Canada's Pandemic Preparedness Plan Core Content

Planning for Respiratory Pathogens with Pandemic Potential
2026

Public Health Agency of Canada
Agence de la santé publique du Canada

Canada

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Acknowledgement

Land Acknowledgement

We respectfully acknowledge that developing and maintaining Canada's Pandemic Preparedness Plan involves meeting and working on the traditional, unceded, and treaty lands of First Nations, Inuit, and Métis Peoples who have cared for these lands since time immemorial. This plan extends to all ancestral lands in this place now known as Canada.

We recognize the deep knowledge First Nations, Inuit, and Métis Peoples hold in health, healing, and resilience, and the importance of inclusive and culturally informed approaches to pandemic preparedness and response. We also acknowledge the historical and ongoing impacts of colonialism, including the disproportionate effects of pandemics and infectious diseases on Indigenous Peoples. As we strengthen Canada's preparedness and response capacities, we affirm our responsibility to uphold the principles of reconciliation, respect Indigenous-led health solutions, and integrate Indigenous knowledge systems in building a healthier, more equitable future for all. Supporting Indigenous self-determination in health and respecting Indigenous governance systems, priorities and ways of knowing will contribute to more effective and culturally relevant approaches to pandemic preparedness and response.

Preface

About Canada's Pandemic Preparedness Plan

The next pandemic is inevitable. As such, it is imperative Canada builds on lessons learned from previous health emergencies and international best practices to prepare effectively before another pandemic arises. To accomplish this, *Canada's Pandemic Preparedness Plan* has been developed. The purpose of *Canada's Pandemic Preparedness Plan* is to provide a harmonised approach to pandemic preparedness planning, fostering alignment across Canada. The plan will be used by federal, provincial and territorial (FPT) planners as a framework to build their own unique plans in preparation for future pandemics. It will guide FPT planners in building essential systems, capacities and plans to respond effectively when the next pandemic arises.

A 'How To' guide for users

Each section of *Canada's Pandemic Preparedness Plan* serves a specific purpose for planners:

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1. Introduction

A pandemic is a worldwide outbreak of an emerging or re-emerging infectious disease, usually affecting large numbers of people across international boundaries. Pandemics can greatly increase morbidity and mortality and cause significant economic, social and political disruption [1] [2]. As the next pandemic's timing and impact are impossible to predict, advanced planning for future events is essential.

Pandemic preparedness is the process of strengthening knowledge, capacities and systems prior to a pandemic to minimize its consequences and ensure an effective response and recovery [2]. It is a continuous and iterative process.

1A. Pandemic Planning in Canada: Past and Present

Prior to the emergence of COVID-19, the *Canadian Pandemic Influenza Preparedness: Planning Guidance for the Health Sector* provided the most up-to-date national guidance for pandemic preparedness planning. This document provided a key reference during the COVID-19 pandemic response. The COVID-19 pandemic brought attention to broad health and societal impacts created by pandemics, and it became clear in 2023 that an updated, more comprehensive and nimble approach to Canadian and international pandemic planning was required [3].

To inform both the development of CPPP and its evergreen nature, extensive consultations with subject matter experts from FPT[1] governments, First Nations, Inuit and Métis partners and other interest holder groups were conducted. In addition, Canada's existing guidance document was analyzed to assess lessons learned from the COVID-19 pandemic in the Canadian context and start a new path forward. More detail about Canada's pandemic planning past can be found in Appendix A.

[1] The federal, provincial and territorial governments, with the exception of Quebec, have agreed to work on Canada's Pandemic Preparedness Plan. Quebec shares the goals and objectives of pandemic preparedness. Given the importance of this issue, Quebec will continue to implement its own plan, in accordance with its exclusive jurisdiction over public health matters. Quebec will also continue to collaborate with other governments on pandemic preparedness, in particular by sharing information and best practices.

In January 2025, FPT Health Ministers[2] affirmed their commitment to work together, with respect for each governments' jurisdiction over public health, on an approach and plan to advance pandemic preparedness, including *Canada's Pandemic Preparedness Plan* [4].

Canada's Pandemic Preparedness Plan takes into consideration the approach to improve preparedness presented in the World Health Organization's Preparedness and Resilience for Emerging Threats published in 2023 (WHO PRET). The WHO PRET offers a hazards-based approach to improving pandemic preparedness, [2] and has been used as a guiding document for development of this plan. The plan was developed in 2024-2026 through consultation with FPT partners via the Communicable and Infectious Diseases Steering Committee and its time limited Pandemic Preparedness Task Group, both of which fall under the Pan-Canadian Public Health Network. The task group brings together members from FPT jurisdictions and Indigenous partners with senior-level technical pandemic preparedness expertise and infectious disease decision-making authority.

1B. Pandemic Planning in Canada: Advancing Meaningful Engagement with First Nations, Inuit, and Métis

Canada's Pandemic Preparedness Plan is an evergreen product designed such that updates and feedback from interest holders can be incorporated throughout the life of the document. Ongoing input from subject matter experts and partners will be critical to the continuous improvement and quality assurance of the plan, allowing the plan to evolve with emerging scientific evidence, living and lived experiences, and lessons learned from other public health emergencies.

The plan considers certain groups, communities, geographic regions and identities who have historically experienced and continue to face disproportionate impacts during public health crises and pandemics. These impacts are rooted in systemic inequities, colonization and ongoing barriers to equitable access to health services, infrastructure, and emergency response resources. A preparedness plan that does not address these realities risks continuing patterns of harm.

[2] Quebec did not participate in this meeting.

In Canada, “Indigenous Peoples” refers to First Nations, Inuit, and Métis – the original inhabitants and descendants of the land that is now Canada. Each group is distinct with unique histories, languages, cultural practices, legal identities, and governance structures. Recognizing this diversity is essential to ensuring that pandemic preparedness efforts are inclusive relevant and respectful.

Engagement with First Nations, Inuit and Métis partners for this plan follows a distinctions-based approach that acknowledges differences of each group and supports participation as determined by each partner. Outreach focuses on building meaningful and sustained relationships, identifying preferred approaches to engagement, and ensure that partners may decide when, how, and if they wish to engage. This approach aims to incorporate the knowledge, living and lived experiences, perspectives and leadership of First Nations, Inuit and Métis partners on areas of focus they consider relevant. Engagement with Indigenous Peoples on *Canada’s Pandemic Preparedness Plan* is guided by a concurrent distinctions-based process to build partnerships on pandemic preparedness which:

- Affirms the commitment of the Government of Canada towards reconciliation by engaging with First Nations, Inuit and Métis partners.
- Supports First Nations, Inuit and Métis partners in choosing which aspects of the plan they want to engage on and how they wish to be engaged.
- Helps provide flexibility of engagement and timing for First Nations, Inuit and Métis partners.

As an evergreen document, the plan is intended to be strengthened over time through continued engagement with First Nations, Inuit, and Métis partners. While *Canada’s Pandemic Preparedness Plan* was not developed through a full Federal, Provincial, Territorial, Indigenous process from the outset, its evergreen nature will seek to progressively build toward more fulsome, sustained, and meaningful engagement leading to a document that is aligned with the distinct priorities, interests, and ways of knowing of First Nations, Inuit, and Métis partners. Collectively, these efforts are intended to support a more comprehensive and inclusive approach to pandemic preparedness in Canada.

1C. Purpose, Scope and Audience

Canada's Pandemic Preparedness Plan emphasizes the value of coordinated national efforts but does not supersede the authority and autonomy of provincial, territorial and local public health agencies, Indigenous governing bodies, or other legislations, regulations and policies related to healthcare delivery and pandemic planning and response.

The purpose of *Canada's Pandemic Preparedness Plan* is to provide a harmonised approach to pandemic preparedness planning, fostering alignment across Canada. The plan will be used by planners as a framework to build their own unique plans. It will guide FPT planners in building essential systems, capacities and plans to respond effectively when the next pandemic arises. Resources and capacity vary by jurisdiction. To ensure efforts are effective, jurisdictions may need to undertake prioritization exercises in advance that reflect their unique contexts.

The FPT health sector has a suite of emergency management frameworks and plans which includes *Canada's Pandemic Preparedness Plan* and the *FPT Public Health Response Plan for Biological Events*.

During a public health emergency response:

- **the *FPT Public Health Response Plan for Biological Events*** provides a governance structure and related guidance to facilitate timely and effective engagement of FPT governments for information sharing and decision-making.
- ***Canada's Pandemic Preparedness Plan*** supports the FPT Response Plan by providing technical and detailed preparedness content on health sector actions, considerations and tools to guide pandemic response for respiratory pathogens with pandemic potential.

The scope *of Canada's Pandemic Preparedness Plan* focuses on respiratory pathogens with pandemic potential. It considers pathogens that cause predominantly upper and lower respiratory infections (e.g., influenza, SARS) as well as those causing infections involving the respiratory and other organ systems (e.g., COVID-19). This scope is in line with the WHO PRET which recognizes that existing systems, capacities, knowledge and tools can be effectively applied to pathogens with patterns of transmission through the air [2]. Specifically, the plan recognizes the unpredictable yet recurring nature of respiratory pathogens along with their

transmissibility and potentially catastrophic consequences for both human health and socioeconomic wellbeing.

Pandemic preparedness touches a wide range of sectors including, but not limited to, animal health, environment, global affairs, defence, corrections, finance, economic and social sectors [2]. However, the health sector remains central to reducing a pandemic's impact on the public's health and mitigating effects on other sectors and this plan provides a framework for health sector preparedness, including public health, surge capacity, and infection prevention and control for various health settings.

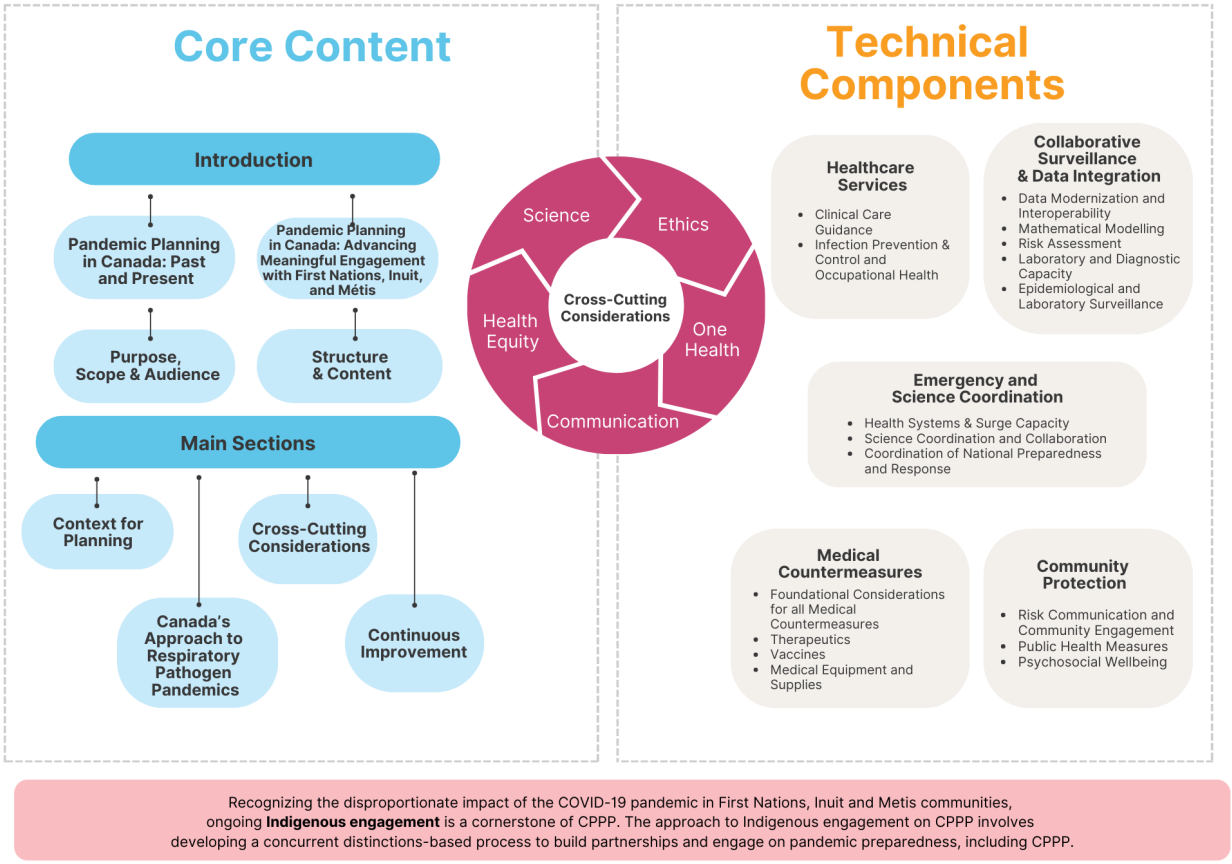
The primary audiences for this plan are FPT ministries of health, Indigenous partners, public health partners, and other federal ministries that have a role in health (i.e., Indigenous Services Canada, Canadian Armed Forces, Canada Border Services Agency, Correctional Service Canada, Immigration, Refugees and Citizenship Canada, Global Affairs Canada, Canadian Food Inspection Agency, tri-agency granting councils, Employment and Social Development Canada). Given the cross-sector links involved in pandemic preparedness, information contained in this plan may also be relevant to other sectors, partners and interest holders.

1D. Structure and Content

Figure 1 illustrates the structure and content of the plan.

Figure 1. The Structure and Content of Canada's Pandemic Preparedness Plan

Structure and Content of Canada's Pandemic Preparedness Plan (CPPP)



Key features of *Canada's Pandemic Preparedness Plan* include:

- **Core Content**: Establishes fundamental elements of the plan, including context for planning, overarching principles and strategic advice for pandemic preparedness planning.
- **Technical Components**: Provides detailed recommendations and planning considerations for the plan's technical aspects. Specific roles and responsibilities for FPT governments (including non-health sector federal departments), First Nations, Inuit and Métis partners and interest holders are outlined. Technical Components are closely aligned with the WHO PRET.
- **Cross-Cutting Considerations**: Communication, Ethics, Health Equity, One Health, and Science are all essential to pandemic preparedness and decision making. Both the Core Content and Technical Components have these considerations embedded throughout.

The Core Content, presented in this document, together with the Technical Components, currently in development, are distinct yet complementary. They are designed to be used in tandem. The Core Content will be released first, followed by the Technical Components throughout 2027.

2. Context for Planning

To prepare effectively for future pandemics, it is essential to understand the broader context shaping pandemic preparedness planning in Canada.

2A. Goals and Objectives

Goals have an important purpose in guiding preparedness and response, and in prioritizing the use of resources as necessary. The goals address both public health and the broader impacts of pandemic emergencies. Canada's pandemic goals are:

To protect the lives and wellbeing of all people living in Canada by minimizing the risk of serious illness and death, while limiting societal disruptions and long-term impacts of a pandemic.

Underpinned by all Cross-Cutting Considerations (i.e., Communication, Health Equity, Ethics, One Health and Science), the supporting objectives for these goals are as follows:

Protect the lives and wellbeing of all people living in Canada and minimize the risk of serious illness and death by:

- Supporting the early detection of a pathogen through ongoing and collaborative surveillance activities and innovating in the integration of science in emergency preparedness.
- Limiting pathogen transmission through individual and community actions and public health measures.
- Limiting susceptibility of populations through the provision of pandemic vaccines, if available.
- Reducing disease severity and improving health outcomes by providing medical countermeasures, health and social support and by supporting access to health products and services.

- Developing adaptable healthcare response frameworks to manage and research post-infectious conditions, which may persist beyond the acute phase of a pandemic.

Limit societal disruptions and long-term impacts of a pandemic by:

- Minimizing disruptions to essential health services by improving the capacity and preparedness of health systems to meet the demands for emergency care and continued routine health services during pandemic surges.
- Fostering public trust and addressing community concerns through enabling people in Canada to make informed decisions about their health based on trusted science-based public health communications.
- Supporting evidence-informed decision-making by collecting, analyzing and sharing surveillance and contextualized scientific information; and communicating advice to decision-makers, First Nations, Inuit and Métis leaders, respected elders, health professionals and the public in a timely, open, accessible and evidence-informed manner and updating this information as evidence evolves.
- Mitigating societal and economic disruptions by working collaboratively with all levels of government and interest holders to support a coordinated response, including considerations and measures to protect other essential services beyond the health sector.
- Mitigating the mental health impacts of the pandemic and the public health measures implemented during the response.
- Integrating strategies to support groups disproportionately impacted in a pandemic.

Depending on the pandemic period and course, goals and objectives may compete with one another creating tension and imbalances. A flexible approach to goals and objectives allows for adjustments to be made based on pandemic course and the unique challenges communities will be faced with. Regular re-prioritization of goals and objectives is needed to support an adaptable response. It is important to acknowledge and be transparent about this and convey the impacts of decisions through ongoing, proactive communication about current and potential scenarios. Additionally, jurisdictions will need to tailor their goals, objectives and responses to reflect regional priorities and capacities. Achieving the goals and objectives will require whole-of-society commitment, intersectoral collaboration, integration of the best available scientific evidence and a focus on building resilience before, during and after a pandemic.

2B. Building on Lessons Learned

The plan incorporates lessons learned from the COVID-19 pandemic and builds upon the *Canadian Pandemic Influenza Preparedness: Planning Guidance for the Health Sector*, which integrated insights learned from earlier public health events, including the 2009 H1N1 influenza pandemic. More details about high-level lessons learned and areas for improvement can be found in Appendix B.

2C. Understanding Canada's Diversity

Canada's geographic and demographic diversity demands a flexible, inclusive, and adaptable pandemic plan. Using a health equity and data-driven approach, engaging with diverse communities, preparing flexible response strategies, and targeted public health interventions will help ensure pandemic planning is effective in protecting all populations living in Canada.

More information, including Canada's geographic and population distribution, population diversity in pandemic planning, First Nations, Inuit and Métis Peoples, immigrants, children, older adults, women, persons with disabilities, racialized people, Black Peoples and the 2SLGBTQI+ community can be found in Appendix C.

2D. Legal Context

The legal context for pandemic planning is varied and complex, including requirements and approaches with shared responsibilities at the international, federal, provincial and territorial levels. The WHO through the International Health Regulations establishes the legal foundation for timely detection, reporting and collective response to reduce the risk of international spread of disease.

Additional information about the international, federal provincial and territorial legal context and roles can be found in Appendix D.

2E. Origins and Characteristics of Pandemics

Many countries, including Canada, acknowledge the important connections between human health, animal health and environmental health (including ecosystems) - highlighting the importance of One Health considerations (see Section 3B. One Health) [5]. This is very applicable to respiratory pathogens that frequently originate in animals before transmission

or “spillover” to human populations [6] [7]. A combination of factors can result in a pathogen spreading between people.

For a pathogen to cause a pandemic, not only must it be capable of efficient human-to-human transmission, but it also must lead to significant disease burden in the population. The mode of transmission of the pathogen and population susceptibility to it impacts transmission efficiency. The interaction between host and pathogen can also be impacted by broader environmental, social and structural factors.

Pandemic Origins

Although specific circumstances vary, the majority of pandemic events are believed to originate from zoonotic spillovers (i.e., an animal pathogen that eventually gains the ability to infect humans) including SARS, SARS-CoV-2, and the Mpox virus. Other factors include:

- Changes in vector dynamics, control or geographical distribution.
- Changes in wildlife habitat; including changes in species distribution or in migration patterns for wild birds (e.g., avian influenza A(H5N1)).

Human-led activities, such as encroachment into wildlife habitats, intensification of agriculture and farming, and globalized trade are a significant driver for spillover events. These activities have led to closer contact between humans, domestic animals, and wildlife, creating opportunities for pathogens to cross species barriers. There are also unique zoonotic risks in northern regions where traditional food practices and emerging infectious disease threats may intersect [8]. For example, avian influenza has been detected in seals, which are consumed traditionally in Nunavut. Although these have been isolated incidents, continued surveillance, culturally relevant risk communication, and proactive contingency planning are important considerations for pandemic preparedness, especially given the central role of country foods for Inuit food security.

Similarly, adverse conditions that destroy habitats and disrupt ecosystems, such as human population growth, industrialization, deforestation and climate change, create ‘hotspots’ for zoonotic spillover [7].

Finally, biosafety and biosecurity failure or compromise can lead to infectious disease emergences, including accidental or intentional release of a pathogen with pandemic potential (e.g. smallpox). Enforcement of appropriate levels of biosafety regulations in laboratories and oversight of dual-use life science research is essential [9].

Global Spread

As the world is increasingly connected via travel, trade and tourism, emerging pathogens are capable of spreading globally within days. Global and regional disparities represent an important dimension for pathogen transmission. For example, political instability and humanitarian crises can further worsen vulnerability to emerging pathogens by disrupting critical infrastructure and displacing large segments of the population, thereby worsening conditions for disease control [6].

Early detection and response are crucial in preventing a localized outbreak from expanding into a pandemic. Routine investments in systems supporting early detection and containment of localized outbreaks are a cost-effective measure compared to the economic, social and healthcare costs of a pandemic [10].

Iterative Pandemic Course

The course of a pandemic is not linear. It is influenced by pathogen transmissibility, population immunity and the effectiveness of public health interventions. There are varied modes of transmission of respiratory pathogens with pandemic potential (see Appendix E). Pathogens can spread rapidly and pandemics can exhibit a pattern of escalating numbers of new cases followed by peaks in mortality. There are also health system impacts associated with illness including health system overload and healthcare workforce burnout.

Pandemic progression may be characterized by recurring waves of infection as transmission dynamics change over time. Each wave may disproportionately affect specific subpopulations based on sociodemographic and clinical characteristics, including populations that are missing or largely underrepresented in routine surveillance data, making ongoing surveillance and robust laboratory capacity essential. These data are critical to identifying inequities, anticipating resource needs, and enabling timely, targeted public health actions.

Additionally, respiratory pathogens may evolve through mutation or genetic reassortment producing variants with altered transmissibility, virulence or immune evasion [11]. This may impact the effectiveness of initially developed vaccines and other medical countermeasures. Ongoing FPT collaboration with public health and intersectoral partners is critical to understanding pathogen evolution and population immunity over time.

2F. Pandemic Impact

Pandemics vary in their impact. A pathogen with low transmissibility and low virulence will have a lesser impact on the population than one with high transmissibility and high virulence. The impacts extend beyond the immediate threat of acute illness, morbidity and mortality, influencing health system capacity, workforce stability, economic productivity, societies, and broader governance structures.

Health Impacts and Disease Severity

Understanding the clinical spectrum of illness, including morbidity and mortality at the individual and population level, is essential to shaping public health guidance, clinical protocols, and resource allocation. Past pandemics demonstrated that early insight into disease epidemiology supports responses that are more targeted and effective.

Clinical Spectrum of Illness

Signs and symptoms caused by a respiratory pathogen with pandemic potential can vary in severity, which have implications for pandemic planning and response. For example:

- Clinical presentation may range from asymptomatic to critical illness.
- Virulence impacts healthcare demand.
- Asymptomatic and pre-symptomatic transmission may make it difficult to identify cases, chains of transmission and contain outbreaks early.
- Early in a pandemic, there may be uncertainty around the full clinical spectrum.
- Some individuals may experience longer-term health impacts or prolonged recovery after infection.

Morbidity

- The population-level burden of illness caused by a pandemic pathogen can vary widely depending on the population affected and social and environmental conditions.
- Disease epidemiology (patterns of illness including severity) among different population groups will vary depending on the pathogen.
- The burden of prolonged or recurrent symptoms following acute infection may differ depending on the pathogen.
- Long-term health consequences of pandemic pathogens may go beyond the clinical domain. Individuals facing prolonged disabilities – such as reduced lung function or

increased frailty – experience diminished quality of life and may require ongoing social services and income support.

Mortality

- Mortality rates reflect the lethality of the pandemic pathogen and can vary based on host factors, healthcare accessibility, use of public health measures, vaccine and therapeutic availability, and pathogen characteristics which may change as new variants emerge.

Health System Capacity Impact

Beyond direct patient outcomes, pandemics stress health system capacities across multiple dimensions. Understanding these impacts helps with contingency planning, surge capacity protocols, and strategies to mitigate system-wide disruptions.

Surging demands for care

Pandemics can result in exceptional health system demands, particularly in emergency departments, intensive care and inpatient units as seen during the COVID-19 pandemic when hospitals needed to expand critical care capacity [12]. Increased demand also impacts laboratories and public health agencies; for example, the need for enhanced specimen collection and rapid turnaround times, as well as the need for enhanced epidemiological monitoring and ongoing modifications in disease control recommendations.

Non-pandemic-related healthcare impact

A pandemic can significantly disrupt health services with reallocating of resources and temporary suspension of non-essential health services. This can have longer term population health impacts. For example, following the COVID-19 pandemic, surges in vaccine preventable diseases have been linked to disruptions of routine immunization services [13].

Risk of healthcare-associated transmission

Nosocomial transmission of pandemic pathogens can occur in healthcare settings including acute and chronic care facilities. This risk is influenced by factors such as the increased vulnerability of patients and the close, frequent contact required to provide care.

Healthcare Worker Impact

Pandemic responses are reliant on healthcare workers, including public health workers, who may face significant professional and personal challenges particularly during prolonged pandemics. Their wellbeing, training and capacity to deliver care influence the overall effectiveness of pandemic responses. Canada's previous pandemic experiences underscore the need to protect all healthcare workers, engage in ongoing dialogue, manage workloads, provide mental health support, and maintain a resilient and sustainable workforce.

Workforce capacity

Pandemics worsen pre-existing workforce pressures. Healthcare workers may be expected to work extended shifts, have greater patient volumes, and manage resource constraints.

- Healthcare workers may be redeployed to units or roles outside their usual scope of practice to meet demand.
- The frequent release of updated protocols and constantly evolving guidelines – from treatment algorithms to specimen collection to personal protective equipment (PPE) recommendations – increases healthcare workers' cognitive load.
- Workforce challenges may be exacerbated by the pandemic itself, if healthcare workers are at increased risk of infection and are required to quarantine when infected. This impacts both workforce capacity and workplace mental health.

Workforce safety and wellbeing

Ensuring the physical and psychological safety of healthcare workers during and after a pandemic is essential. They may face increased risk of infection due to close and frequent exposure to infected individuals. They also may experience workplace violence or hostility during periods of heightened public anxiety and social unrest related to the pandemic, public health measures and the spread of mis- and disinformation. Finally, there are often mental health impacts on workers during a pandemic, which can be associated with witnessing patient deaths, moral distress, fear of infection, and working excessive hours in high-stress conditions.

Societal Impacts

Pandemics create complex broader consequences in society, leading to social, economic, educational and political disruption. Canada's experience with COVID-19 exemplified this; it simultaneously exposed and often worsened pre-existing inequities. Below are examples of societal impacts.

Social impacts

Some public health measures, such as travel restrictions and closure of schools, offices and gathering places, disrupt the normal functioning of communities. While these measures save lives, they may also lead to unintended social harms including social fatigue, frustration, and, in some cases, barriers to adherence, as seen during the COVID-19 pandemic [14]. Structural disparities in housing, employment and access to community resources may intensify the impact, highlighting systemic inequities. A variety of social settings can be impacted:

- Cultural and religious gatherings may be cancelled, restricted or moved online, reducing face-to-face support systems.
- Funerals, weddings and other life-cycle events may be postponed or conducted with strict limitations.
- Communal activities and ceremonies of First Nations, Inuit, and Métis Peoples which play a vital role in cultural identity, may be disrupted.
- Closed communities, such as correctional, institutional, and other congregate living settings may face a reduction in programs and support services, including restriction of visitors which can lead to mental health consequences.
- School closures, shifts to remote learning and alternative learning models may occur and can be disruptive and have both short- and long-term consequences.

Psychosocial impacts

Psychosocial impacts of pandemics include anxiety, depression and substance related harms due to fear of infection, social isolation, and economic insecurity, highlighting the need for accessible and appropriate mental health services.

- The loss of loved ones, often without the ability to be involved in their care or to properly grieve through traditional funerals or memorials, may result in prolonged trauma and mental health challenges [15].
- Balancing competing roles, such as telework, home-schooling, and caregiving, can lead to stress and burnout which can influence productivity, family relationships and mental wellbeing [16].
- Addressing potential long-term psychosocial consequences of a pandemic, through targeted mental health promotion, programming and treatment, is essential.

Economic impacts

The economic impact of a pandemic can be profound, as seen during the COVID-19 pandemic, where lockdowns, consumer uncertainty and supply chain disruptions triggered widespread unemployment and business closures in Canada [17].

- Pandemic-related job losses and job insecurity in service sectors may be disproportionately affected subpopulations including women, youth and immigrant populations [18].
- Retail, food, hospitality, personal services and tourism sectors may be disproportionately impacted during a pandemic.
- Post-pandemic, economic recovery may be uneven, reflecting changes to consumer behaviours, disrupted international trade and limited investment.

3. Cross-Cutting Considerations

Cross-Cutting Considerations encompass foundational principles that guide pandemic preparedness plans. These Cross-Cutting Considerations are key elements applied throughout the plan to inform pandemic planning and decision making.

3A. Communication

Risk communication is the exchange of information about health risks between government, experts, interest groups and communities [19]. The goal is to engage in a dialogue, to deliver timely, relevant and actionable information about risks, and to empower individuals to make informed decisions. Exemplary risk communication requires that communicators understand the information needs, beliefs, and sociocultural context of diverse populations.

Role in Pandemic Preparedness

In the context of a pandemic, effective risk communication is crucial for managing public health responses, fostering public trust, and ensuring the dissemination of evidence-informed information. It must be prioritized in all aspects of pandemic preparedness as it:

- enables the timely flow of critical information,
- reduces confusion and frustration, and
- builds resilience against mis- and disinformation [20].

During health emergencies, communicating potentially life-saving messages effectively to diverse populations is essential [21].

Planning Considerations

The COVID-19 pandemic highlighted the importance of effective communication during public health crises. Key pandemic communication principles essential to reduce confusion and provide the public with consistent information are to:

- share evidence-informed messaging early and frequently,
- use plain and inclusive language,
- normalize uncertainty,
- proactively manage mis- and disinformation, and
- align jurisdictional and interest holder messaging.

Building on the principles outlined above, messages should be culturally appropriate and be adapted to age, educational level and available technologies (e.g., internet connectivity, phone vs. smartphones, access to media). Building public trust requires moving beyond dissemination of information to engaging in meaningful dialogue with diverse communities and interest holders. This involves identifying community partners and spokespersons who can demonstrate scientific expertise and empathy [22], and collaborating with community leaders and diverse population groups to foster trust, develop and deliver messages in diverse formats and channels [23]. To support these efforts, these relationships need to be built and maintained before and between health emergencies.

Incorporating risk communication planning into pandemic preparedness also involves understanding the evolving communication landscape, such as the role of social media in providing rapid access to information while also increasing exposure to mis- and disinformation.

Training public health officials and healthcare professionals in the principles and best practices for risk communication can also improve their ability to convey critical information during an emergency. The **Risk Communication and Community Engagement** subcomponent of the Community Protection Technical Component provides more detailed information on risk communication.

3B. One Health

The One Health approach is integral to preventing and mitigating emerging zoonotic diseases and spillback. This approach integrates surveillance, communication and actions across human, animal and environmental health sectors to detect and mitigate emerging threats before they spillover to other animal species and humans or spread more broadly in animals and humans.

Role in Pandemic Preparedness

The aim of the One Health approach is to reduce the risk of pathogen transmission from animals or the environment to humans and vice versa, which reduces the risk of a pandemic [10] [24]. The COVID-19 pandemic highlighted the significant impact of an emerging zoonotic disease on human health, the environment and the economy. Comprehensive, interdisciplinary strategies that account for the interconnectedness of health systems to effectively manage and mitigate complex global health threats are required. Approximately 60% of emerging infectious diseases in humans originate from animals, highlighting the important role that zoonoses play in pandemic emergence [6]. Non-zoonotic diseases typically arise from other environmental or human-made factors. Therefore, understanding wildlife reservoirs and environmental niches where pathogens continue to exist is fundamental to pandemic prevention.

Novel viruses can emerge through genetic reassortment – when segments of viral genomes mix in co-infected hosts, often across species – or genetic mutation, where changes in the virus's genetic code increase its ability to infect new hosts or increase transmissibility. These evolutionary processes, which may be amplified by human-animal-environment interactions, further reinforce the need for a One Health approach.

Planning Considerations

Integrating One Health considerations into pandemic preparedness and planning helps identify and lessen risks at the human-animal-environment interface, helping prevent the emergence and spread of infectious diseases. The ongoing threat of emerging pathogens emphasizes the need for strong surveillance and early detection systems. These systems help us take early action to prevent widespread outbreaks and minimize their impact on public health, wildlife health, agriculture and biodiversity.

Avian influenza A, and other global health issues, demonstrates the impact environmental factors such as habitat destruction and climate change may have on disease evolution, emergence and spread [25]. Integrating data from human, animal and environmental health

sectors allows a comprehensive understanding of potential threats and evolving risk assessment, which can help to develop effective prevention and control strategies.

Developing strong partnerships and networks to ensure a comprehensive approach to disease prevention and response that goes beyond sectoral lines is an important component of pandemic planning. This includes investing in education and training programs to build capacity across sectors and raise awareness about the One Health approach. These considerations and the need for rapid communication about any impacts on animal populations are also fundamental for First Nations, Inuit, and Métis communities whose traditions include fishing, hunting, and other land-based activities.

3C. Health Equity

Health equity is the absence of unfair, avoidable or remediable differences in health between population groups (social, economical, demographical or geographical). These measurable differences, or "inequities," are the result of unfair underlying levels of social advantage or disadvantage. Health equity is influenced by both structural and social determinants of health. Achieving health equity involves assessing and addressing the social and systemic barriers that contribute to these disparities.

Role in Pandemic Preparedness

Pandemics, and other public health crises, often reveal and exacerbate previously overlooked vulnerabilities and inequities within populations. Health equity considerations play a crucial role in pandemic preparedness by guiding efforts to address gaps in access to healthcare resources, services and other supports before and during a crisis for all individuals and communities (especially systematically marginalized groups).

The impacts of emergencies are determined by their nature and severity and by how they interact with the broader physical, social, ecological, political and economic situation (including systems of oppression and system discrimination). To what degree an emergency impacts individuals and communities is influenced by how likely they are to be exposed to a hazard, intersecting inequities or vulnerabilities they experience, and access to resources for response and recovery (see Figure 2). When public health interventions and relief efforts in a pandemic are not designed with the diverse needs of population groups in mind, or fail to account for their secondary effects, those in vulnerable situations may be disproportionately affected.

Section 2C: Understanding Canada's Diversity and Appendix C: Understanding Canada's Diversity provide an overview of various populations in Canada who may be disproportionately impacted by pandemics.

The COVID-19 pandemic highlighted how secondary impacts worsened pre-existing socioeconomic disparities across dimensions such as gender, race, class, and age [26]. Incorporating health equity considerations into pandemic preparedness helps address disparities by supporting equitable access to resources such as vaccines, medical care, and information. Health equity also involves adapting public health strategies to reflect the unique needs of diverse communities, including developing culturally focused programs.

Figure 2. Inequitable Health Outcomes from Emergencies
(Full report: The Chief Public Health Officer of Canada's Report on the State of Public Health in Canada 2023 - Canada.ca to be readapted into a visual).

Planning Considerations

To build community resilience and ensure inclusive and accessible support systems, it is crucial to include equity-based approaches such as:

- co-development with impacted communities of plans, processes, and procedures,
- culturally relevant planning,
- participatory and meaningful engagement,
- targeted resource allocation,
- inclusive and tailored communication, and
- capacity building for pandemic preparedness, response and recovery.

Inclusive policies and equitable resource allocation are essential to address the specific needs and challenges of diverse groups. By fostering trust and encouraging community cooperation and collaboration, public health interventions can be more effective and widely accepted. Tailored public health interventions that consider the unique circumstances of different populations can help lessen the impact of a pandemic on systemically marginalized communities.

To address these challenges, tools like The Pandemic Preparedness Playbook: Ensuring Equity-Based Response During Crisis offer practical strategies and resources to support equity-focused planning and decision-making. These resources help ensure future responses

are inclusive, responsive to diverse needs, and mindful of the broader social impacts of public health interventions.

Tailored communications, in multiple languages and formats, developed in collaboration with leaders of diverse communities and other relevant partners is an important equity consideration during risk communication. Many non-English or non-French speakers face barriers in accessing public health information.

To further operationalize health equity, staff working in the health sector require training to deepen their understanding of population disparities and strengthen their role in planning and capacity building. Integrating concepts such as health equity into pandemic planning prevents a worsening of existing inequities that communities experience before, during and after a pandemic response. Encouraging the collection and use of socio-demographic and socio-economic data supports intersectional analyses which can be used to highlight disproportionate impacts on diverse populations. This includes data such as:

- race,
- ethnicity,
- age,
- gender,
- health status, and
- socioeconomic status.

Although disaggregated data are critical for identifying health inequities, without proper contextualization, there is risk of further marginalizing and reinforcing stigma against certain populations.

3D. Science

Science is a systematic and iterative process of inquiry and investigation that seeks to understand the natural and social world through the collection and analysis of empirical evidence, the formulation of testable hypotheses, and the development of theoretical frameworks [27]. It encompasses various epistemological approaches to knowledge, including Indigenous, Afrocentric and other cultural knowledge systems. These approaches recognize that different cultures and communities may have unique ways of understanding and interpreting the world.

First Nations, Inuit, and Métis Peoples have knowledge systems with methodologies and ways of knowing that have been shared across generations. While there is no single definition of Indigenous Knowledge, which is contextual, dynamic, place-based, and encompasses the complex worldviews of Indigenous Peoples, it is often generated through observation, experience and dialogue, reflection, and collaboration [28] [29] [30].

Role in Pandemic Preparedness

Science, including natural, social, health, and applied sciences, and effective coordination of science activities, is integral for pandemic preparedness and response [3] [31] [32] [33] [34] [35].

To understand pathogens with pandemic potential, science is required to:

- understand how pathogens transmit,
- assess risk systematically,
- develop recommendations for public health measures.
- develop and deploy medical countermeasures and recommendations for their use,
- anticipate broader social, economic, and behavioural impacts, and
- make effective public health decisions.

Evidence generated across sectors through well-designed, effectively executed science activities, can be translated into useable, equity-centred science advice. This advice informs pandemic decisions, policies, programs, practices, and communications [31]. Science is explicitly integrated across *Canada's Pandemic Preparedness Plan's* Technical Components as a Cross-Cutting Consideration. Additionally, strong science coordination is essential for timely, relevant, and evidence-informed decision-making. This is particularly true during public health emergencies such as pandemics [33] [34] [36] [37] [36] [38] and its importance is reflected in the inclusion of the **Emergency and Science Coordination** as a Technical Component.

Planning considerations

To quickly and effectively mobilize science capacity during a pandemic, agile mechanisms for coordination must be established during interpandemic periods.

Key science functions include:

- evidence synthesis,
- research prioritization,
- science advice,
- rapid research capacity (including research infrastructure such as networks and hubs), and
- knowledge mobilization [35] [39] [40] [41].

These functions are interconnected and iterative. For example, evidence syntheses help address key questions that guide public health action. Evidence gaps, identified through syntheses or other means, are prioritized for action. Funders support research to address these gaps, while governments and academic institutions can help streamline related processes such as contracting, collaboration, and research governance (e.g., data-sharing agreements and research ethics reviews). Networks, hubs, and researchers across sectors and disciplines generate new evidence which is then interpretated and synthesized by evidence reviewers. Science advisory tables use this synthesized evidence to develop scientific advice, and evidence users mobilize this knowledge to inform decisions, policies, programs, practices, and communications [40] [41].

In Canada, science for pandemic preparedness and response is a shared responsibility involving:

- academia,
- research funders,
- science-based federal, provincial, territorial, and First Nations, Inuit, and Métis Peoples government departments and agencies including their partners and interest holders,
- non-governmental and community-based organizations,
- public health agencies, and
- industry [42].

The federal government supports collaboration across this ecosystem through infrastructure such as the Canadian Institute of Health Research's Centre for Research on Pandemic Preparedness and Health Emergencies, Health Emergency Readiness Canada within Innovation, Science, and Economic Development, and the six National Collaborating Centres

for Public Health funded by the Public Health Agency of Canada to promote the use of scientific research to strengthen public health policies, programs, practices, and communications in Canada.

International coordination is critical to support a strong global evidence infrastructure when responding to pandemics and reducing research waste. This includes aligning with international initiatives such as the WHO Pandemic Agreement (under development), the WHO Research and Development Blueprint series, and the 100 Days Mission [43] [44] [45].

To support science integration for pandemic preparedness, the following actions should guide efforts:

Contextually relevant science. Use science that shapes decisions, policies, programs, practices, and communications within different social, environmental, and regional contexts to better address health disparities and those disproportionately impacted by pandemics [31] [46] [47] [48].

Inclusive evidence use. Develop pandemic decisions, policies, programs, practices, and communications that are grounded in evidence generated through rigorous science activities. They should meaningfully consider:

- diverse perspectives,
- disciplines,
- forms of evidence, and
- methods.

This integration maximizes impact and benefits to society, while minimizing inequities among those disproportionately impacted during pandemics [49].

Focus on equitable health outcomes. Taking an equity-centred approach to evidence generation, that is intentionally designing Canada's science capabilities to identify and address social and structural drivers of health inequities, can promote equitable health outcomes for all people living in Canada [50] [51] [52]. Health equity is discussed in more detail in Section 3C: Health Equity.

Science collaboration. Adopt strategies that encourage and facilitate national and international collaborations within and between the science workforce and those working in governments, including:

- Indigenous communities,
- communities and public health settings,
- academia,
- funding agencies,
- industry; and
- the public [37] [53] [40] [46].

Science communication. Support the democratization of knowledge by removing barriers and enabling access to high quality information whenever possible (such as through Open Science). It is also important to acknowledge uncertainties, strengths, weaknesses, and shifts in evidence [3] [54] [55].

Build and maintain science capabilities outside of pandemics. To mobilize science effectively and prevent the need for reactive solutions in a pandemic, infrastructure for science coordination and collaboration must be established during interpandemic periods. This infrastructure must be able to be scaled up in a pandemic response [37] [53] [56].

Further information on mechanisms for science coordination regarding pandemic preparedness can be found in the **Emergency and Science Coordination** Technical Component.

3E. Ethics

Public health ethics focuses on moral challenges and dilemmas in public health policy, practice, and research. It helps clarify what should or should not be done, and why - from the perspective of what is right or wrong, just or unjust. Ethics provides a framework to identify ethical issues, analyse options in a systematic manner. It assists in weighing values and principles (such as justice, respect for persons, and wellbeing), particularly when there are tensions or conflicts between these considerations. Public health ethics helps authorities to make thoughtful and justifiable decisions.

Role in Pandemic Preparedness

Ethics is as critical to decision making as scientific, logistical and economic considerations. Pandemic planning, preparedness and response requires complex decisions in areas such as the allocation of scarce resources, prioritization of various health and social services,

development and distribution of medical countermeasures, closure of public institutions, and implementation of public health measures that may limit personal freedoms. The COVID-19 pandemic showed that these decisions are fundamentally ethical because they are based on judgments about what is considered important.

Considering ethical factors throughout the decision-making process includes defining pandemic response objectives, navigating trade-offs, and managing uncertainty. Ethical judgements may vary across jurisdictions and interest holder groups but must align with regional legal frameworks and cultural values.

Planning Considerations

Ethics should be an integral part of pandemic planning. Integrating ethics expertise will help anticipate and address ethical issues from the early stages of planning during non-pandemic periods, through pandemic onset. Ethics expertise can be integrated into pandemic planning and decision making by:

- establishing ethics committees to provide guidance on ethical considerations associated with complex decisions,
- including ethics experts in advisory boards, and
- calling upon ethics experts as needed.

Ethics capacity should be built internally within organizations across the public health ecosystem, and ethics should be meaningfully embedded in pandemic planning and governance mechanisms. The Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans (TCPS 2) expresses a continuing commitment to the people of Canada to promote the ethical conduct of research involving humans with chapter 6 specifically addressing research ethics review within the context of publicly declared emergencies [57].

Ethical preparedness also requires ongoing engagement with communities and systematically marginalized groups to ensure their voices are heard as discussed in Section 3C: Health Equity.

Regardless of the type of expertise solicited, pandemic preparedness planning and response decisions should result from careful deliberation guided by several factors, including ethical considerations such as those listed in Figure 3 [58] [59].

Figure 3: Ethical Considerations

- **Trust:** confidence or faith in others, in particular their reliability, integrity, good will and loyalty. It requires open, honest, and transparent decision-making and communication in times of uncertainty.
- **Justice:** treating all individuals and groups fairly and equitably, and carefully assessing the distribution of burdens, benefits, and opportunities to preserve health or wellbeing.
- **Respect for persons, communities and human rights:** respecting the inherent dignity, rights, and unconditional worth of all persons, and acknowledging the ability of individuals and communities to make decisions about their own goals and actions.
- **Promoting wellbeing** and **minimizing harm:** making decisions that protect the physical, psychological, and social health of all individuals and communities. Avoids causing undue harm and minimizes the harmful effects of policies.
    - Actions should be proportionate, effective, and reciprocal. Even in the face of scientific uncertainty, precautionary measures should be taken to reduce harm, while continuing efforts to strengthen the evidence base.
- **Solidarity:** acting in a manner that acknowledges our interdependence and common interests, such as by helping each other and **working together** to plan for, respond to, and recover from public health threats that affect all of society.
- **Procedural considerations:** help ensure that the best information is gathered, that relevant values and principles are identified and that all interest holders' views and interests are considered.
    - Accountability, openness, transparency, inclusiveness, and responsiveness are essential principles for effective decision-making. Decision-makers must be answerable to the public, ensure that processes are transparent and allow for public input, actively engage those most affected, and remain adaptable as new information emerges.
- **Intersectionality:** awareness of overlapping social identities and factors relating to oppression or discrimination. This lens is applied to deliberation and decision-making.

4. Canada's Approach to Respiratory Pathogen Pandemics

Canada's approach to respiratory pathogen pandemics brings together key planning elements to support coordinated preparedness, while respecting jurisdictional autonomy and responsibilities.

4A. Intersectoral Collaboration in Pandemic Preparedness

Pandemic preparedness involves a wide-reaching multi-sectoral and multi-disciplinary domain that extends beyond the human health sector and, as emphasized by WHO, requires coordinated action across preparedness, response and recovery. Coordination is needed across sectors, including but not limited to:

- human health
- animal health,
- environment,
- education,
- global affairs,
- defence,
- finance,
- economic, and
- social.

Pandemics have far-reaching impacts that necessitate the involvement of all levels of government. Each have respective roles and responsibilities, as well as engagement responsibilities with other government departments, academia, non-governmental organizations, international partners and the private sector.

These collaborations are essential for promoting an effective, inclusive and coordinated pandemic response. Preparedness plans should describe:

- roles and responsibilities across sectors,
- governance,

- linkages, and
- channels of communication between sectors.

To support these efforts, existing federal coordination mechanisms can be leveraged. The *Federal Emergency Response Plan* maintained by Public Safety Canada, provides mechanisms and processes to coordinate the structures, capabilities, and resources of federal government institutions, non-governmental organizations and private sector into an integrated emergency response for all-hazards.

Under the *Federal Emergency Response Plan* the federal Health Portfolio is the primary department responsible for coordinating the federal public health response to a pandemic. The FPT health sector has the *FPT Public Health Response Plan for Biological Events,* which may be leveraged to bring together different sectors in support of decision making by the FPT Special Advisory Committee. See the **Coordination of National Preparedness and Response** subcomponent for more information.

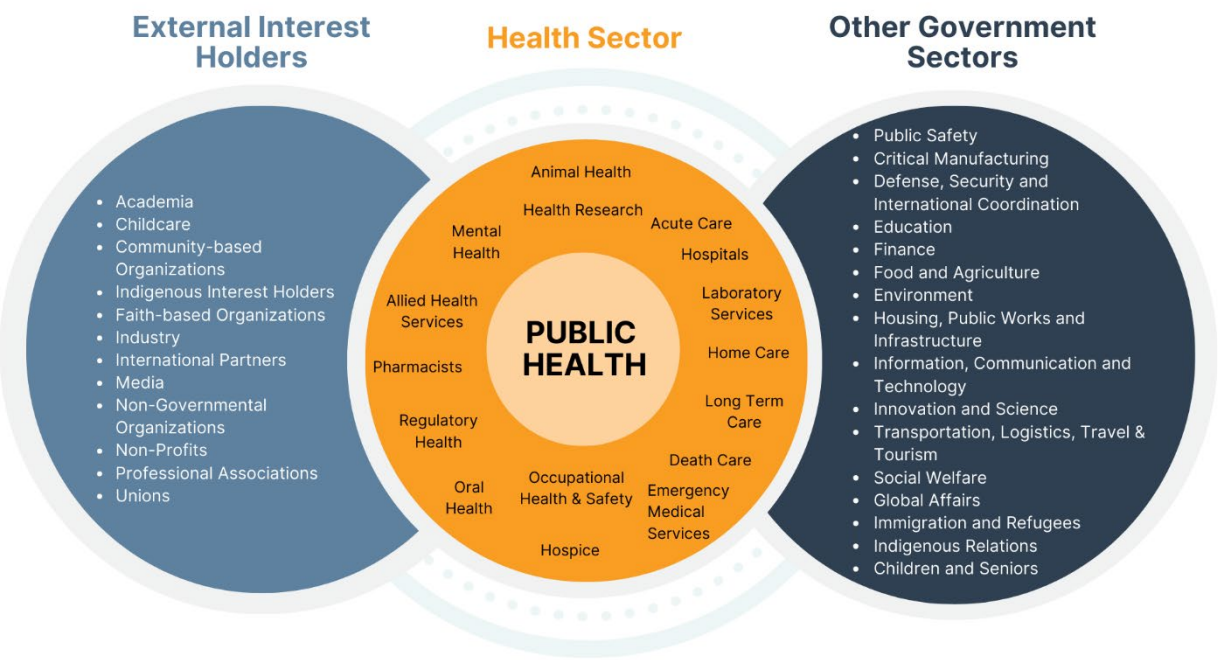
Figure 4 illustrates connections among sectors in pandemic preparedness. This Figure highlights the need for a whole-of-society approach.

When developing pandemic preparedness plans, provinces and territories should consult this graphic to guide the creation of their own unique collaboration strategy. Every jurisdiction should develop their own tailored list of external interest holders and other government sectors.

The health sector overlaps both external interest holders and other government departments as it has a central role in coordinating the response to health emergencies and mitigating effects on other sectors.

Figure 4. Intersectoral Interaction During a Pandemic

Intersectoral Interaction During a Pandemic



Integrating a Strength-Based Approach and Community Engagement

Integrating a strength-based approach to pandemic preparedness emphasizes the recognition, mobilization, and enhancement of existing resources within institutions and communities. This approach highlights what communities already do well and leverages these strengths to support more effective and sustainable preparedness and response strategies, while continuing to assess gaps and understand vulnerabilities.

Central to this approach is meaningful community engagement. Engaging with communities and their trusted leaders early and consistently ensures preparedness efforts are grounded in living and lived experiences of diverse populations. This includes integrating community knowledge in engagement to help inform tailored preparedness and response interventions incorporating their:

- strengths,
- needs,
- vulnerabilities,
- languages,
- traditions, and

- cultural perspectives.

Community engagement also plays a critical role in building trust, fostering transparency, and nurturing social cohesion. These elements are essential in building connections that will be important during a pandemic, when public trust, timely communication and mutual support can significantly influence the health outcomes of populations.

4B. Core Planning Assumptions

Canada's Pandemic Preparedness Plan has aligned its planning assumptions with the WHO PRET (Annex 5 Examples of assumptions in the national planning process) to reflect the plan's scope that includes respiratory pathogens with pandemic potential. This allows planning assumptions to be flexible and relevant across a wide range of emerging threats regardless of the pathogen.

These assumptions provide a useful approach to:

- deal with uncertainty,
- reflect evolving scientific evidence, and
- addresses the need for flexible and adaptable responses.

Reflection questions have been included to serve as prompts but are not exhaustive. These can guide the development of jurisdiction-specific pandemic plans that account for multi-sectoral roles, interdependencies and coordinated preparedness and response efforts.

Additional specific assumptions related to the Technical Components can be found in each of the technical subcomponents and should be considered alongside these core planning assumptions.

a) Inevitability but unpredictability of the next pandemic

There is broad consensus that the world will face another pandemic. Uncertainty remains about when and where it will emerge, and how severe it will be.

Considerations:

- Early in the pandemic there will be significant uncertainty about transmission dynamics of the pathogen.

  - » Consider adopting a precautionary approach, assuming efficient transmission through the air until more is known.
  - » Prioritize scalable, flexible interventions that can adjust as evidence emerges over the first 100 days.
- The choice of public health measures, medical countermeasures, research needs, etc. will depend on whether the pathogen is known or unknown.
- Determining whether the pathogen originates nationally or internationally is critical. Strong detection systems in Canada and globally will be needed, as well as national/international collaboration (e.g., under the International Health Regulations).
- The potential for multiple emergencies occurring at the same time (e.g., a second pandemic or environmental disaster) requires a highly flexible and agile response with strong surge capacity.
- Some events may currently seem unlikely or may fall outside of immediate consideration: scenario planning helps explore and understand a wide range of future states.

Reflection

- What pandemic scenarios have you planned for?
- What strategies are in place to strengthen your healthcare and public health systems?
- What systems, structures, or capacities are in place to support a rapid, adaptive and scalable response as the pandemic evolves?
- Have relevant sectors been engaged in planning to identify interdependencies, clarify roles and responsibilities and to coordinate risk management strategies?
- Are the necessary legislation or policies in place to effectively address a pandemic, including considerations of overlap in authority and need for coordination?

b) Varied severity and impact of the pandemic

Pandemics vary in severity in terms of morbidity and mortality [2] and in impact over time and place. Even a low-severity pandemic could have significant health and societal impacts, amplifying existing weaknesses within the healthcare and public health system and across sectors. Refer to Section 2F: Pandemic Impacts for additional information.

Considerations:

- Consideration should be given to different levels of:
  - » Severity: clinical course of infection, morbidity and mortality.
  - » Impact: Including social, economic, agriculture and food, supply chain impact as well as longer-term impacts on individuals, populations and health systems.
- Early adoption of broad public health measures (e.g. universal masking, widespread testing, quarantine policies) may be required - especially if asymptomatic transmission is identified.
- Different components of the healthcare and public health systems may be impacted with varying severity at different times over the course of the pandemic.
- Severity and impact can vary across different populations, influenced by intersecting factors including social determinants of health as well as age, underlying health conditions and other factors. Children and older adults may experience unique health, social, and developmental consequences that require tailored, multi-sectoral approaches.
- The extent of a pathogen's impact depends on whether it is exclusively human or has a zoonotic component. Pandemics may first emerge at human-animal interfaces where zoonotic spillover from farms, agricultural industries, or wildlife-human interactions can occur.
- Contextual vulnerabilities across sectors, such as workforce shortages, service continuity, and socio-economic inequities will influence the overall impact of a pandemic.

Reflection

- How can surveillance systems be leveraged to track and assess health, social and economic impacts, including long-term impacts? How can this information inform ongoing public health interventions and resource allocation?
- Are there specific populations (children, older adults or equity-deserving groups) that would be more affected than others and why? What actions could be taken now to prevent or mitigate harms to those populations?
- What government departments and external interest holders are best positioned to successfully deploy resources and implement mitigation measures in specific groups?

c) Uncertain pandemic course

During a pandemic, multiple waves may occur. Be prepared for multiple surges in cases, hospitalizations and deaths over the course of the pandemic. Public health authorities should be ready to support all people throughout the regions, irrespective of geographical location, including those living in extremely remote community settings and Indigenous communities.

Considerations:

- Potential for variant or new strain emergence, multiple surges over several months/years. Planning should account for prolonged disruptions lasting for 2 or 3 years.
- Pandemic waves may be delayed in rural and remote areas as compared to urban centres, due to less frequent travel and movement within communities, lower population density and/or barriers to travel as a result of geographical accessibility.
- Potential for concurrent animal outbreaks requiring their own emergency response and resources that impact the economy, workforce, food availability and risks of cross-species transmission.

Reflection

- How will an evolving pandemic (i.e., shifts from early case detection to sustained community transmission) impact healthcare and public health capacity, the burden of severe outcomes, and broader system pressures across sectors?
- What advance warning tools are available to determine when a surge will happen and ways to mitigate it?
- What thresholds will be used to escalate or de-escalate response measures?
- Can sectors adapt and sustain operations as the pandemic evolves, during multiple waves or periods of prolonged disruption?

d) Changing immunity

When there is a new respiratory pathogen, most people will have little or no immunity. Susceptibility will vary among different subsections of the population and over time. Public health authorities should consider how to adjust response measures accordingly.

Considerations:

- If the pathogen is known (e.g., influenza) some groups may have underlying immunity or partial immunity.
- If the pathogen is new, the absence of prior circulation means larger segments of the population will be at risk of infection.
- Host factors (including pre-existing conditions) can impact immunity.
- Immunity will vary during the course of the pandemic (e.g., initial phase, variants, immunizations, waning immune response) and with the use of pandemic vaccines, if available.

Reflection

- How will response measures be adjusted based on population susceptibility (beginning of pandemic, vaccine availability, vaccine uptake, surges, variants, etc.)?
- What type of information is needed to support response measures based on sub-population susceptibility (e.g., disaggregated data)?
- How will the population's immunity to a new pathogen be assessed throughout the pandemic?
- What mechanisms can be established to monitor and address waning immunity over the course of the pandemic?

e) Increased demand for health care, medicine and supplies

Early in a pandemic, demand for healthcare services and essential supplies will likely exceed available supply. When resources are limited, prioritization based on health equity and ethics should remain a priority.

Considerations:

- Pandemics place increased demands on the healthcare and public health systems.
  - » Staffing, essential medications and supplies, laboratory capacity, specific medical countermeasures, hospital beds and funding capabilities, will be affected.
  - » Non-pandemic-related healthcare service needs do not diminish. Postponing these services indefinitely, including responses to concurrent health crises (e.g., opioid crisis), may have long-term consequences.
  - » Mental health services will be in high demand.

  - » Alternative models of healthcare services (i.e., decentralized, Indigenous-led and community-based testing models) may be needed. The adoption of such models may require federal support and flexibility in regulatory frameworks, alongside endorsement of innovation service delivery approaches by FPT partners.
- Ensure availability of up-to-date, routinely updated data on healthcare and workforce capacity and other critical resource inventories, supported by supply estimates and distribution capabilities.
- Increased demand for limited resources will be expected and will impact supply chain resilience and distribution of resource inventories needed to support the safe delivery of health services and reduced pathogen transmission.
- Prioritization frameworks based on equity with specific considerations for remote and Northern Indigenous communities that experience disparities in accessing healthcare services will be needed.
- Healthcare system recovery between surges and post emergency must be planned.

Reflection

- Which cross-training programs are in place, including innovative learning models, for both public health and healthcare systems, to enable workforce flexibility across roles and settings (e.g., pediatric vs. adult care, hospital vs. community-based care)?
- What mechanisms or strategies are in place to maintain essential routine programs (e.g., vaccination, screening, etc.) or address postponed healthcare needs during a prolonged health emergency?
- What sufficient supplies are stockpiled to address initial pandemic requirements?
- How will jurisdictional prioritization frameworks and allocation models support First Nations Inuit and Métis communities including those in remote and northern regions that face unique barriers?

f) Need for medical countermeasures

Medical countermeasures (e.g., vaccines, therapeutic drugs, medical devices, and other related supplies) may not be available immediately and/or in sufficient quantities to support a pandemic response. If new variants emerge, medical countermeasures may need to be adapted to maintain effectiveness.

Considerations:

- Continue building domestic medical countermeasure capacity and plan for further development by understanding the product development cycle, including current gaps, and setting up infrastructure for research, development and manufacturing.
- Strengthen the regulatory ecosystem to provide timely and reliable access to safe and effective medical countermeasures.
- Maintain security of supply considering access to critical manufacturing inputs, supply chain resilience, manufacturer negotiation requirements, regulatory authorization in Canada, purchasing power, available procurement funding and national or international collaboration or competition, including the role of Canadian manufacturers in meeting global needs.
- Have an existing and agile life sciences ecosystem.
- Develop a prioritization framework for equitable access.
- Consider the role of available antimicrobials (i.e., antivirals, antibiotics and antifungals), anti-inflammatory agents (e.g., corticosteroids, nonsteroidal anti-inflammatory drugs), monoclonal antibodies and immunomodulatory treatments as well as the potential for emerging resistance.

Reflection

- What rapid emergency funding mechanisms are in place to enable timely procurement of medical countermeasures during a public health emergency?
- What sufficient and sustainable funding streams are available to support ongoing preparedness activities, including maintaining the resilience of Canada's life sciences sector and sustaining innovative technologies relevant to future pandemic scenarios?
- What existing prioritization frameworks will be used for equitable access and distribution of medical countermeasures?
- Once medical countermeasures are deployed, is a strong system for post-market surveillance in place (digital healthcare charting, integrated databases, adequate reporting structure, trained healthcare personnel)?

g) Whole-of-society impact

Pandemics can negatively impact all parts of society, including social, economic, environmental and political systems. All sectors must be ready to have and maintain surge capacity to minimize societal disruptions.

Considerations:

- Pandemics have a disproportionate impact on populations in situations of vulnerability.
- Businesses and other workplaces will experience disproportionate impacts based on their ability to transition to remote operations, with those unable to pivot to remote work experiencing more exposure to the pathogen.
- Early or simultaneous animal outbreaks or spillovers can accelerate impacts on food production and food security, as well as economic and mental health impacts.
- Given the complex interdependencies between different sectors, preventing and reducing the risks and impacts of pandemics is a shared responsibility across sectors at all levels of society.

Reflection

- What are the potential negative consequences of implementing public health measures, and who is most likely to be affected?
- What accurate, relevant and up to date information is available to evaluate the impacts of a pandemic on all sectors of society and diverse population groups?
- How can plans account for the disproportionate health, economic and operational impacts on sectors requiring in-person work that protects the workforce and business continuity while maintaining essential services?
- What interdisciplinary collaboration, including One Health considerations, can strengthen pandemic preparedness, prevention and response?

h) Decreased workforce capacity

Absenteeism impact workforce capacity and disrupt essential services including emergency services, health sector, transportation, education, critical infrastructure and the supply of critical goods. Pandemic plans should have multisector, multi-level, whole-of-society contingency plans to prepare for a range of absenteeism levels.

Considerations:

- Provide opportunities for remote work or alternate operations, where feasible.
- Ensure availability of and access to data on workforce capacity including absenteeism data.
- Evaluate how absenteeism may affect essential sectors beyond health care including, but not limited to transportation, food and agriculture, communications, law enforcement.
- Identify essential operational activities within your sector, minimum staffing levels to maintain critical services and develop a plan to backfill or cross-train staff for those roles.
- Training of healthcare students or staff may be disrupted and can impact workforce readiness and capacity.

Reflection

- How will the workforce be protected during a pandemic to prevent/minimize absenteeism due to illness and restore staffing levels as the pandemic progresses?
- What plans for surge capacity in essential sectors can be put in place?
- Who will be consulted (e.g., sector-specific government ministry, regulator or industry association) to obtain guidance and support for your pandemic business continuity planning?

i) Potential for negative impact on social cohesion

Pandemics have the potential to disrupt societal stability, often leading to negative impacts on social cohesion. The stress placed on systems, resources and public trust can increase existing divisions and create new tensions between and within communities.

Considerations:

- Pandemics negatively impact economic growth and can identify and/or worsen pre-existing inequalities, especially within populations in situations of vulnerability. Both factors are associated with increased potential for social unrest.
- Scarcity of services and goods is a driver for social unrest.
- Public trust in health authorities and the spread of mis- and disinformation can impact the effectiveness of the pandemic response, broader receptivity and social cohesion.

- Timely and well-designed policies (e.g., financial assistance) can help mitigate the socio-economic effects of pandemics, while suitable social protections can reduce unintended consequences.
- The proportionality and effectiveness of public health interventions can influence public trust, perceived fairness, and the duration of any unintended negative impacts. Ongoing evaluation should be considered.

Reflection

- How can partnering with other sectors (e.g., social services, community organizations etc.) help anticipate and mitigate the potential for social unrest?
- What actions can be taken to reduce equity gaps including improved access to health care to build a more resilient society?
- What measures can be taken to increase community engagement and establish and maintain strong relationships that foster trust, engagement, and collaborative leadership during a pandemic and beyond?
- What kind of policies could be prepared in advance to be deployed quickly in order to mitigate unintended adverse effects of pandemic response?

j) Need for risk communication and community engagement

Building trust, especially with populations in situations of vulnerability, should be prioritized during the interpandemic period when there is time to strengthen relationships and communication channels.

Considerations:

- Reliable communication systems that can withstand the extra demand or possible disruptions are needed to communicate information in a timely fashion.
- Increased demand for information will require more briefings, coordinated governance and transparent communication across governments, sectors, and communities.
- Risk communications must focus on building trust through ongoing engagement and be grounded in transparent and adaptive messaging.
- Risk perception has an impact on public behaviour, trust in public health measures, and overall response effectiveness.

- Social and behavioral science research should be conducted as part of pandemic planning and throughout pandemic response to test, adapt and inform risk communication strategies.
- Reliable, public health focused communication networks are needed at multiple levels of government,
- The sharing of emerging research, including program evaluation, is essential for use in best practices in risk communication, health literacy and public health education.

Reflection

- How can horizontal communications be improved to ensure collaboration and coherence across sectors and across levels of government?
- How is communication campaign success measured? Are there tools to measure positive engagement and outcomes on observance to recommendations?
- How are public perceptions and misperceptions being monitored and addressed in real time?
- What plans are in place to counter mis- and disinformation? How can mis- and disinformation be countered in collaboration with allies and diverse partners? What legislative and/or regulatory tools would be needed in the social media space?
- What long-term strategy is in place to improve baseline health and science literacy?

k) Need for decision making

Decision making during a pandemic is influenced by many competing factors. While public health advice provides essential guidance, it is only one consideration. It is crucial to account for these complexities when planning for and responding to pandemics.

Considerations:

- Decision making can be influenced by:
  - » Available and advancing scientific data and evidence, supported by advisory structures,
  - » Preexisting laws and emergency powers,
  - » Government and policy frameworks,
  - » First Nations, Inuit and Métis perspectives,

  - » Political pressures and ideologies,
  - » Global, national and regional coordination efforts,
  - » Ethical and social considerations,
  - » Healthcare and public health system capacity,
  - » Economic and other societal impacts,
  - » Geopolitical dynamics, and
  - » Public trust/mistrust and public perception/misperception.
- Decisions may need to be made despite limited or evolving evidence, while balancing potential benefits with possible harms, and considering broader social, economic, equity and ethical impacts.

Reflection

- How will scientific data be integrated into decision-making while considering practical limitations, such as resource availability and public agreement?
- How will First Nations, Inuit and Métis perspectives be integrated into decision-making?
- How will evidence-informed public health advice be transparently considered alongside competing political pressures, public considerations or differing jurisdictional priorities?
- How can the need to protect public health while minimizing disruptions to the economy and essential services be balanced?
- How will health equity and ethics be incorporated into decision-making?

4C. Pandemic Planning Scenarios

Pandemic planning scenarios are used to reflect varying pandemic impacts and a range of uncertainties. As shown in Table 1, they serve as a tool to:

- Support proactive decision-making
- Guide evidence informed policy
- Support collaborations across sectors
- Assist with training and preparedness

- Support flexibility and scalability

Table 1. Key Elements Highlighting the Importance of Pandemic Planning Scenarios

Proactive Decision Making	Pandemic scenarios help governments, community leadership and health and other sectors identify strengths, assets, potential risks and vulnerabilities in advance. This allows for proactive planning rather than reactive responses, minimizing delays during an outbreak.
Guiding Evidence-Informed Policies	Scenarios align with principles like proportionality, flexibility and evidence-informed decision-making providing a structured basis for policymakers to adapt responses to the evolving situation.
Supporting Collaboration Across Sectors	Pandemic scenarios facilitate a unified approach among public health agencies, governments, non-government and private sectors. They create a shared understanding of potential risks and encourage coordinated responses across multiple sectors, jurisdictions and organizations.
Training and Preparedness	Scenarios assist with conducting simulations, drills and tabletop exercises. These activities help identify gaps in preparedness, clarify roles and responsibilities, and test response plans.
Flexibility and Scalability	Scenarios allow for responses to be scaled up or down as new information becomes available. They support the adaptability of strategies across pandemic periods.

Elements of Pandemic Scenarios

The potential impact of a pandemic on a given population is determined in large part by the transmissibility of the pathogen and by its virulence, which reflects the clinical severity of the infection [60]. Virulence is often measured by case fatality rate (CFR) [61]. The infection fatality rate (IFR) is similar to the case fatality rate but also accounts for asymptomatic and undiagnosed infections.

Together, transmissibility and virulence provide a basis to begin assessing the impact a pathogen may have on a population [62] and are used to map “hypothetical-yet-plausible” pathogens (see Table 2) as a means of estimating the range of pandemic impact. Transmissibility and virulence depend on both pathogen traits and vulnerability of the human population, such as immunological susceptibility and behavioural patterns. Scenarios need to recognise key aspects of the Canadian population, and that extrapolation of data and

parameter values from other countries to the Canadian population needs to be done with caution.

Pandemic Planning Scenario Framework

This plan's pandemic planning scenarios include 'hypothetical-yet-plausible' pathogens, informed by past pandemic pathogens or pathogens that demonstrate pandemic potential and are most relevant for the Canadian context. These scenarios assume no pre-existing population immunity at the onset of a pandemic, with the exception of a '1918 influenza-like pathogen', where partial immunity among individuals over 40 years of age is noted, reflecting cohort-specific cross-protection observed in past influenza pandemics.

Table 2. Hypothetical-yet-plausible pathogens

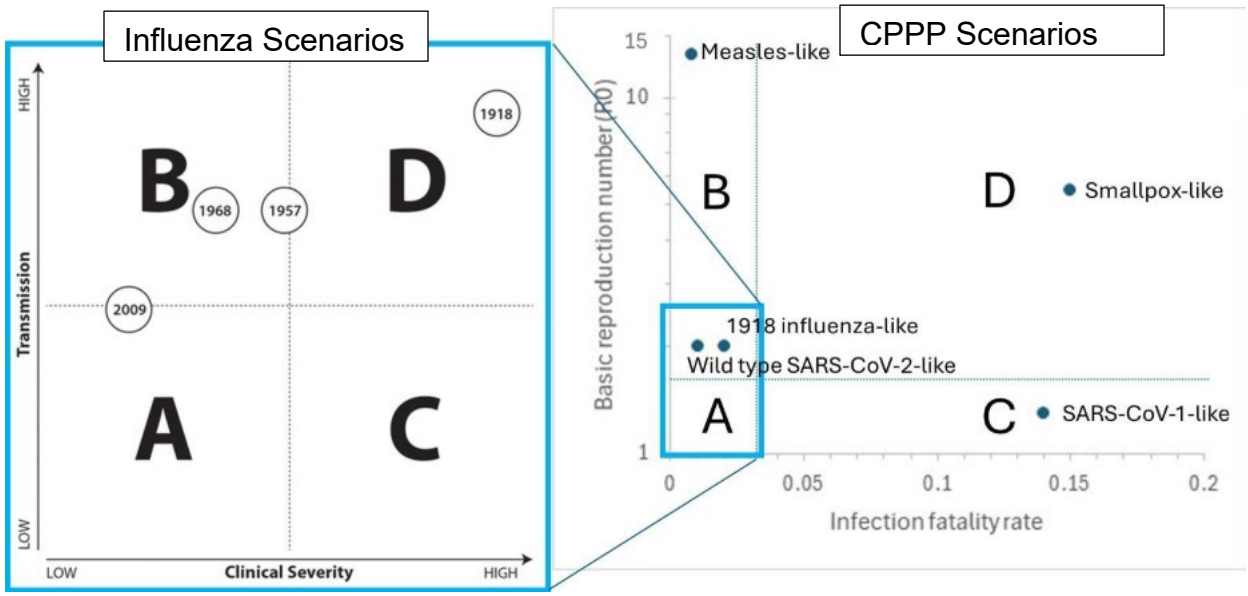
Pathogen	Transmission class	Basic Reproduction Number R_0	Virulence Class	Case Fatality Rate/Infection Fatality Rate	Pre-existing Population Immunity considered?
SARS-CoV-2-like	Moderate	2.69 (95%CI 2.40,2.98) [MA, [63]]	Moderate	CFR: 2.67% (95%CI 2.25, 3.13) [MA, IFR 1% [64]]	No
Measles-like	High	13.2 (range 4.6-44.4)[a,c, [65]]	Low	CFR: 0-0.45% [d, [66]]	No
SARS-CoV-1-like	Low	1.5[b] (range 1.1-4.59)[67]	High	CFR: 13.8% (95%CI 9.2-20.3) [MA, [67]]	No
Smallpox-like	High	5.5 (range 3.5-6)[c,[68]]	High	CFR: 15%[68] (range 0-20.5%)[69]	No
1918 influenza-like	Moderate	2.02 (range 1.34-3.21) [c,[70]]	Moderate	CFR: 1.7% (range 0.78 - 3.14%)[c, [71]]	Yes*

[MA] Pooled estimate (95% confidence interval); [a] Estimate from surveillance data subset; [b] Estimate of Toronto outbreak; [c] Median and range of R_0 values; [d] CFR for high income countries; * Immunity in those aged ≥ 40 years that prevents severe outcomes but not transmission. Note, where available community-based estimates from

developed countries were used to better reflect transmission in the general population and virulence expected in Canada as both can vary by context.

Figure 5 presents mapping of these hypothetical-yet-plausible pathogens based on their transmissibility and virulence. The previous model used in influenza pandemic planning on the left, shown in blue [72], represents a narrower scope, focussed on historical influenza viruses and lower-impact scenarios. On the right, revised mapping for this plan expands the view to include the hypothetical-yet-plausible pathogens and a broader range of impact profiles to support more comprehensive preparedness planning. These scenarios are briefly described in Table 3.

Figure 5. Parameter Space of Transmissibility (R_0) and Virulence (IFR).



N.B. Sources of the R_0 and IFR values of these pathogens are those identified in Table 2.

Table 3. Scenario Ranges Low to High Impact

Scenario A **Low Impact**	**Scenario B** **Moderate Impact**	**Scenario C** **Moderate Impact**	**Scenario D** **High Impact**
Low transmissibility and low virulence. • Potentially more manageable with a less restrictive	High transmissibility and low virulence. • May be difficult to suppress transmission.	Low transmissibility and high virulence. • May be able to use more targeted measures aimed at bringing a pandemic wave under control	High transmissibility, high virulence. • May be difficult to suppress transmission. • May require more restrictive

Scenario A Low Impact	Scenario B Moderate Impact	Scenario C Moderate Impact	Scenario D High Impact
public health approach. • Likely minimal strain on the healthcare system or other essential services.	• Measures aimed at decreasing transmission. • Although virulence is low, volume of cases may significantly disrupt health systems with increased general absenteeism.	due to limited spread. • High virulence could generate significant public concern. • Strain may be seen more in critical care areas.	public health approach. • Likely extreme strain on the healthcare system with broader impacts on essential services.

While pandemic planning scenarios help guide preparedness and response planning, an emerging pandemic may not align with these scenarios. These scenarios are intended to illustrate possible contexts, not to prescribe a singular approach to managing a pandemic. In the early stages of an outbreak, estimates are often highly uncertain due to limited and potentially biased data. As more clinical, experimental and surveillance data becomes available, uncertainty will lessen and measures of transmissibility and virulence will be refined. Conducting rapid risk assessments and maintaining adaptability to evolving information will support timely and proportionate responses to unforeseen threats.

4D. Risk Analysis

A systematic approach is needed to effectively identify, assess, manage and communicate risk during a pandemic. Risk analysis is a structured process that can assist in dealing with incomplete information often occurring during the initial stages of a pandemic.

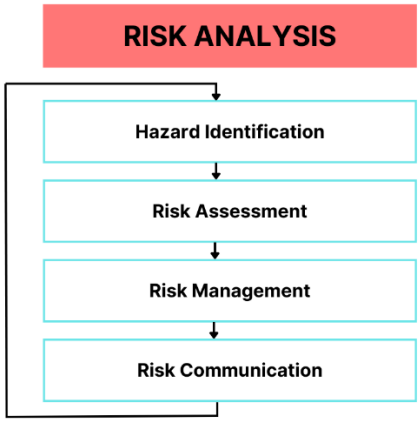
The purpose of risk analysis varies depending on the pandemic stage and is to:

- identify and assess the likelihood of a respiratory pathogen with pandemic potential being introduced and spreading within Canada,
- recommend mitigation measures to control the spread of the pandemic, and
- assess the impact on the people living within Canada and the healthcare system.

Managing risk has challenges which include data and information limitations, especially early on in the pandemic, resource constraints and sector and jurisdiction complexity that can lead to fragmented and/or inconsistent responses.

Risk analysis is composed of four components: hazard identification, risk assessment, risk management and risk communication. Figure 6 illustrates the risk analysis process and is followed by a brief description of each of the components.

Figure 6: Risk Analysis Process



Components of Risk Analysis

- Hazard Identification
  - » The process of identifying and characterizing potential threats [73].
  - » In the context of a pandemic this can include new emerging pathogens and zoonotic risks.
- Risk Assessment
  - » The systematic process of gathering, assessing and documenting information to estimate the level of risk and associated uncertainty related to a public health event, during a specified period of time and in a specified location [74].
  - » Risk assessment is critical in evaluating the likelihood and impact of risks and to ensure efforts and resources are applied appropriately [75].
  - » See the **Risk Assessment** subcomponent for additional information.
- Risk Management

  - » The process of identifying, selecting and implementing measures that can be applied to reduce the level of risk [76].
  - » Strategies to mitigate risks and build resilience, including community engagement, should also address the treatment of risks by clarifying responsibilities for action, how measures will be monitored, and how these link to the appropriate level of response (see Table 5 for key actions and decisions).
- Risk Communication
  - » Risk communication refers to the ways in which information about health risks is shared and discussed with interest holders and the public.
  - » See the Communication Cross-Cutting Consideration and **Risk Communication and Community Engagement** subcomponent.

Risk analysis is a continuous and iterative process that should operate throughout the entire pandemic cycle, ensuring a comprehensive and collaborative approach to managing pandemic risk across sectors, including the integration of all Cross-Cutting Considerations. The pandemic periods detailed in Section 4E: Pandemic Periods and Triggers of the plan provide the temporal structure outlining the timeline of a pandemic, while risk analysis serves as the methodology to guide decision-making during each period of the pandemic.

4E. Pandemic Periods and Triggers

The WHO PRET presents pandemic periods and operational stages and sub-stages [2] to assist in pandemic planning by providing practical steps and an outline for structure.

WHO Pandemic Periods and Operational Stages

The WHO PRET describes five pandemic periods, with associated operational stages and sub-stages, that are used to communicate high-level global views of the evolving picture of a pandemic and can be found on the WHO PRET website.

The WHO PRET pandemic periods are distinct from (1) the determination of a public health emergency of international concern (PHEIC) under the International Health Regulations (2005) and (2) the declaration of a pandemic emergency by the WHO. Both of these are based upon specific risk assessments. They can be used for communicating the need for collective global action, or by regulatory bodies and for legal or contractual agreements, should they be

based on a determination of a public health emergency of international concerns or on a pandemic emergency declaration [77].

Canada's Approach to Pandemic Periods, Stages and Sub-stages

The WHO PRET pandemic operational stages have been used but renamed to align with the purpose of this plan and the Canadian context using the stages of preparedness, readiness, response and recovery detailed in Table 4.

As respiratory pathogens with pandemic potential emerge, intelligence from the international community will assist with understanding the situation in Canada, although risks faced by the country, provinces and territories may differ from each other and from other countries. The FPT response will depend on the pathogen activity level in Canada. Each region should use global, national and/or sub-national risk assessments to inform their own assessments to decide when and how to respond, and some control and mitigation efforts will need to be localized. FPT and First Nations, Inuit and Métis partners can then collaborate and communicate risks between them to support aligned approaches.

It is important to adopt a proactive and precautionary approach when dealing with respiratory pathogens, particularly in the early days of a potential pandemic when key characteristics may still be uncertain. Planning should assume the possibility of efficient transmission through the air to ensure timely and effective response measures while critical information is being gathered.

Triggers and actions and decisions to consider

Triggers guide when to shift between operational stages and sub-stages (Table 4). The situation and timelines may evolve differently in Canada and internationally; for instance, Canada might have its first case while other countries are already facing sustained human-to-human transmission. Alternatively, Canada could be well into the first pandemic wave before other countries get their first cases. Not all triggers occur simultaneously in all provinces, territories or local communities (if at all) during a pandemic. Jurisdictions may move between operational stages or sub-stages in a nonlinear fashion based on regional epidemiological trends and capacities.

Insights gained from the 2009 H1N1 Influenza pandemic, and the increase in human cases of Avian Influenza A(H5N1) starting in 2023, demonstrate the need for public health actions and

decisions when cases of pathogens are detected in animals before the emergence of human cases [78]. This is further reflected in Tables 4 and 5.

Each operational stage and substage contributes to the overall goals of the plan.

- Preparedness stage: Build plans and capacity to detect and respond to an event.
- Readiness stage: Operational readiness strengthened while additional insights are gained regarding the epidemiological, microbiological and clinical characteristics of the pathogen.
- Response stage:
  - » Contain substage: Detect early cases, contain outbreaks and decrease transmission chains.
  - » Control and reduce transmission substage (when cases may no longer be linked to transmission chains): Slow transmission, protect vulnerable groups and decrease pressure on the health system. Identify and implement public health measures, increase case detection capacity, and develop medical countermeasures.
  - » Mitigate impact substage: Reduce severe outcomes while sustaining essential services and supporting societal functioning,
- Recovery stage: Restore systems, address impacts and support research on lessons learned.

Table 4. Triggers for shifting between the operational stages and sub-stages

Operational Stage	Operational sub-stage	Triggers to shift to the operational stage or sub-stage
Preparedness		
Readiness		• Pathogen with pandemic potential circulating among animal(s) with limited transmission to humans within Canada and/or outside national borders; **and/or** • First case(s) or clusters of cases in humans of pathogen known to have human-to-human transmission have been detected outside national borders; **and/or**

Operational Stage	Operational sub-stage	Triggers to shift to the operational stage or sub-stage
		• Sustained or disseminated community human-to-human transmission in multiple countries excluding Canada; **and/or** • Declaration by WHO of a public health emergency of international concern and/or a pandemic emergency.
Response	Contain	• First case(s) or clusters of cases in humans of pathogen known to have human-to-human transmission have been detected in Canada.
	Control/reduce transmission	• Sustained human-to-human transmission of pathogen within Canada.
	Mitigate impact	• Disseminated human-to-human transmission of pathogen within Canada; **and/or** • Demands for health services anticipated to or have exceed capacity.
Recovery (Scale down and sustain)		• Sustained reduction in cases, deaths, and hospitalizations caused by pathogen; **and/or** • Population largely protected by vaccine or infection-induced immunity or availability of effective therapeutics; **and/or** • Response is absorbed into standard operations; **and/or** • Termination of the public health emergency of international and/or pandemic emergency by WHO.

Table 5 lists actions and decisions to be considered by FPT and local jurisdictions for each operational stage and sub-stage, categorized by the five Technical Components (i.e., *Healthcare Services; Collaborative Surveillance and Data Integration; Community Protection; Emergency and Science Coordination;* and *Medical Countermeasures)*. Some actions and decisions may apply to multiple Technical Components but will only be included under one to avoid duplication. These build upon each other as a pandemic evolves and therefore actions and decisions from previous stages and sub-stages should also be considered.

Table 5. Actions and decisions to consider according to operational stages and sub-stages.

Operational Stage	Operational Sub-stage	Actions and decisions *Actions and decisions from previous stages and sub-stages should also be considered*
Preparedness	Not applicable	**Healthcare Services** • Strengthen health systems (e.g., human resources, interprofessional collaboration, infrastructure). • Update and maintain policies, protocols, guidance and training for clinical care and infection prevention and control during a pandemic. **Collaborative Surveillance and Data Integration** • Create or update One Health multisectoral management governance framework for zoonoses with pandemic potential. • Continue routine surveillance activities to be able to rapidly detect the first case in humans or animals (including wildlife) and support evidence-informed decision-making [79]. • Articulate pandemic surveillance objectives and identify sources of information that will support risk assessment and decision making. • Create, strengthen and maintain capability to routinely monitor and assess infectious disease events and threats, including those with pandemic potential, while leveraging seasonal respiratory surveillance and monitoring. • Leverage existing FPT tables and relationships with research networks across Canada, map existing capabilities and capacities, review and strengthen existing surveillance systems (for disease detection, vaccine uptake, therapeutic use, effectiveness and safety) and explore the feasibility of scaling up surveillance systems during future emergencies.

Operational Stage	Operational Sub-stage	Actions and decisions *Actions and decisions from previous stages and sub-stages should also be considered*
		• Leverage traditional and non-traditional types of surveillance, including the collection of disaggregated data to better inform responses to address inequities and to close data gaps for key populations [3]. • Strengthen data interoperability and linkages among FPT and First Nations, Inuit and Métis partners, while upholding Indigenous data sovereignty and respecting First Nations, Inuit and Métis governance over health information. • Invest in IT infrastructure for digital data/surveillance applications and in coordinated data management by developing data structures that allow for the sharing and integration of surveillance data to and from national, P/T and/or other networks and international interest holders. • Build, maintain and strengthen pan-Canadian diagnostic and genomic laboratory capacity readiness. • Produce modelling scenarios of potential pandemic pathogens for planning purposes, including hospital surveillance data needs and standards, National Antiviral Stockpile and National Emergency Strategic Stockpile needs [80], and the capacity needed to detect cases (e.g., surveillance efforts), and to control transmission prior to pandemic vaccines and treatment availability. • Foster transparency and accountability through strengthened data governance including pre-established agreements and memorandums. • Conduct ongoing surveillance of hospital utilization using available surveillance systems. **Community Protection** • Maintain seasonal respiratory pathogen disease public health guidance.

Operational Stage	Operational Sub-stage	**Actions and decisions** ***Actions and decisions from previous stages and sub-stages should also be considered***
		• Develop a risk communication plan, with community leadership, including a strategy for managing mis- and disinformation, anticipatory products, operational planning and web strategy, and revise as needed. • Build public trust and awareness about pandemic planning through transparent and timely communication with the public and the health sector [3]. • Maintain communications networks (this includes accessibility, inclusivity, and culturally sensitive considerations including languages other than of English and French) and contracts. • Implement strategies that are co-developed with community leadership to reduce health inequities, strengthen community resilience and minimize disproportionate impacts in future public health emergencies [79] [3]. • Promote and explain the effectiveness of healthy behaviours, such as the use of personal protective measures to help reduce the transmission of respiratory pathogens with pandemic potential. **Emergency and Science Coordination** • Prepare and maintain surge capacity, including training materials to rapidly onboard surge team members, and the appropriate tools to support employee wellbeing [3]. • Promote awareness and familiarization of the pandemic preparedness plan by all interest holders. • Maintain multisectoral engagement, including conducting joint exercises, ongoing information sharing, and maintaining a contact list of international and other collaborating agencies and interest holders.

Operational Stage	Operational Sub-stage	**Actions and decisions** ***Actions and decisions from previous stages and sub-stages should also be considered***
		• Develop core capacities for emergencies, including training and maintaining systems and structures for responding to a pandemic [2]. • Maintain, exercise and update jurisdictional pandemic response plan. • Maintain rosters of key scientific infrastructure and coordination networks that can be mobilized or scaled up as needed, including research infrastructure, capacity to monitor and synthesize evidence, science advice mechanisms, research prioritization mechanisms and linkages to research funding organizations. • Establish a pathogen-agnostic science plan, including identifying roles, responsibilities, and key research networks. • Pre-define and obtain pre-approval from research ethics boards for research protocols for specific investigations and studies, in collaboration with academic institutions. **Medical Countermeasures** • Maintain seasonal immunization programs. • Monitor the availability, effectiveness and safety of medical countermeasures available domestically and globally. • Document and review supply chain capacity, including the temperature-controlled supply chain and distribution to remote and isolated locations, where necessary.

Operational Stage	Operational Sub-stage	Actions and decisions *Actions and decisions from previous stages and sub-stages should also be considered*
		• Improve resilience of security of supply through actions to prevent health product shortages, including contingency planning and mapping exercises to understand federal capabilities for future response. • Strategically promote domestic manufacturing capacity across a diversified set of platform technologies. • Support research and development of medical countermeasures and sustain domestic manufacturing capacity by leveraging prioritization frameworks. • Secure access to existing medical countermeasures through stockpiling, exploring new pathways to access, and reviewing and/or updating readiness contracts with manufacturers (e.g., pandemic vaccines and related supplies, antivirals, PPE, medical devices, bulk drug substances). • Develop plans to support storage, inventory management and supply agreements for medical countermeasures to support rapid preparations for delivery, administration and monitoring during pandemic response, including consideration of digital logistics infrastructure. • Manage and replenish National Antiviral Stockpile and National Emergency Strategic Stockpile surge capacity and outline how to access them. • Develop evidence-informed medical countermeasures allocation strategies using various resource-constraint scenarios, with considerations for health equity and ethics.
Readiness	Not applicable	***Continuation of Above Activities, as appropriate*** **Healthcare Services** • Promote awareness of pathogen transmission, prevention and associated symptoms among healthcare and public health workers, including healthcare workers in Indigenous communities.

Operational Stage	Operational Sub-stage	**Actions and decisions** ***Actions and decisions from previous stages and sub-stages should also be considered***
		• Engage representative health service sectors and subject matter experts to coordinate creating and/or updating of healthcare guidance (e.g., clinical guidelines, operational instructions, protocols for infection protection and control) once a pathogen is identified. • Increase vigilance during triage in healthcare settings (e.g., travel history to affected areas). • Consider staffing needs that allow opportunities for rest and recuperation for staff throughout the response. **Collaborative Surveillance and Data Integration** • Continue preparations to enhance disease detection surveillance within Canada, including sero-surveillance and syndromic surveillance, in collaboration with One Health partners. • Conduct and update risk assessments as new information emerges. • Maintain the consistent and ongoing timely sharing of laboratory and epidemiological data, meta-data and reference support with international, national, provinces and territories, researchers, interest holders and communities. • Enhance intelligence gathering from affected areas to gain knowledge on the clinical, epidemiological and microbiological characteristics of the pathogen. • Engage scientific expertise in a coordinated way to rapidly synthesize incoming scientific evidence and ensure ongoing capacity for evidence-informed decision-making, while avoiding duplication [3]. • Develop quantitative models and qualitative frameworks to assess impact in anticipation of human-to-human transmission and options for pathogen control.

Operational Stage	Operational Sub-stage	**Actions and decisions** ***Actions and decisions from previous stages and sub-stages should also be considered***
		• Support One Health coordination and real-time information sharing concerning pathogens circulating in animals prior to emergence among humans, including timely analysis of animal and environmental genomic surveillance data. • In the case of a new emerging pathogen, facilitate access to timely genomic sequencing and provide rapid development and dissemination of diagnostic testing methodologies, validation procedures, and standard materials. • Confirm national surge capacity for laboratory and rapid diagnostics and surveillance testing and epidemiology support. **Community Protection** • Develop public health guidance/protocols and case definitions for case investigation and contact management with the goal of containment. • Consider international border measures (e.g., health screening, testing and surveillance) to delay the introduction and spread of the pathogen in Canada, if appropriate, in collaboration with regional and international partners. • Support the availability of required resources (human, infrastructure and material resources) prior to implementation and enforcement of public health measures. • Activate risk communications plan (surge capacity, contact partners, reviewing and updating of anticipatory products). • Enhance trust and collaboration through multisectoral interest holder engagement (e.g., One Health partners). • Share early risk messages providing information about the situation and actions taken by public health to minimize harm.

Operational Stage	Operational Sub-stage	**Actions and decisions** ***Actions and decisions from previous stages and sub-stages should also be considered***
		• Provide public health information to incoming and outgoing travellers and travel health advice to the public, including international, inter-provincial/territorial and inter-community travellers. • Provide tailored communications to the health sector and groups at higher risk on the use of public health measures and occupational health, safety, and biosecurity measures to prevent both animal-to-human transmission and human-to-human transmission. • Provide communication to clinicians to increase awareness to help with recognition, diagnosis and isolation of first cases in Canada, • Communicate and normalize uncertainty and guidance changes. • Use infodemic management strategies (such as prebunking and debunking, improving science and media literacy) to build public resilience against mis- and disinformation. • Engage with international (where appropriate), FPT, local and First Nations, Inuit and Métis partners to coordinate plans and messaging. **Emergency and Science Coordination** • Strengthen operational readiness in anticipation of cases. • Support global efforts to contain the event (e.g., share timely relevant information with the WHO as per the International Health Regulations [2005]) [2]. • Complete ongoing intra-action reviews, including assessments of surge staff wellbeing, and all staff meetings [3]. • Mobilize key science infrastructure and coordination networks and scale up as appropriate. Activate science coordination networks related to evidence synthesis, science advice mechanisms, research prioritization, research infrastructure, linkages with research funding agencies and knowledge mobilization.

Operational Stage	Operational Sub-stage	**Actions and decisions** ***Actions and decisions from previous stages and sub-stages should also be considered***
		• Where required, engage scientific expertise to rapidly synthesize and disseminate incoming scientific evidence and ensure ongoing capacity for evidence-informed decision-making. • Support access to and communication of scientific evidence (e.g., evidence syntheses, research results and epidemiologic modelling) and science advice/guidance to decision makers, public health practitioners, researchers, health workers and the public. • Provide leadership and support global scientific efforts to address knowledge gaps, including identifying and prioritizing research needs and domestic and international research collaborations. **Medical Countermeasures** • Evaluate availability and the supply and demand landscape of pathogen-specific medical countermeasures (e.g., therapeutics, vaccines, rapid diagnostic tests) for novel/re-emerging threats. • Communicate needs of medical countermeasures for novel/re-emerging threats with domestic developers and manufacturers and coordinate with global partners and manufacturing networks to minimize supply disruptions. • Collaborate with subject matter experts and the National Advisory Committee on Immunization regarding guidance on pandemic vaccine prioritization and consider the appropriateness and development of guidance for targeted immunization and administration of treatment in non-pandemic context (e.g., use of vaccine against avian influenza in a non-pandemic context) [81]. • Collaborate with subject matter experts regarding guidance on pandemic therapeutics prioritization, including targeted treatment and prevention. • Confirm pandemic vaccine supply arrangements and discuss with pandemic vaccine manufacturer(s) production capacity, regulatory authorization and other elements of the arrangement (e.g., vaccine strain availability), if required.

Operational Stage	Operational Sub-stage	Actions and decisions *Actions and decisions from previous stages and sub-stages should also be considered*
		• Coordinate access to pandemic vaccines for use in targeted campaigns to contain further transmission and prevent escalation of a pandemic risk, if available and when required. • Review medical countermeasure storage, handling, supply chain and delivery capacity across Canada and identify any shortfalls that require activation of supply arrangements for third-party logistics services. • Consider need for animal health vaccines and therapeutics, as required.
Response	Contain	***Continuation of Above Activities, as appropriate*** **Healthcare Services** • Facilitate the treatment of cases. • Prepare and/or disseminate clinical and infection protection and control guidelines and public health advice. • Consider setting FPT prioritization criteria for distribution and use of critical goods, services and health personnel that may become short in supply, integrating a health equity and ethics approach. **Collaborative Surveillance and Data Integration** • Increase testing and disease surveillance and timely data sharing. • Conduct detailed investigations of early cases to determine the clinical, epidemiological and microbiological characteristics of the pathogen and inform risk assessment. • Facilitate timely communication and collaboration with national and international partners should the index case of the pandemic be in Canada, as per International Health Regulations (2005) requirements.

Operational Stage	Operational Sub-stage	Actions and decisions *Actions and decisions from previous stages and sub-stages should also be considered*
		• Conduct and update risk assessments as new information emerges. • Scale-up/enhance vaccine coverage, effectiveness and safety surveillance capabilities to ensure readiness for deployment upon pandemic vaccine roll-out. • Conduct modelling of cases, hospitalizations and deaths to properly plan next actions (low, moderate, high impact predictions), and support the development of interventions using public health measures. **Community Protection** • Initiate case and contact management activities, including case investigation and contact tracing, as well as possible case isolation, quarantine of contacts, testing and chemoprophylaxis and adjust guidance/protocols to reflect evolving evidence and response goals. • Raise public awareness of the risk and promote the appropriate use of personal protective measures tailored to different segments of the population (e.g., staying home when sick, masking, hand hygiene, respiratory etiquette, cleaning and disinfecting, ventilation optimization). • Considering a rapidly changing scientific context, continue frequent communications with the public through multiple channels and platforms, and partners. • Conduct ongoing assessments of the psychosocial impact of public health measures on the population and mitigate unintended consequences. • Consider using relevant legal authority to declare FPT or local emergencies and to apply targeted public health measures at the appropriate level based on risk assessment as the situation evolves, considering the ethical principles of proportionality, least restrictive means and reciprocity. • Implement enhanced border measures to prevent/contain transmission by travellers arriving in Canada.

Operational Stage	Operational Sub-stage	**Actions and decisions** ***Actions and decisions from previous stages and sub-stages should also be considered***
		Emergency and Science Coordination • Review, revise and activate emergency response plans and coordination mechanisms, as needed. • Review and revise the scientific response and mobilization with respect to evidence synthesis, science advice, research prioritization, science coordination mechanisms (including linkages with research funding agencies; research networks and hubs; and intra- and extramural research) and knowledge mobilization, as necessary, to reflect evolving science needs and knowledge gaps. • Implement hospital surveillance data system – collect data on hospital utilization and hospital capacity. **Medical Countermeasures** • If available and deemed required, deploy targeted immunization and therapeutic programs to contain the threat and prevent escalation of a pandemic risk, informed by the National Advisory Committee on Immunization and other scientific guidance, allocation frameworks, demand, epidemiological developments and changing contextual factors. • Support FPT partners in accessing health technologies (e.g., therapeutics, rapid point of care tests, and diagnostic tools), including providing bulk procurement support, guidance on appropriate use and surge capacity via the National Antiviral Stockpile and National Emergency Strategic Stockpile. • Facilitate FPT collaboration to prepare for the strategic deployment and pre-positioning of medical countermeasures for a broader response to control/reduce transmission, as required according to defined FPT and First Nations, Inuit and Métis roles and responsibilities.

Operational Stage	Operational Sub-stage	Actions and decisions *Actions and decisions from previous stages and sub-stages should also be considered*
Response	Control/ Reduce Transmission	***Continuation of Above Activities, as appropriate*** **Healthcare Services** • Scale up healthcare system capacity as case numbers increase. • Provide adequate PPE stocks and ongoing training for healthcare workers, including cultural safety. • Increase resources for infection protection and control, occupational health and safety and mental health programs/services. • Provide evidence supported updates to clinical care, infection prevention and control protocols, guidance, etc. **Collaborative Surveillance and Data Integration** • Continue ongoing heightened surveillance to monitor pathogen activity and epidemiological analysis to characterize the pandemic. • Conduct and update risk assessments as new information emerges. • Use modelling to assess impact of the pathogen and the types of public health measures needed to control or limit transmission until a pandemic vaccine is produced. • Instigate regular model-based forecasting of the epidemic's trajectory in Canada. • Once pandemic vaccines are available and considering health systems capacity and local contexts, assess the vaccine coverage needed before public health measures can be lifted using modelling.

Operational Stage	Operational Sub-stage	Actions and decisions *Actions and decisions from previous stages and sub-stages should also be considered*
		• Implement surveillance initiatives (routine and enhanced) for pandemic vaccine coverage, effectiveness and safety monitoring and reporting. • Activate national surge capacity for laboratory diagnostic testing. **Community Protection** • Update guidance/protocols considering operational limitations and capacity for case and contact management activities with the overall goal of reducing transmission and interrupting chains of transmission. • Scale up communications activities, specifically targeting priority or key populations and the health sector (e.g., media conference updates, social media) [3] [37]. • Consider adopting social marketing campaigns, targeting various populations in Canada, particularly those at increased risk of exposure, severe disease or outcomes, to promote risk prevention and risk mitigation measures. • Engage partners and collaborators for the dissemination of messages. • Increase clear and evidence-based communication with the public and healthcare sector to manage mis- and disinformation and adjust as needed as evidence evolves or based on audience. • Support access to the resources needed to follow public health measures including individuals and their caregivers in isolation or quarantine (e.g., access to food, medication, home care, and overall wellbeing). • Consider using relevant legal authority to apply widespread public health measures at the FPT and/or community level (e.g., restricting gathering sizes, masking mandates) to reduce transmission and mitigate health system and socioeconomic impact, including to protect groups that are disproportionately impacted in a pandemic.

Operational Stage	Operational Sub-stage	**Actions and decisions** ***Actions and decisions from previous stages and sub-stages should also be considered***
		• Consider approaches to mitigate the unintended and disproportionate impacts of public health measures (e.g., mandatory quarantine, school closures) on various communities, due to existing health inequities [3]. • Assess the need for supportive emergency and social services (e.g., reception centres, volunteers, Friendship centres, non-governmental organizations). **Emergency and Science Coordination** • Activate emergency response plans and coordination mechanisms, as necessary. • Review and revise the scientific response and mobilization with respect to evidence synthesis, science advice, research prioritization, science coordination mechanisms (including linkages with research funding agencies; research networks and hubs; and intra- and extramural research) and knowledge mobilization as necessary, to reflect evolving science needs, and knowledge gaps. • Support access to and communication of scientific evidence and science advice/guidance to decision makers, public health practitioners, researchers, health workers, civil society and the public. • Provide leadership and support global scientific efforts to address knowledge gaps, including identifying and prioritizing research needs and domestic and international research collaborations. • Share timely information, research evidence, and research data nationally and internationally, underpinned by appropriate data protection and regulations, including for Indigenous data sovereignty. **Medical Countermeasures** • Once available, ensure the ongoing strategic deployment of pandemic vaccines and therapeutics to provinces and territories, federal populations and Canadians deployed abroad.

Operational Stage	Operational Sub-stage	Actions and decisions *Actions and decisions from previous stages and sub-stages should also be considered*
		• Facilitate procurement of medical countermeasures beyond stockpiled levels if required, informed by FPT demand planning. • Continue ongoing support for medical countermeasure storage/handling/distribution as needed. • Monitor medical countermeasure distribution, administration and adverse events. • Consider whether medical countermeasure programs should be scaled up in response to results of monitoring (e.g., vaccine program funding). • Continuously review pandemic vaccines and therapeutics efficacy and safety. • Support efforts to identify new and/or modified pandemic vaccines and therapeutics as needed (e.g., due to strain changes). • Monitor pandemic specific and routine medical countermeasure supply chains for potential disruptions and respond to supply chain disruptions and shortages and activate associated contingency plans as required [82]. • Communicate the availability of and provide equitable pan-Canadian access to the National Antiviral Stockpile and the National Emergency Strategic Stockpile for FPT populations not covered by arrangements for provincial and territorial provision.
Response	Mitigate impact	***Continuation of Above Activities*** **Healthcare Services** • Review the effectiveness of infection protection and control measures implemented and reassess organizational risk assessment. **Collaborative Surveillance and Data Integration**

Operational Stage	Operational Sub-stage	Actions and decisions *Actions and decisions from previous stages and sub-stages should also be considered*
		• Facilitate ongoing risk assessment. **Community Protection** • Continue to adapt and scale communications activities, as needed. • Continue to adapt disease control guidance including public health measures based on risk assessment as the situation evolves (e.g., setting closures, masking mandates, gathering limitations, travel restrictions). **Emergency and Science Coordination** • Further escalate surge capacity. • Prioritize or triage services, as needed, considering health equity and ethics. • Review previous actions and decide which ones to modify based on the evolving situation. • Review and revise the scientific response and mobilization with respect to evidence synthesis, science advice, research prioritization, science coordination mechanisms (including linkages with research funding agencies; research networks and hubs; and intra- and extramural research) and knowledge mobilization as necessary, to reflect evolving science needs, and knowledge gaps. **Medical Countermeasures** • Review and update vaccine and therapeutics recommendations based on scientific guidance, allocation framework, demand, epidemiological developments and changing contextual factors • Replenish stockpiles and/or just-in-time contracts. • Continue to facilitate and update procurement agreements of medical countermeasures as needed.

Operational Stage	Operational Sub-stage	Actions and decisions *Actions and decisions from previous stages and sub-stages should also be considered*
Recovery	Not applicable	**Healthcare Services** • Resume health programs that may have been suspended or postponed (e.g., childhood immunizations). • Provide response staff with the opportunity to rest and recuperate. **Collaborative Surveillance and Data Integration** • Continue ongoing surveillance and intelligence activities to quickly detect resurgence. • Deactivate surge capacity and establish sustainable capacity for new laboratory diagnostics. **Community Protection** • Modify public health guidance based on risk assessment. • Assess the health and psychosocial impact on the population (i.e., workforce resiliency, mental health, social cohesion) from previous wave(s), with consideration of strategies to mitigate unintended consequences with possible future wave(s) and possible repeated infection. • Continued communications with the public, health sector and interest holders. • Communicate resumption of normal services or programs with the public [83]. **Emergency and Science Coordination** • Use recovery efforts to review, evaluate and refine activities to support continuous improvement.

Operational Stage	Operational Sub-stage	Actions and decisions *Actions and decisions from previous stages and sub-stages should also be considered*
		• Scale down response according to risk assessment(s). • Restore normalcy while also maintaining vigilance for pathogen resurgence and assessing the health needs/impacts identified during the recovery phase. • Evaluate the response and revise plans, as required based on evolving scientific needs. **Medical Countermeasures** • Collaborate on supply and demand planning and replenish stockpiled medical countermeasures as needed, in anticipation of future wave(s) or another pandemic. • Continue to deliver pandemic vaccine-related initiatives (e.g., administration of pandemic immunization program) within jurisdictions, as required. • Modify pandemic vaccines and/or therapeutics procurement, as needed (e.g., shift to routine procurement, modify products being procured, scale down procurement entirely). • Evaluate the need to include new vaccines in routine and/or seasonal vaccination programs in alignment with well-established FPT roles and responsibilities for routine programming. • Evaluate overall medical countermeasure storage, handling, supply delivery capacity across Canada and identify areas for improvement.
Post-pandemic Preparedness		***Resume activities from Preparedness stage at the beginning of this table and conduct a post-pandemic lessons learned review*** **Healthcare Services**

Operational Stage	Operational Sub-stage	Actions and decisions *Actions and decisions from previous stages and sub-stages should also be considered*
		• Update policies, protocols, guidance and training for clinical care and infection protection and control. **Collaborative Surveillance and Data Integration** • Continue laboratory-based and immunization surveillance. • Incorporate monitoring of new pathogen into routine surveillance, including genetic changes in the pathogen. • Use modelling for future predictions. **Community Protection** • Update disease control guidance as needed to reflect endemicity. • Evaluate pandemic communication activities, ongoing evidence and lessons learned and gathering feedback from partners and collaborators. **Emergency and Science Coordination** • Continue to monitor evolving scientific evidence and complete pandemic studies and reports. • Conduct reviews of available scientific evidence, which will inform after-action reports, future research needs and help planning for future pandemics **Medical Countermeasures** • Build evidence-informed strategic stockpiles to facilitate a rapid response to the re-emergence of the pathogen or emergence or a new pathogen and other strategies for managing a scarce or limited supply.

5. Continuous Improvement: Pandemic Preparedness Cycle

IN DEVELOPMENT: The Pandemic Preparedness Cycle provides a framework for the ongoing maintenance and continuous improvement of this plan. Tools and resources to support the maintenance/continuous improvement of this plan are currently being developed and will be integrated upon completion.

Pandemic preparedness is a continuous cycle of planning, capabilities, training, exercises, evaluation, and corrective actions to make improvements. The Pandemic Preparedness Cycle (Figure 7) ensures plans (e.g., *Canada's Pandemic Preparedness Plan*, and jurisdiction-specific plans) remain actionable, and organizations are ready to respond swiftly and effectively when the next pandemic arises.

Pandemic Preparedness Cycle

Figure 7. The Pandemic Preparedness Cycle

The Pandemic Preparedness Cycle has six phases that continually feed into each other, with ongoing reviewing and updating throughout. The cycle depicts an "ideal scenario" for

pandemic preparedness planning, moving from one phase to the next in an organized way. However, pandemic preparedness does not always occur under ideal circumstances. The phases may occur non-sequentially (e.g., training could happen at any point in the cycle), or the cycle could be interrupted by real-world events, such as a pandemic.

Although evaluation is a distinct phase of the Pandemic Preparedness Cycle, where overall lessons learned, gaps, and best practices are identified to inform improvements in pandemic planning, other phases of the cycle also include an aspect of evaluation to analyze performance and effectiveness.

Planning:

Planning is the foundational phase guiding continuous improvement. The planning phase includes:

- Developing, maintaining and sharing pandemic preparedness plans, policies and frameworks (strategic and operational).
- Identifying and developing competencies (knowledge and skills) and capabilities (actions) required to respond to a pandemic.
- Identifying relevant players, interest holders, planning committees, FPT and First Nations, Inuit and Métis partners for pandemic response, including broad engagement across various sectors (e.g., One Health engagement).
- Outlining respective roles and responsibilities for pandemic response.
- Identifying necessary resources for pandemic response (e.g., equipment, stockpiles, infrastructure).
- Identifying and developing standard operating procedures and emergency coordination.

Capabilities:

Guided by planning, this phase identifies staff and resource requirements needed to effectively respond to a pandemic. The capabilities phase helps to:

- Ensure the right people with the necessary skills are in place.
- Ensure necessary resources (e.g., equipment, stockpiles, infrastructure) are in place to be properly prepared for a pandemic.
- Ensure required reporting structures are in place and utilized correctly.

- Ensure the appropriateness and condition of existing resources.
- Review organizational structures to ensure clarity of roles and responsibilities.

Training:

Based on capabilities, the training phase provides staff with essential knowledge and skills for pandemic response. The training phase includes:

- Designing, developing, delivering and evaluating competency-focused training programs.
- Reviewing training programs to ensure alignment with updated pandemic plans, protocols, and scientific advancements.

Exercises:

The exercise phase builds and strengthens capacity and capability to respond to a pandemic. A progressive, multi-year exercise program allows for a "building-block approach" to assess all aspects of a preparedness plan, starting with a basic exercise and progressively building up to a complex exercise. The exercises phase can:

- Test and evaluate plans and procedures and how they interact (e.g., modelling, simulations, tabletop exercises).
- Identify opportunities for improvement and gaps (e.g., planning gaps, resource gaps).
- Improve coordination and collaboration.
- Clarify roles and responsibilities and explore boundaries where they overlap and intersect.
- Support staff training, including development of hard and soft skills, knowledge and cross functional relationships.
- Support knowledge translation and socialization.

A **real-world event** is a public health event of any scale that provides an opportunity to test pandemic preparedness. This can be a large-scale event (such as the COVID-19 pandemic) which allows for the testing of a full pandemic response. It could also be a regularly occurring event (such as seasonal influenza) which provides annual opportunities to test specific components of a plan. Other emergencies also provide opportunities to practice and refine components of effective pandemic response. This includes coordination across partners and interest holders and communication. Real-world events can occur at any phase of the Pandemic Preparedness Cycle. Following a real-world event, pandemic planners should re-initiate the cycle beginning at the evaluation phase so that the response to the real-world event can be evaluated and recommendations for improvements can be incorporated into future pandemic planning.

Evaluation:

Evaluation is the review of a pandemic response (exercise or real-world event) to identify lessons learned, best practices and gaps while also identifying recommendations for specific, actionable improvements and corrective actions. It also involves defining monitoring metrics and evaluation criteria that are aligned with preparedness objectives, to enable systematic tracking of progress. Evaluation criteria for both real-world events and/or exercises can include:

- What aspects went well?
- What aspects could be improved?
- What patterns were observed that are shared with other recent events?
- What actions undertaken were new and warrant further review or attention?
- What capabilities were lacking? Which were strong?
- Are existing resources (e.g., workforce, equipment, funding) adequate to meet identified risks?

While there is a focus in capturing observations after an event, it is equally important to ensure that a continuous improvement lens is applied to an event response. This encourages a robust real-time review that supports course corrections.

Improvement:

Based on evaluation findings, the improvement phase re-examines the pandemic preparedness strategy to see where improvements can be made. Corrective actions should be implemented to address gaps and reduce risks, improving future preparedness. Armed with knowledge from this phase, the cycle begins again with revisions in the planning phase.

Review and Update:

To support continuous improvement, ongoing reviews and updates should take place throughout the Pandemic Preparedness Cycle. Reviewing focuses on tracking, collecting and analyzing real-time data on the implementation of preparedness plans and activities. Based on the findings, updates to pandemic preparedness plans and activities should be made on an as-needed basis. Although a continuous process, an annual stock take may be beneficial to determine what updates are required. This will support plans and activities in being nimble and reflective of current research and knowledge, emerging evidence, and the ever-changing landscape.

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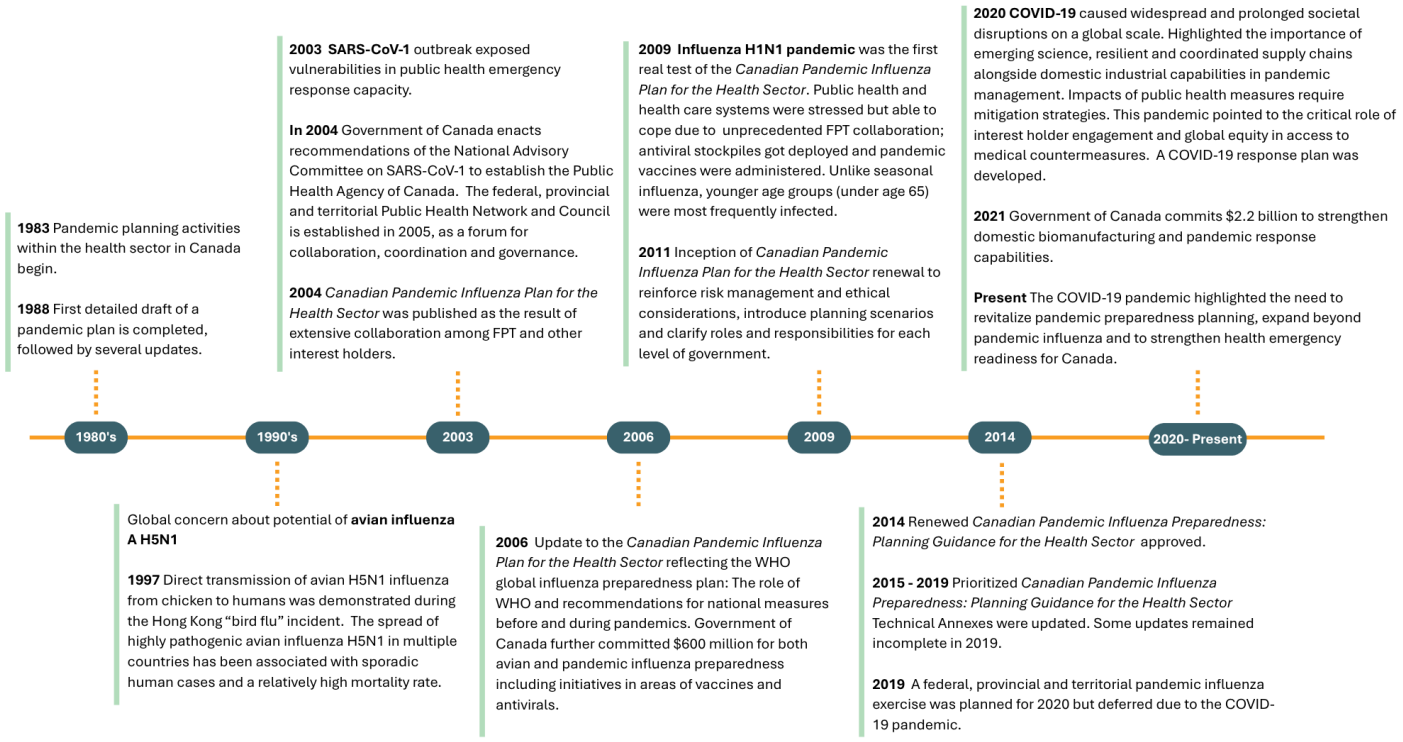
Appendix A- Pandemic Planning in Canada over Time

Dating back to 1988, Canada was among the first countries to draft a national pandemic plan [36]. In 2003, the emergence of Severe Acute Respiratory Syndrome (SARS) in Canada, caused by the SARS-CoV-1 virus, presented many challenges for public health. Lessons learned from SARS included the need for better response coordination by multiple levels of government and renewed recognition of the health threat posed by emerging or re-emerging infectious diseases [84].

The first version of the *Canadian Pandemic Influenza Plan for the Health Sector* was published in 2004, incorporating lessons learned from SARS. This marked the first FPT plan showing how jurisdictions across Canada would prepare for and respond to an influenza pandemic. In 2006, the Pan-Canadian Public Health Network Council approved an updated version as an evergreen document to be revised when needed. The plan has been updated over time, as shown in Figure 8, based on advances in science and lessons learned from important public health emergencies such as the 2009 H1N1 influenza pandemic.

Figure 8. Brief timeline of pandemic planning in Canada



Appendix B- Key Lessons Learned

Specific lessons learned and related planning considerations will be included within the Technical Components. The following present key high-level lessons learned and areas for improvement, organized by Technical Component thematic areas [2] [3] [36] [37] [85]:

Emergency and Science Coordination

- Collaborative partnerships across government agencies and departments, public-private partnerships, First Nations, Inuit and Métis partnerships, international networks of government agencies and non-governmental organizations, institutes and academia, health professionals, critical infrastructure and communities should be developed and maintained.
- Provincial and territorial pandemic plans with clear structure, governance and roles and responsibilities should be developed.
- The best available science, scientific advice and research to inform policies and actions in pandemic preparedness and response should be integrated, including implementing a mobilization strategy, allowing for technical and medical experts to develop and update guidance and advice.
- Health systems and advance planning for surge capacity, including human resources, supplies (stockpiles, contracts, development, manufacturing and licensing), hospital and ICU beds and capacity, ventilators and contingency funding, should be strengthened.
- People in Canada should be enabled to make informed decisions about their health based on trusted science-based public health communications, along with working with partners to promote science and health literacy, including debunking and prebunking, to boost resiliency to mis- and disinformation.

Medical Countermeasures

- Roles and responsibilities for medical countermeasure procurement should be clarified.
- Development, clinical trials, production and authorization of emergency medical countermeasure should be expedited.

- Domestic capabilities and manufacturing capacity should be supported. These can be used to support Canadian populations, as well as solidify Canada's role and contributions globally.
- Vaccine supply management issues to reduce wastage including implementing information technology systems that support vaccine planning and management should be addressed.
- Resilient response by addressing PPE supply management should be supported.

Healthcare Services

- Ongoing dialogue with healthcare workers and professional organizations at all levels should be engaged and maintained to support timely information sharing and to identify, understand and address frontline workforce concerns.

Community Protection

- Public health strategies need to be flexible and proportional to the impact of the pandemic. They should consider local factors and decision-making authorities as well as the potential social and psychosocial impacts such as impacts on mental health and education.
- A timely and transparent risk communication strategy (including infodemic management best practices and capacity to address mis- and disinformation during both the preparedness and response phases) should be maintained.
- A network of community partners at the local level (facilitating the provision of timely public health information during an emergency), including targeted information for populations facing barriers to health equity should be maintained.

Collaborative Surveillance and Data Integration

- A strong, integrated epidemiologic surveillance system, as well as access to public health technologies to support public health decision making should be implemented.
- A strong surveillance system (for broader health issues present in the population during public health events to better understand indirect effects of the pandemic) should be implemented.

- A strong vaccination data infrastructure, including capabilities for vaccine coverage and safety surveillance that can be mobilized to support pandemic vaccination campaigns, should be maintained and upgraded.
- Data technology infrastructure to support surveillance and data management (improving) data flow and informing a consistent national picture of public health infections in Canada should be modernized.
- An integrated laboratory response, including diagnostic and screening strategy, should be developed.

Appendix C- Understanding Canada's Diversity

Geographic and Population Distribution

Canada's population is unevenly distributed across urban, rural, remote, and northern areas, each of which presents distinct considerations for pandemic planning. The majority of people living in Canada reside in urban centers near the United States border [86], where daily activities such as border travel, trade, and shipping could be affected by public health interventions like national and interprovincial border closings, travel restrictions, and quarantine measures during pandemics [87].

Urban centers like Montreal, Toronto, and Vancouver face unique challenges due to high population densities, which increase the risk of rapid disease spread. Additionally, increased likelihood for large or mass gatherings, neighbourhoods or communities experiencing socioeconomic barriers, and increased populations of unhoused persons may necessitate specific measures such as:

- masking in public areas,
- enhanced public transportation sanitation, and
- more shelter space to allow for isolation and quarantine to reduce crowding.

The proportion of Canada's population in rural areas varies greatly (between 14% and 53%) from one province and territory to another. Rural and remote areas, including northern regions and areas that include Indigenous populations, face significant challenges due to geographic isolation as well as health, social, environmental, climate, economic, and historical factors. Accessibility and resources in these areas also varies widely [86]. Healthcare services are often spread out with fewer specialized resources, requiring residents to travel long distances for treatment, which complicates timely medical care, especially for critically ill patients. Limited access to information technologies reduces access to health-related information.

Some remote and isolated communities may lack basic amenities, such as household access to running water, which is assumed to be available when public health guidance on hand washing is promoted. Some households may also lack phone or internet access, which can be a challenge for communication in and out of these communities.

It is crucial to tailor control measures to specific needs of these communities. This can include deploying mobile health units to deliver essential medical services, decentralized diagnostic testing, adapting public health guidelines to local conditions such as recommending alternative hand hygiene practices, and engaging local leaders and community members to ensure strategies are culturally appropriate and widely accepted.

Specific places where people conduct their daily living activities also play an important role in pandemic preparedness. These settings vary widely from private residences, such as single-family homes; non-traditional or precarious living arrangements associated with being unhoused, such as encampments and transitional housing; and congregate living settings. Congregate living settings refer to a range of facilities where people (often unrelated) live or stay overnight and use shared spaces such as sleeping areas, bathrooms, and kitchens [88]. Examples include:

- correctional and/or detention facilities,
- community care homes,
- group homes,
- communal living settings (e.g., university dorms and military barracks),
- long-term care facilities,
- shelters, and
- residential settings for children or youth.

While some populations are mentioned below, the list is not exhaustive. Pandemic planners should consider the above settings, and intersecting factors, when developing their own plans.

Population Diversity in Pandemic Planning

Canada is home to a broad range of populations, each of which may have different needs during a pandemic. Certain populations may require specific attention due to pre-existing health disparities, structural inequities, or increased exposure risk. Many face compounding challenges that can intersect with other vulnerabilities during pandemics, significantly hindering their ability to access timely and effective support. For example, approximately 9.9% of people in Canada live in poverty [89] and one in ten individuals experience being unhoused during their lifetime [90]. Those living in poverty or without stable housing face increased risks in a pandemic due to limited access to health care, inadequate living

conditions that worsen disease spread, and barriers to receiving public health messaging and health information [89] [91]. However, risk is not fixed. While some groups may be more affected early in an outbreak, impact can shift over time depending on various factors including characteristics of the disease, the individual, and evolving public health measures. These factors and their interactions are expanded on in Section 4A.

An equitable and inclusive pandemic plan addresses diverse needs, experiences, inequities, health disparities and intersectionality of peoples' identities (e.g., age, gender, cultural/racial identity, etc.) within their jurisdictions.

To gather living and lived experiences, policymakers should seek to understand demographic and socioeconomic characteristics of the population through research and consultation. Only then can they can make informed decisions on resource allocation and develop guidelines that are ethically grounded and advance health equity and respect community-specific needs [92] [91].

The following section provides a brief overview of demographic representation and pandemic preparedness considerations for various populations in Canada that may be disproportionately impacted by pandemics. These populations are not mutually exclusive. While national level population data has been presented for context, it will be important for FPT planners to consider jurisdiction-specific geography and population demographic data when developing jurisdictional pandemic plans. Note that Ethics and Health Equity considerations are described in further detail in Section 3C.

First Nations, Inuit, and Métis Peoples

In Canada, "Indigenous Peoples" refers to First Nations, Inuit, and Métis – the original inhabitants and descendants of the land that is now Canada. Each group is distinct with unique histories, languages, cultural practices, and legal identities. First Nations, Inuit and Métis populations in Canada, totaled over 1.8 million people in 2021, accounting for approximately 5% of the country's population [93].

There is much diversity when we look at the geographic location of Indigenous Peoples in Canada. In 2021, the proportion of First Nations (27%), Inuit (76%) and Métis (11%) living in areas classified as "remote" or "very remote" was higher than that of non-Indigenous people (3%) [94]. In addition, there is a large and growing urban First Nations, Inuit and Métis population across Canada.

The health and wellbeing of First Nations, Inuit and Métis Peoples is shaped by historical and ongoing colonization, colonial cultures, systemic racism, governance, institutions and government policies (such as residential schools) [95] [96]. First Nations, Inuit and Métis continue to experience disproportionate inequities such as the lack of access to timely, culturally safe, and appropriate health services. Many First Nations, Inuit and Métis living in remote, northern, and isolated regions (particularly fly-in-only) face unique challenges due to limited access to services, infrastructure, and transportation. These communities often experience extreme weather conditions which can further impact food security, emergency response, and the delivery of health and social services [97].

These challenges are compounded during public health emergencies, where First Nations, Inuit and Métis are disproportionately impacted due to challenges in accessing healthcare services or receiving timely public health messaging [79]. Additionally, disproportionate levels of pre-existing health conditions among First Nations, Inuit and Métis people contribute to increased barriers during crises [98].

Urban dwelling First Nations, Inuit and Métis also face unique barriers to accessing services and being included in pandemic planning. For example, while health services may be available in some areas, they are not always equitably accessible to all Indigenous Peoples. Access can depend on factors such as eligibility for the Non-Insured Health Benefits program, which is limited to certain First Nations and Inuit individuals, leaving others without coverage for essential health services. Additionally, some may choose not to access available services due to systemic discrimination and deep-rooted mistrust in the healthcare system [95]. These inequities are not a reflection of Indigenous identity, but rather the result of historical and ongoing colonialism, as well as structural and social determinants of health.

Pandemic preparedness planning should consider:

- ***Key legal and political instruments***: In Canada, Aboriginal and treaty rights are recognized and affirmed under Section 35 of the *Constitution Act, 1982*. The Truth and Reconciliation Calls to Action from 2025 contains recommendations that aim to advance reconciliation efforts. On the international front, Indigenous rights are enshrined in legal frameworks such as the *United Nations Declaration on the Rights of Indigenous Peoples Act*. These instruments are crucial for advancing distinctions-based Indigenous engagement, consultation, and collaborating with Indigenous partners and communities on pandemic planning.

- ***Distinct health and governance systems***: Ensure planning efforts are aligned with the unique health systems, governance structures, and priorities of First Nations, Inuit, and Métis Peoples. This includes recognizing legal requirements such as Jordan's Principle and addressing the needs of individuals living in urban settings away from their home communities, or those who must travel for medical care [99] [100].
- ***Community-led infrastructure and capacity building:*** Empower and support community-driven planning initiatives to strengthen infrastructure and build local capacity [97]. Key areas may include access to safe and affordable housing, clean drinking water, food security and sovereignty, and reliable broadband internet access [101] [102]. An example of community-led planning is a tool developed by the First Nations Health Managers Association in 2021, to empower First Nations communities to develop their own pandemic plans by building on existing strengths [103].
- ***A co-development approach*:** Adopt a co-development approach by working in full partnership with First Nations, Inuit and Métis leadership to design resources together, ensuring their perspectives and priorities shape every stage of the process. Many First Nations, Inuit and Métis continue to demonstrate strength and leadership in responding to public health challenges through culturally grounded practices, local knowledge, and community-led solutions.
- ***Traditional and land-based practices***: Ensure public health messaging and service delivery respect and incorporate traditional and land-based practices.
- ***Culturally relevant public health messaging:*** Design messages that align with First Nations, Inuit and Métis languages, information practices, cultural worldviews, and preferred ways of receiving information including through First Nations, Inuit and Métis trusted voices such as Elders.
- ***Mental health support:*** Support mental wellness through holistic, community-led approaches that honour culture, identity, and traditional healing practices. Pandemics can lead to isolation, service disruptions, and community-wide stress, which increase emotional and psychological strain — especially where systemic barriers to care already exist. Limited access to culturally safe, land-based, and trauma-informed supports, including in remote and northern communities, can hinder healing and recovery.

Immigrants

Canada's population growth is heavily driven by immigration, with many newcomers settling in urban areas. In 2021, more than 8.3 million people, or almost one-quarter (23.0%) of the

population, were, or have been, a landed immigrant or permanent resident in Canada [104]. Migrants and refugees often face worse health outcomes due to challenges such as language and cultural differences, discrimination, precarious employment conditions and barriers to health care and services [105].

Pandemic preparedness planning should consider:

- ***Clear and accessible public health messaging:*** Develop clear and accessible public health messaging, considering Canada's diverse linguistic landscape.
- ***Coordination of services:*** Provide the coordination of services for those without health coverage, including those waiting for coverage under the Canada Health Act, undocumented migrants, temporary workers, asylum seekers, and refugees etc.

Children

Canada, as a signatory to the United Nations Convention on the Rights of the Child, has promised to protect and promote the rights of all children [106]. Children, from birth to age 17, represent approximately 18% of the people living in Canada [107]. They are often over-represented in equity deserving groups such as migrants, racialized families and First Nations, Inuit and Métis families, and may have living conditions that increase their vulnerability during a pandemic [108] [109]. Children rely on physical care and social interaction for all aspects of their development, and the relative harms of public health measures potentially affect them over the course of their lives. Unlike other groups, they have no political representation and may experience increased morbidity and mortality - particularly in a novel respiratory pathogen scenario. Pandemic preparedness for children must account for these diverse backgrounds. This includes those waiting for coverage under the Canada Health Act, temporary residents such as students, undocumented migrants, etc.

Pandemic preparedness planning should consider:

- **Access to health care and communication:** Develop culturally sensitive communication strategies to help assure equitable access to health care, education, and mental health support for all children.
- **Paediatric-specific needs and lifelong effects:** Address paediatric-specific healthcare needs, including vaccine supplies, and consider the lifelong social, educational, and developmental effects (e.g., physical, cognitive, emotional growth and mental health) of public health measures.

- **Support systems and caregivers:** Improve the support systems available to families and caregivers of children, especially in the context of public health measures.

Older Adults

The older adult population, aged 85 and older, continues to grow, with projections indicating the number of people aged 85 and older will triple by 2050, totalling more than 2.7 million people [110]. Over one-quarter of older adults reside in congregate living settings, such as long-term care facilities or seniors' residences [110]. Stigma and ageism are also notable considerations when tailoring plans to meet the needs of older people.

During pandemics, older adults face numerous challenges including greater health vulnerabilities due to chronic conditions, mobility, access limitations, and potentially increased social isolation. They may experience social disconnection, including reduced connections with family and friends, and increased risk of unaccompanied death (e.g., in hospital, long term care, or at home). Older adults also encounter economic constraints and barriers to digital technology, making it difficult to afford necessary services and access online resources. This can also make health messaging less accessible.

Pandemic preparedness planning should consider:

- ***Provision of accessible health care and support:*** Develop strategies to help ensure accessible health care, mental health support, and other targeted services to enhance the wellbeing of this population during pandemics [92] [91].
- ***Prioritization of congregate living settings for seniors:*** Implement public health and infection control measures while also considering quality of life, along with ensuring adequate staffing levels, and provide necessary resources such as PPE and testing supplies [111] in long-term care homes and senior residences. Develop contingency plans for outbreaks, facilitate communication between residents and their families, and ensure the mental health and wellbeing of both residents and staff.
- ***Support for independently living older adults:*** Assess the needs of older adults living independently and their caregivers who may need additional support. This can involve establishing community support networks to help ensure access to daily necessities and to healthcare services during a pandemic.

Women

Women account for 50.9% of Canada's total population aged 15 and older [112]. Women are disproportionately impacted by pandemics due to a combination of economic, social, and health-related factors rooted in gender roles and inequalities. Women are more likely to work in low-wage, part-time or informal jobs (often in industries like retail, hospitality and education) which are among the hardest hit during public health crises. They also represent a substantial portion of the healthcare workforce and caregiving roles, increasing their risk of pathogen exposure. Additionally, there may be increased risk of illness for pregnant people [18] [113].

Pandemic preparedness planning should consider:

- ***Addressing challenges for women***: Develop strategies to mitigate challenges that women may face during pandemics. As primary caregivers, women often shoulder increased responsibilities during pandemics, such as caring for sick family members, homeschooling children (due to school and daycare closures), and managing household needs.
- ***Mitigation of risk and provision of health support:*** Develop strategies to mitigate exposure risks for those in health care and caregiving roles, as well as mental health resources to support women facing increased stress and anxiety due to their caregiving responsibilities and economic challenges.
- ***Support for pregnant people:*** Develop strategies to help ensure ongoing access to prenatal and postnatal care, as well as access to clear and accurate information about risks and precautions for pregnant people.

Persons with Disabilities

About 27% of people living in Canada aged 15 and older have at least one disability that limits their daily activities. Disabilities can be physical, sensory, intellectual or mental, each requiring specific considerations in pandemic plans [91]. Stigma is a notable consideration when tailoring plans to meet the needs of people living with chronic conditions.

Pandemic preparedness planning should consider:

- ***Specialized healthcare services***: Develop strategies to support the continuity of specialized healthcare services for individuals with disabilities, as these can be disrupted during a pandemic. This includes access to regular medical treatments, therapies and assistive devices essential for their wellbeing. To help ensure the continuity of these services, consider leveraging alternative care models rather than a

one-size fits-all approach [114] [115], and training healthcare providers to address the specific requirements of impacted individuals.

- ***Provision of alternative access*:** Provide alternative access to medical care, public health information and essential supplies for this population during pandemics. This can include telehealth services for remote consultations, making public health information available in accessible formats (e.g., large print and sign language), and ensure essential supplies and assistive devices are delivered to their homes.

Racialized People

Canada is home to a diverse range of racialized communities, representing over 23% of the population, each with different sociodemographic characteristics, linguistic profiles and ethnic origins. During the COVID-19 pandemic, numerous instances of stigma, discrimination and violence were reported among these populations. Existing structural racism has resulted in racialized persons being over-represented in frontline jobs, increasing vulnerability to infection due to their higher exposure risk and often precarious working conditions.

Pandemic preparedness planning should consider:

- ***Provision of inclusive and collaborative public health strategies***: Tailor public health strategies to unique demographic and socio-economic contexts of distinct communities to effectively address disproportionate impacts among diverse population groups. Collaborating with community organizations and individuals with living and lived experience through a co-development approach ensures public health messages and strategies are accessible and relevant.
- ***Ensuring access to health care***: Provide equitable access to healthcare services for racialized communities, including anti-racist, transparent, and culturally safe interventions, testing, treatment, vaccination, and risk communication.
- ***Development, collection, analyses and reporting on race-based data*:** Collaborate with community partners and leaders to plan race-based data collection strategies. Analyze and publish this data, and integrate race-based data in modelling and monitoring activities to decrease inequities before, during and after pandemics [116].

Black People

As of 2021, Black populations in Canada make up 4.3% of the population or 1,547,870 people, which is a growth of 2.7 times since 1996 [117]. Black populations have a long history in Canada and are predominantly made up of people descending from historic Black

communities in Canada, Canadian-born individuals who are the descendants of contemporary Black immigrants, African-born individuals, and Caribbean-born individuals [117].

Each of these populations have different sociodemographic characteristics, linguistic profiles, ethnic origins, and places of residence. As such, it is important to understand differences and the effect that they have on pandemic preparedness, planning and response [117]. Black populations in Canada are disproportionately impacted by health emergencies due to systemic health and social inequities tied to anti-Black racism at interpersonal, institutional and structural levels [118] [116] [119] [120] [121]. Black populations in Canada face inequities with regard to access to health and social services, food security, housing, safe and secure employment [122]. Black populations also disproportionately experience discrimination, policing and criminalization [121]. This can foster distrust in healthcare, social, and public health systems, increasing pandemic-related vulnerabilities [121].

During the COVID-19 pandemic, Black populations in Canada faced disproportionate morbidity and mortality [50] [123] [123]. This was driven by pre-existing inequities and structural determinants of health, which resulted in over-representation among essential frontline workers, lower COVID-19 screening, vaccine hesitancy and inequitable access to health services [124].

Pandemic preparedness planning should consider:

- **Co-development of tailored initiatives to enhance access to culturally appropriate healthcare services:** Collaborate with diverse Black organizations and community leaders to assess community readiness. Co-develop culturally appropriate, and accessible resources, initiatives and communication campaigns, and ensure preventive services, and health services are accessible to, and accepted by, Black communities [116] [125] [126].
- **Co-design strategies to reduce exposure risk in Black communities:** Co-develop strategies to acknowledge and mitigate unique challenges and exposure risks Black communities may face during pandemics. This is due to systemic anti-Black racism and other intersecting forms of discrimination (e.g., based on gender, sexual orientation, immigration status) at interpersonal, institutional and structural levels [118] [119] [120] [124] [127]. Co-develop tailored strategies to address challenges by focusing on upstream determinants of health to address root causes.

- **Development, collection, analyses and reporting on race-based data:** Collaborate with diverse Black organizations, community partners and leaders to plan race-based data collection strategies. Analyze and publish this data, and integrate race-based data in modelling and monitoring activities to decrease inequities before, during and after pandemics [116].

2SLGBTQI+ Community

The acronym 2SLGBTQI+ refers to Two-Spirit, lesbian, gay, bisexual, transgender, queer and intersex people, and those who use other terms related to gender and sexual diversity. About 1.3 million or 4.4% of people living in Canada aged 15 years and older reported being part of the 2SLGBTQI+ population in 2024 [128]. This community faces unique challenges including greater health disparities, limited access to gender-affirming health care, mental health impacts from increased isolation, and economic vulnerabilities due to job instability and housing insecurity [129] [130].

Pandemic preparedness planning should consider:

- ***Provision of inclusive communication and culturally safe health services:*** Incorporate language and imagery in public health messaging that represents the diversity of the 2SLGBTQI+ community. Train healthcare providers to deliver culturally competent care. Testing and vaccination sites should be accessible to everyone.
- ***Collaboration with community organizations and those with living and lived experiences:*** Engaging with 2SLGBTQI+ organizations and using a co-development approach with people with living and lived experience can help ensure effective and relevant strategies are developed, and reflect the unique needs and challenges of the community [91].

Essential Workers

Essential workers are key populations that must be prioritized in pandemic planning due to their critical roles in maintaining societal function. In Canada, essential workers are those who provide services vital to the health, safety, and functioning of society. They span sectors such as:

- health care,
- public services,
- food supply,

- transportation,
- education,
- critical infrastructure, and
- emergency services [131].

These roles can include but are not limited to personal support workers, first responders, laboratory professionals, postal and sanitation staff, grocery clerks, truck drivers, and childcare providers.

These roles often come with lower wages, fewer benefits and less job security and are often filled by racialized individuals or temporary foreign workers. They typically involve frequent interaction with others and limited opportunities to work remotely - increasing exposure risk during a pandemic [18] [132] [133].

The COVID-19 pandemic highlighted significant challenges faced by essential workers - many of whom had limited access to PPE, little or no paid sick leave, and few options to safely isolate from potentially infectious individuals. Unlike healthcare workers, other essential workers may not be integrated into formal health systems or emergency preparedness frameworks, leaving them vulnerable and with limited information despite their critical frontline roles. For example, hospital sanitation workers were tasked with cleaning rooms of COVID-19 patients, often without the same training and protections afforded to clinical staff [134]. Pandemic planning must address these inequities recognizing that safeguarding essential workers is fundamental to public health resilience.

Pandemic preparedness planning should consider:

- ***Examination of secondary effects***: Consider broader social and economic impacts of public health measures and pandemic response on essential workers - including mental health strain, family caregiving responsibilities, and long-term job insecurity [26].
- ***Provision of equitable access to PPE and workplace protections:*** Provide all essential workers (not just healthcare professionals) with adequate and appropriate PPE, training, and protocols, to reduce exposure risk. This should also consider language requirements of required materials. Safe working conditions and safety standards must apply to all workers.

- ***Paid sick leave and income supports:*** Implement policies allowing essential workers to take time off without financial penalty, reducing the risk of workplace transmission due to income insecurity. This may consist of benefits for specific groups and priority populations, and policies at a variety of governmental levels.

Appendix D- Legal Context

In pandemic preparedness and response planning, the following legal and governance elements, including legislation, international frameworks, guidance documents, and relevant international organizations should be considered in accordance with respective jurisdictional roles. Please see Tables 6 and 7 for details.

The WHO Pandemic Agreement is not currently included below as it is currently under development.

WHO Pandemic Agreement: *In December 2021, WHO Member States, including Canada, agreed to launch an intergovernmental negotiating body to develop a pandemic agreement to strengthen international cooperation on pandemic prevention, preparedness and response. Member States adopted the Pandemic Agreement on May 20, 2025, at the 78th World Health Assembly. Negotiations will continue on a Pathogen Access and Benefit Sharing Annex, which will be integral to the Pandemic Agreement. Once the Annex has been adopted by the World Health Assembly, the Pandemic Agreement will open for signature and ratification. When sixty Member States have signed and ratified the Agreement, it will enter into force and become legally binding for those who have ratified it. Canada will carefully assess the obligations in the Pandemic Agreement, including implications for provinces, territories and Indigenous partners, to determine whether it will sign and ratify the Agreement.*

1. International Context

Table 6. International Context

Name	Description	Roles
International Health Regulations (2005)	The purpose of the International Health Regulations are to prevent, protect against, control and provide a public health response to the international spread of disease while avoiding unnecessary interference with international traffic and trade. They are also designed to reduce the risk of diseases spreading at	WHO role: • Conducting international public health surveillance and assessment of significant public health events; • Determining if any event constitutes a public health emergency of international concern using the Decision Instrument

Name	Description	Roles
	international airports, ports, and ground crossings.	(Annex 2) in the International Health Regulations; • Developing and recommending critical health measures if a public health emergency of international concern is declared; • Providing technical assistance in response to public health risks, events and emergencies; • Supporting States Parties in assessing their own national public health resources and helping develop and strengthen the core public health capacities; and • Monitoring the implementation of International Health Regulations. As a State Party, Canada is legally bound by the International Health Regulations. The implementation of the International Health Regulations are a joint FPT responsibility. Canada implements the International Health Regulations under existing legislation, regulations, policies and agreements in place at the FPT levels. **Federal role:** The Public Health Agency of Canada is the designated National International Health Regulations Focal Point

Name	Description	Roles
		for Canada. The Agency is the lead organization for implementing the International Health Regulations on behalf of the government of Canada. As the lead, the Agency: • Assesses all reported urgent events; • Notifies WHO when an assessment indicates that an event may be a public health emergency of international concern; • Enables national coordination through mechanisms, agreements and plans in place with provincial and territorial governments; • Establishes and implement rapid control measures to prevent spread at designated points of entry; • Provides support and assistance to implicated jurisdictions; • Maintains up to date and relevant public health emergency response plans, rapid response teams, and national emergency stockpiles; • Provides direct liaison functions with other federal government ministries; and • Ensures a 24/7 response capacity. While the Public Health Agency of Canada is the federal lead, due to the broad nature of the

Name	Description	Roles
		International Health Regulations, other federal departments have a key role to play, especially those that act as competent authorities (responsible for the implementation and application of health measures under the International Health Regulations). Competent authorities under the International Health Regulations include: • The Public Health Agency of Canada's Center for Border and Travel Health; • Canadian Food Inspection Agency; • Canada Border Services Agency; • Transport Canada; • Department of National Defense; and • Immigration Refugees and Citizenship Canada. **Provincial or Territorial role:** Provinces and territories support International Health Regulations implementation by: • Detecting and confirming unexpected events involving disease or death above expected levels; • Reporting urgent event and all available information to the next level; • Establishing and implementing control measures within the jurisdiction, to support

Name	Description	Roles
		measure at the local level; and • Contributing to International Health Regulations communications/reporting to WHO. Note: Annex 1 of the International Health Regulations, *Core Capacity Requirements for Surveillance and Response*, provides more details on the FPT responsibilities.
Pandemic Influenza Preparedness Framework (2011)	This WHO framework is a global approach aimed at improving the sharing of influenza viruses with human pandemic potential and to achieve more predictable, efficient and equitable access for countries in need of life-saving vaccines and other pandemic related supplies during future pandemics.	Under the Pandemic Influenza Preparedness Framework, Canada, as a Member State, is responsible for: • Ensuring the timely sharing of influenza viruses with human pandemic potential with the Global Influenza Surveillance and Response System; • Contributing to the pandemic influenza benefit-sharing system; and • Continuing to support the Global Influenza Surveillance and Response System. Implementation of this framework is a joint FPT responsibility. **Federal role:** The Office of International Affairs for the

Name	Description	Roles
		Health Portfolio is Canada's focal point for the WHO and the Pandemic Influenza Preparedness Framework as a WHO instrument. The Public Health Agency of Canada leads on implementation of this framework in their capacity as a National Influenza Centre and member of Global Influenza Surveillance and Response System. **Provincial or Territorial role:** Support the Pandemic Influenza Preparedness Framework implementation by providing influenza viruses to the Public Health Agency of Canada.
The World Organisation for Animal Health	As the global authority on animal health, the World Organisation for Animal Health is an intergovernmental organization that focuses on transparently sharing information on animal diseases, improving animal health globally, and building a safer, healthier and more sustainable world.	The duties of the World Organisation for Animal Health delegate for Canada include: • Representing Canada at the World Assembly of Delegates and voting on international standards, recommendations and resolutions; • Notifying the World Organisation for Animal Health of animal diseases present in Canada; and • Designating national focal points for animal health information, wildlife diseases and other animal health related topics. Implementation of Canada's World Organisation for Animal

Name	Description	Roles
		Health duties are a joint FPT responsibility. **Federal role**: Canadian Food Inspection Agency is Canada's liaison with the World Organisation for Animal Health. Canadian Food Inspection Agency appoints the World Organisation for Animal Health Delegate for Canada. **Provincial or Territorial role:** Support the implementation of Canada's World Organisation for Animal Health duties.

2. Federal Context

The federal government is responsible for emergency management at the national level in its areas of jurisdiction and on land and properties under federal responsibility.

Health Canada is responsible for helping Canadians maintain and improve their health through activities such as regulation, innovation, and public health information. Whereas, the Public Health Agency of Canada works to promote health, prevent and control disease, and respond to public health emergencies (e.g., pandemics, acts of terrorism) that may have negative impacts upon the health or social wellbeing of people living in Canada. Together, they form part of the federal Health Portfolio, which also includes the Canadian Institutes of Health Research, the Patented Medicine Prices Review Board, and the Canadian Food Inspection Agency. Various pieces of federal legislation mandate the federal Health Portfolio organizations to be the lead federal department in some emergency situations or to support other departments as necessary, particularly those with a duty of care for specific populations under federal responsibility. The Health Portfolio's mandates are derived from various federal legislation, including the *Department of Health Act* and the *Public Health Agency of Canada Act*.

Table 7. Federal Legislation

Name	Description	FPT Roles and Responsibilities
Emergency Management Act (2007)	Section 6(1) of the Emergency Management Act mandates each Minister who is accountable to Parliament for a government institution to identify the risks that are within or related to their area of responsibility and prepare emergency management and response plans with respect to those risks; to maintain, test and implement those plans; and to conduct exercises and training in relation to them. Canada is responsible for developing, testing and maintaining mandate-specific emergency plans for the federal Health Portfolio. These emergency plans (e.g., the Health Portfolio Emergency Response Plan) outline the federal response to national public health threats or events such as major disease outbreaks or pandemics, and to the health effects of natural disasters or major chemical, biological, radiological, nuclear and explosive events.	Implementation of the Emergency Management Act is a federal responsibility. **Federal role:** The Minister of Public Safety has the lead responsibility under the Emergency Management Act. The Emergency Management Act also outlines responsibilities of other Ministers involved in emergency management (e.g., Minister of Health). **Provincial or Territorial role:** No obligations under the Emergency Management Act. Provincial and territorial governments are responsible for emergency management within their respective jurisdictions. Each province and territory has a central emergency management statute. These function like the Emergency Management Act by delegating roles and responsibilities and setting out the processes for declaring an emergency and using emergency powers.
Health of Animals Act (1990)	The Health of Animals Act focuses on diseases and toxic substances that may affect animals or that may be transmitted by animals to persons, and respecting the protection of animals. The Act includes the control of diseases and toxic substances, infected places and control zones, disposal and treatment, samples,	Enforcement of the Act is a federal responsibility. **Federal role:** The Canadian Food Inspection Agency is responsible for the administration and enforcement of the Health of Animals Act and associated regulations. **Provincial or Territorial role:** Provinces and territories do not

Name	Description	FPT Roles and Responsibilities
	limitation on liability, compensation, regulations and more.	enforce the Act but are critical partners in its implementation.
Quarantine Act (2005)	The Quarantine Act protects the health of the public by taking comprehensive measures to prevent the introduction and spread of communicable diseases in Canada. The Act authorizes the Federal Minister of Health to establish quarantine stations and quarantine facilities anywhere in Canada, and to designate various officers including quarantine officers, environmental health officers and screening officers. The Act authorizes measures that can be taken with international travellers, or other persons at an entry or departure point, who have or might have a communicable disease (one that poses a risk of significant harm to public health). It also authorizes measures that can be taken regarding conveyances arriving in or departing from Canada, and cargo on those conveyances, which could be the source of a communicable disease.	Enforcement of the Quarantine Act is a federal responsibility. **Federal role:** The Public Health Agency of Canada is the lead authority for enforcement of the Quarantine Act, while the Canada Border Services Agency administers traveller screening for communicable diseases at the Canadian border. **Provincial or Territorial role:** While the Quarantine Act is federally led and enforced, provinces and territories play a role in its implementation. As critical partners, provinces and territories carry out key operational responsibilities under the Act, such as, providing medical examinations, facilitating compliance with federal orders, and supporting enforcement through local policing.
Food and Drugs Act (1985)	The Food and Drugs Act regulates the production, import, export, transport, and sale of food, drugs, contraceptive devices, cosmetics, and medical devices in Canada. It provides the legal authority to approve, regulate, and ensure access to essential medical countermeasures during public health emergencies.	Implementation of the Act is a federal responsibility. **Federal role:** Health Canada and the Canadian Food Inspection Agency are responsible for administering and enforcing the Food and Drugs Act, including the authorization of drugs and biologics.

Name	Description	FPT Roles and Responsibilities
		Provincial or Territorial role: No obligations under the Food and Drugs Act.

3. Provincial/Territorial Context

In Canada, provinces and territories are primarily responsible for the delivery of health care. Each province and territory has its own health and emergency management legislation requiring them to have comprehensive emergency plans regarding the preparation for, response to, and recovery from emergencies and disasters. Important health emergency management powers are also found in provincial and territorial public health legislation. An effective response requires the authority to establish appropriate leadership for a coordinated response, along with the authority to establish and implement appropriate control measures at the provincial and territorial and local level. It is recommended that pandemic planners ensure that they will have the authority to mount an effective response whether or not an emergency is officially declared. As a part of this, planners may also need to consider and plan for enforcement mechanisms for public health orders. It will also be important to anticipate potential challenges, such as non-compliance or legal challenges from affected groups that could impact the overall effectiveness of response measures.

Appendix E- Modes of Transmission

Transmission of pathogens through the air (respiratory transmission) occurs when an infected individual generates and expels infectious respiratory particles containing pathogens, for example, when they breathe, talk, sing, spit, cough or sneeze [135]. Transmission through the air can occur by:

- Inhalation or airborne transmission: When infectious respiratory particles are expelled from an infectious person into the air and are inhaled by another person. The distance which infectious particles travel through the air and infect susceptible individuals depends on various factors such as the particle size, how it was expelled, and environmental factors such as airflow, humidity, temperature, and ventilation.
- Direct deposition: Infectious respiratory particles expelled from an infectious person into the air can directly deposit onto the mucosa of the exposed mouth, nose or eye of another person.

Additionally, respiratory pathogens can spread via contact transmission, which includes:

- Direct contact: Physical contact between an infected person and another individual, which can result in infectious particles being directly transferred to mouth, nose or eye of another person. Examples include kissing or shaking hands and then touching one's mouth, nose or eye.
- Indirect contact / Contaminated objects: Transmission of a pathogen through a contaminated surface or object. Surfaces and objects can become contaminated by coming into contact with infectious particles from an infected individual. Another individual touches the contaminated surface and then touches their mouth, nose or eye.

A respiratory pathogen may also have several other modes of transmission (food and water, gastrointestinal, blood-borne, vertical transmission with maternal-fetal and maternal-newborn).