety for pedestrians at railway crossings, countries such as the Netherlands, the United Kingdom, and Portugal have implemented a variety of safety measures. In the United Kingdom, Network Rail has placed signs and fences at the end of platforms to deter pedestrians from crossing over the tracks (Network Rail, 2020). They have also installed alarms, flashing lights, large warning signs, red light safety cameras, and sometimes physical barriers (Network Rail, 2020). Within two years of implementing this ambitious safety enhancement program, the risk to the public was reduced by 25% at more than 6,500 level crossings (Railway Technology, 2013). Both the Netherlands and Portugal have adopted similar strategies by erecting large fences and signs. Through similar measures, Belgium has seen a 78% reduction in railway trespassing over a period of three months (Community Research and Development Information Service, 2015). Fences, cameras, anti-trespass panels, and warning signs have been placed at railway crossings across many Belgian cities. Belgium has gone as far as eliminating 22 level crossings and has taken 26 other crossings out of service (TUC Rail, 2020). They believe the best way to avoid accidents is to eliminate the crossing entirely (TUC Rail, 2020). Australia is taking the same approach by planning to remove 25 level crossings before 2025 in addition to the 29 crossings that were already removed over the past three years (Level Crossing Removal Authority, 2018).

Prorail from the Netherlands has also seen significant declines of near misses at crossing sites after painting specific rail crossing road surfaces, and they are now looking to extend this approach to other such tracks (Vosman, 2018). The government and the Dutch Research Council for Safety are trying to reduce the number of level crossing accidents by 50% over the next 10 years, and an additional €50m will be allocated to achieve this and improve level crossing safety (Vosman, 2018).

Next-generation smart technology with the latest advancements in data acquisition and real-time active warning systems should also be implemented to make railroad crossings safer and smarter (Chen & Hsiao, 2017). Many countries around the world are also taking serious steps to ensure pedestrian safety at railway crossings (Laapotti, 2016; ILCAD, 2019).

When the Midnight Train is the first of many: Dealing with Irregular and Unsafe Railway Crossings in the City of London

Something needs to change in the City of London and the surrounding area to improve rail safety and prevent further tragedy. Kendra's mother thinks people need to change, to stop trying to outrun trains, and start realizing the very real danger that exists.

Operation Lifesaver believes more education and awareness will help. Community members are pushing for the installation of more active systems but spending more money on railways is not always politically favourable. Something needs to be done, but what, and by whom? With so many organizations and groups involved, it is difficult to determine who should ultimately be responsible for this dilemma.

What is the problem? Who should define it? Who is responsible for devising a solution? Who should ultimately implement that solution?

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INSTRUCTOR GUIDANCE

When the Midnight Train is the first of many: Dealing with Irregular and Unsafe Railway Crossings in the City of London

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BACKGROUND

While visiting a local school, the mayor of London was asked a simple question by a grade three student: "why aren't there flashing light barriers at all railway crossings that are close to the places where children play?" The mayor did not have an answer to this question or the many other questions that went along with it, but he knew something needed to be done. But what? And by whom? Rail crossings in London are typically prone to risk. In Canada, only 17% of all 17,000 railway crossings have gates, and the primary purpose of these gates is to control motor vehicles. London residents remain frustrated by the delays caused at rail crossings on busy commuter roads. Residents are also concerned about the lack of safety mechanisms at smaller, low-traffic streets.

Trains fall into a jurisdictional triangle. Many organizations, local municipalities, and provincial and federal ministries are involved in building and overseeing railways. All parties must work collaboratively to improve safety on the more than 17,000 rail crossings across the country. Decisions about how to move forward with this issue are complex and require mass consultation from government agencies such as Transport Canada and from railroad companies such as Canadian National Railway, Canadian Pacific Railway, and VIA Rail Canada. Pedestrians need to be educated about the dangers of crossing railway tracks. Railway police often give presentations to children and educate them about the risks associated with public rail crossings and trespassing on railway property. In recent years, the number of railway police officers has declined. Cities such as London are no longer able to have police at rail sites. Something needs to change in the City of London and the surrounding area to improve rail safety and prevent further tragedies. Operation Lifesaver believes more education and awareness will help. Community members are pushing for the installation of more active systems but spending more money on rail safety is not always politically favourable. What needs to be done, and by whom, remains uncertain. With so many organizations and groups involved, it is difficult to determine who should ultimately be responsible for this dilemma. Because the reality of train safety in London is not changing, the need to address the concerns about this issue is essential. Unfortunately, London has several dangerous rail crossings that lack gates or other physical barriers to block the crossing. The main concern is the safety of pedestrians at these sites.

OBJECTIVES

1. Appreciate the complexity of municipal-level decision-making.
2. Learn about strategies for effective health communication campaigns.
3. Understand the role of multiple stakeholders across multiple jurisdictions in health promotion interventions.

DISCUSSION QUESTIONS

1. Who are the stakeholders involved in decision-making at the municipal level? How does this change when provincial and federal policies impact the decision?
2. Who is responsible for railway safety? Does this change whether it is for pedestrians, automobiles, or other types of trains? Should it?
3. What might a railway safety health education campaign look like? What would your messaging look like? Who would your audience be? Who could you get to support your campaign?
4. What should be done in the City of London to improve overall railway safety? Be sure to consider the feasibility of your suggestions, including issues related to cost, timing, and public support.

KEYWORDS

Health promotion; municipal government; pedestrian safety; railway; stakeholder analysis