BEING READY

Ensuring Public Health Preparedness for Infectious Outbreaks and Pandemics

Ontario

2022 ANNUAL REPORT

Of the Chief Medical Officer of Health of Ontario to the Legislative Assembly of Ontario

Land Acknowledgement

We wish to acknowledge the land on which we are working. For thousands of years it has been the traditional land of the Huron-Wendat, the Seneca, and the Mississaugas of the Credit. Today this place is still home to many Indigenous people from across Turtle Island, and we are grateful to have the opportunity to work on this land.

Dear Speaker,

I am pleased to provide you with my 2022 Annual Report, *Being Ready: Ensuring Public Health Preparedness for Infectious Outbreaks and Pandemics,* in accordance with the provision of section 81.(4) of the *Health Protection and Promotion Act*.

Three years of COVID-19 have reinforced the devastating impact of pandemics on individuals, communities, and societies. We have lost too many loved ones. Ontarians are still experiencing the acute and ongoing, long-term effects of the virus itself, as well as the unintended consequences of some measures used to control the virus. The province also faces new infectious disease risks such as MPOX, re-emerging pathogens like poliomyelitis and tuberculosis, and the return of annual seasonal epidemics such as influenza and respiratory syncytial virus (RSV). Now, more than ever, we must be able to rapidly identify and respond to infectious disease outbreaks and pandemics so we can limit their impact, save lives, and safeguard Ontarians' health and well-being.

Being Ready is a call to learn from the past and ensure Ontario is ready for the next outbreak or pandemic, whenever it may occur. It calls for an end to the "boom and bust" cycle of funding that left Ontario less prepared than it should have been for COVID-19. It also calls for sustained investment in pandemic preparedness over time, so Ontario maintains a steady state of readiness. As Ontario's Long-Term Care COVID-19 Commission noted: "Pandemic planning is most effective when it is completed and tested before an emergency hits."

This report stresses the need for ongoing investment in public health sector and health system readiness: the relationships, workforce, scientific expertise, technologies, systems, supplies, and other resources required to detect and manage outbreaks. It also makes the case for investing in community and societal readiness: healthier, more equitable communities that will be more resilient during outbreaks; and an informed society that understands how and why decisions are made and has the information and supports it needs to protect itself.

As with previous Chief Medical Officer of Health (CMOH) reports, *Being Ready* advocates for the routine collection of sociodemographic data and community-based efforts to reduce health inequities which, as COVID-19 has proven, can help ensure more equitable outbreak and pandemic responses.

Thank you to all Ontarians who made sacrifices and endured through these very challenging times. And my condolences to all those who lost loved ones. We must learn from this experience to ensure Ontario continues to be ready, I will be assessing and reporting on the state of Ontario's pandemic preparedness in future CMOH reports.

Yours truly,

Dr. Kieran Moore

Table of Contents

Executive Summary

Three years after the first case of COVID-19 was diagnosed, the world is still struggling to adapt to and recover from this disease. While still in the midst of this pandemic, we have to ask the hard questions. If another infectious pathogen emerges in the near future, will Ontario be ready? What about in five, 10 or 20 years from now?

History tells us that, once an event like SARS, H1N1, or COVID-19 passes, complacency often sets in, funding is redirected, and readiness wanes.

Yet the risk of serious disease outbreaks and another pandemic is real and growing. Population growth, land use practices, climate change, the growing international wildlife trade, and global travel are making it more likely for zoonotic diseases, like COVID-19, to spread from wildlife to people. At the same time, we are seeing the re-emergence, globally and locally, of previously controlled pathogens, such as polio, tuberculosis, and measles, as well as an increase in antimicrobial resistant organisms, and the potential for an accidental or deliberate release of engineered or natural pathogens.

What does it mean to be ready for infectious disease outbreaks?

The duration and severity of COVID-19 drove home the challenges of containing a fast-spreading virus and making ethical decisions in a world competing for scarce resources. It highlighted the critical importance of the public health sector:

- maintaining the people, expertise, technology, systems, supplies, and other tools to track and contain infectious diseases
- knowing their communities and settings – who is most of risk of infection and severe illness – and adapting services to meet their needs
- having the support of an informed and engaged public who knows why and how to protect themselves and others.

The experience with COVID-19 demonstrated that the only way to slow or stop outbreaks and pandemics is through collective action.

Preparedness is a process that requires sustained investment in a wide range of relationships, skills, technologies, infrastructure, and capacities.

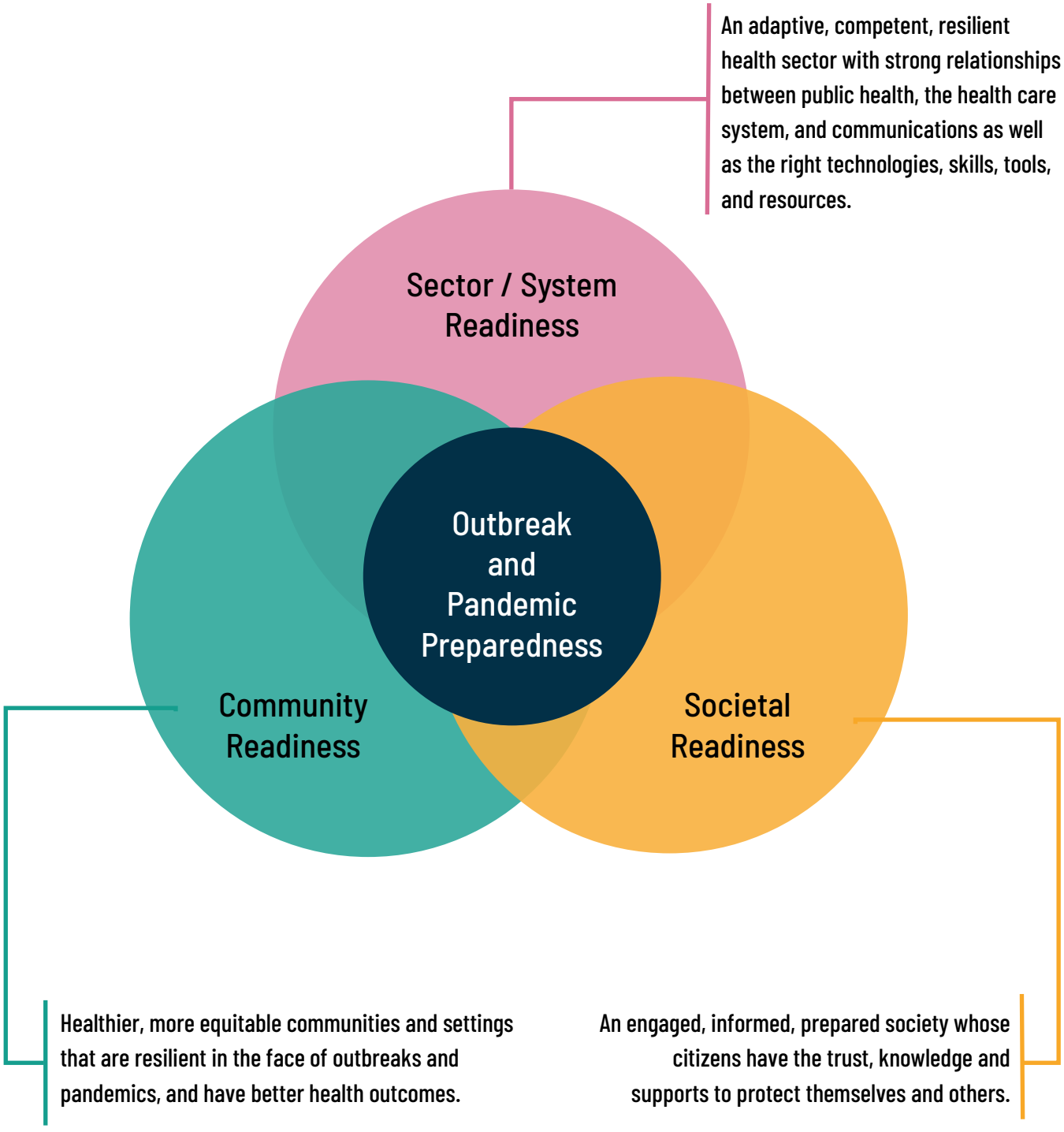
While Ontario's public health sector is responsible for leading pandemic preparedness and response in the province, preparedness is a team effort. During an infectious disease outbreak, public health must work closely with the broader health care system and other organizations responsible for health, including Indigenous health authorities and leaders, as well as communities, schools, workplaces, families, individuals, and all levels of government to:

- increase resilience
- achieve shared objectives, such as equitably minimizing morbidity, mortality, and social disruption.

> "Pandemic planning is most effective when it is completed and tested before a public health emergency hits.
>
> Final Report, Ontario's Long-Term Care COVID-19 Commission, 2021

To be ready for the next outbreak, Ontario's public health sector must take a collective, forward-thinking approach to pandemic planning. It must make sustained investments in strengthening sector and system[1], community, and societal readiness.

Figure 1: A big picture of readiness



[1] In this report, the term "sector" refers to the public health sector and the term "system" refers to the broader health system.

Where should we focus our attention and investment in the next 1-2 years?

Sector and System Readiness

Relationships

Strengthen **collaborative networks** across the health care system, including with Indigenous health service providers, and develop the governance structures to support those networks.

People

Build a skilled, adaptable resilient **public health workforce**, cross-trained in public health core competencies (e.g. vaccination, infection control, epidemiology, and outbreak management), with the surge capacity to respond to outbreaks, pandemics, and other emergencies while maintaining essential public health services.

Testing capacity and expertise

Strengthen Ontario's lab network capacity - people**, infrastructure, and technologies** - including Public Health Ontario (PHO) Laboratory's capacity, so that the network can deliver high volume testing during a pandemic while continuing to provide routine health testing, and contribute to global efforts to detect and monitor emerging infectious diseases.

Surveillance and scientific expertise

Strengthen the public health surveillance and scientific infrastructure so the sector can: provide **comprehensive real-time information** (e.g. laboratory results, cases, severity, immunizations, and sociodemographic data) to inform the public health response; adopt One Health Surveillance approaches; and coordinate the work done by scientific experts to create knowledge and inform decision-making.

Critical response resources

Maintain timely access to the critical resources required in most outbreaks:

- **Infection prevention and control** (IPAC) interventions and expertise in both health care and non-health care settings - including primary care, schools, workplaces, and congregate living settings (e.g. long-term care homes, retirement homes, shelters).
- **Personal protective equipment** (PPE) - including the capacity to produce PPE, resilient supply chains, and a reliable rolling provincial stockpile
- **Vaccines and therapeutics** – partnerships with the health care system, including pharmacists, to deliver vaccines and therapeutics, as they become available.

Community Readiness

Community partnerships

Build enduring collaborative partnerships with **communities that face health inequities and systematic racism and discrimination** as well as settings that may be at increased risk, such as congregate living settings. Work with them to: adapt public health and other health services to meet their needs; co-design and advocate for upstream interventions to reduce health inequities and risks; and co-develop and test outbreak plans.

Data to address inequities

Develop the provincial capacity to routinely collect **social, economic, health outcome, and sociodemographic data**, including information on race, ethnicity, and language, that can be used to identify communities at risk and work with them to reduce health inequities.

Societal Readiness

Social trust and ethical preparedness

Build social trust and **engage society in conversations** about the ethics and values that guide public health decisions.

Clear and transparent communications

Use evidence-based methods to increase **health literacy** and improve communications, provide credible, trusted and transparent information, and **counter misinformation**.

There are many competing demands for health and public health resources across the health system. The province must take a balanced approach to managing the health care needs of today and preparing for the disease threats of tomorrow. It is more efficient and more effective to invest in preparedness than to pay the much higher and heavier costs of being unprepared: more illness and death, mental health problems, social disruption, and economic losses.

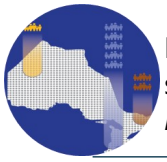
To enhance the province's preparedness and its capacity to respond to future outbreaks and pandemics, Ontario must sustain its investments in public health over time.

Investments in preparedness can cut the health and economic costs of pandemics.

When jurisdictions are prepared and respond quickly to outbreaks, they can reduce illnesses and deaths. They can also avoid more stringent public health measures (e.g. stay-at-home orders, mask mandates), or reduce the negative impacts of those measures.

Preparedness is an ongoing process, not an end state.

Ontario's public health sector knows what to do to improve health now **and** be ready for the next outbreak or pandemic. Many recommendations in this report echo those in past Chief Medical Officer of Health (CMOH) reports – because they are the right way to improve health both before and during outbreaks, including:



Develop information systems to help public health agencies gather health, economic and sociodemographic data on their communities and identify populations at risk (**2015 report** *Mapping Wellness: Ontario's Route to Healthier Communities)*

Reduce health inequities to improve health, and lower health and social costs (**2016 report** *Improving the Odds: Championing Health Equity in Ontario)*

Build public confidence in vaccines (**2014 report** *Vaccines: the Best Medicine)*

Encourage strong social connections as a way to reduce stress, improve health, and make individuals and communities more resilient (**2017 report** *Connected Communities: Healthier Together)*

Improve health literacy and help people distinguish between credible scientific evidence and misinformation (**2013 report** *Old Foes and New Threats, Ontario's Readiness for Infectious Diseases)*

This report also aligns with recommendations made by Ontario's Long-Term Care COVID-19 Commission (2021), which called on the province to develop pandemic plans that are "updated, tested, drilled" and reported on "annually to the legislature".

There is no specific checklist that Ontario can use to guarantee it will be ready for the next outbreak or pandemic. However, the Office of the Chief Medical Officer of Health will adapt existing frameworks and indicators for pandemic preparedness to regularly assess and report on the public health sector's progress in sustaining, strengthening, and developing its capacity to be ready for the next outbreak or pandemic.

Learning from the Past

COVID-19 caught the world off guard.

No one was ready for a pandemic that would last years, cause more than 6.5 million deaths worldwide (Coronavirus Resource Center, 2022) – 14,724 in Ontario as of October 29, 2022 – overwhelm hospitals, send millions of people into long lockdowns, close businesses, schools, and daycares, halt global travel, and cause social rifts over whether to follow public health measures. Nor was the world prepared for global supply chain issues and the competition over limited supplies, including hand sanitizer, masks, respirators, and vaccines.

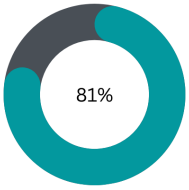
Compared to other countries that took a similar approach to COVID-19 (i.e. they did ***not*** take a zero-COVID approach[2]), Canada had relatively low mortality and high vaccination rates. (Ogden et al, 2022; Razak et al, 2022).

> “Simply put, we were not adequately prepared to face an emergency of the scale and magnitude of COVID-19. We must do better for the future.
>
> *A vision to Transform Canada's Public Health System, The Chief Public Health Officer of Canada's Report on the State of Public Health in Canada, 2021*

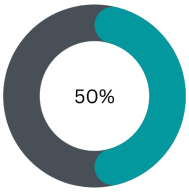
Figure 2: Cumulative deaths per 100,000 population and percentage of the population vaccinated with two doses as of April 20, 2022

Country	Cumulative deaths per 100,000 population	Percent of the adult population vaccinated with two doses
Canada	101.3	82%
Denmark	103.7	82%
Germany	159.3	77%
Sweden	183.1	75%
France	214.6	78%
United Kingdom	259.8	73%
Belgium	268.7	79%
United States	291.9	66%

Ontario also did well in preventing COVID-related hospitalizations and deaths, and vaccinating its population (all ages). (Public Health Ontario data as of November 19, 2022)

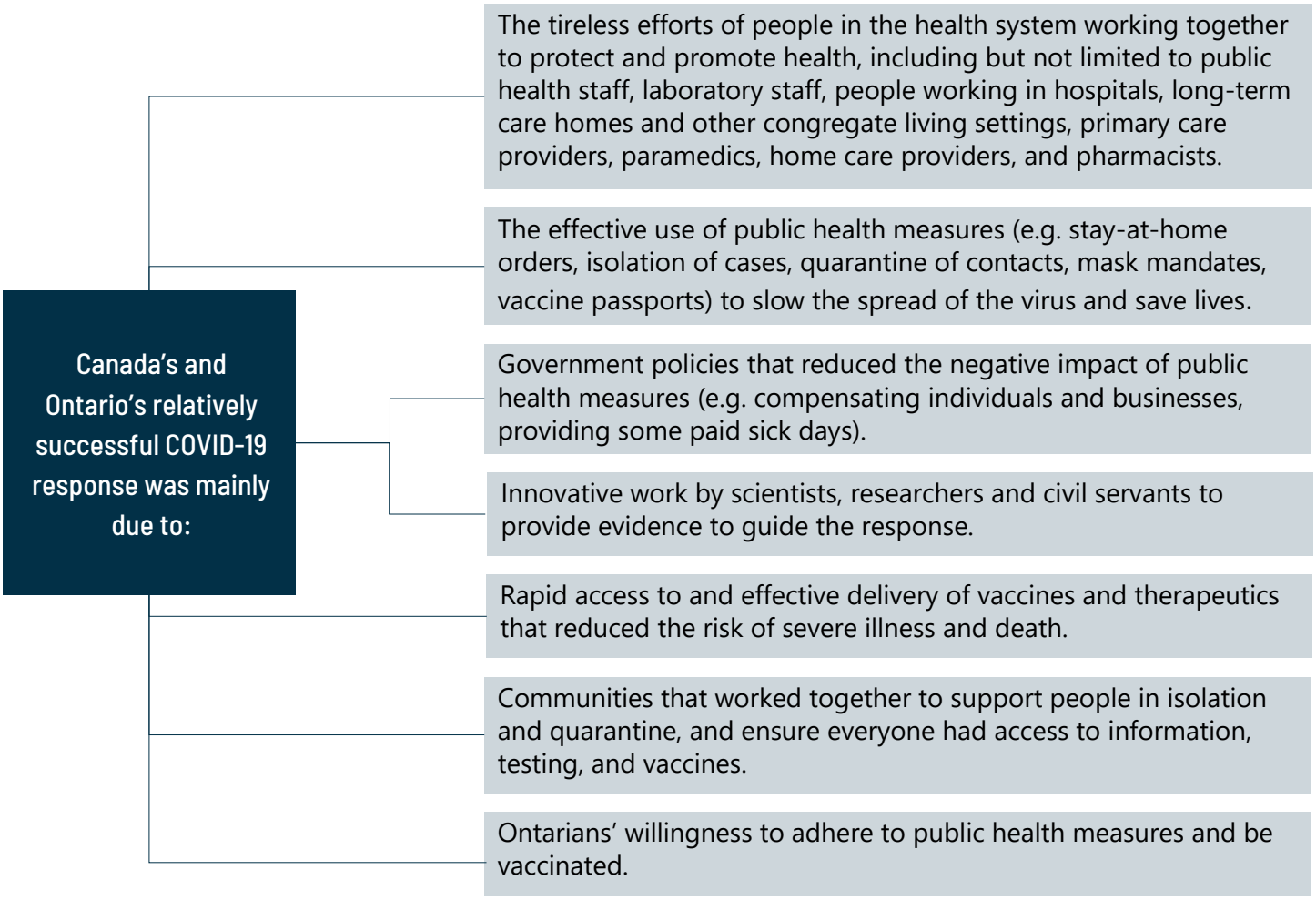


Ontarians are fully vaccinated with two shots



Ontarians have had a third dose

[2] Note: a small number of countries did adopt a zero-COVID approach, including New Zealand, Singapore, Australia, and South Korea. Those countries had lower death rates (between 11.7 and 42.2 per 100,000 population) and higher vaccination rates (between 80% and 90%) than countries, like Canada, that did *not* adopt that approach nationally.



While Ontario has done well overall, the response required sacrifices by individuals, families, society, and the health care system. In addition to the direct effects on health, including deaths, hospitalizations, acute illness, and long-term illness, the pandemic isolated people from family and friends, exacerbated health inequities (i.e. some populations experienced worse outcomes), limited access to other essential health services (e.g. surgeries, cancer care), had a negative effect on mental health and well-being, caused burnout and stress in all parts of the health system, and had a severe economic impact on many individuals, businesses, and industries.

Almost three years since the first case of COVID-19 was diagnosed in Canada, we are still experiencing the impacts of the pandemic. We will be weighing its toll for years to come.

If another virus similar to COVID-19 emerges in the future, will Ontario be ready?

Although the health system is dealing with capacity and health human resources issues, Ontario is more ready now than we were when the COVID-19 pandemic started in 2020. The province proved that in its response to the global MPOX (formerly monkeypox) outbreak in the spring of 2022. Within three weeks of the province's first confirmed case, the public health sector had established testing, determined who was most at risk, worked with those communities to reduce risk, educated health care providers to recognize and manage the illness, accessed vaccines and therapeutics from the federal government, provided immunization clinics, and connected infected individuals with specialty care.

The effective rapid response to MPOX was possible because the public health sector was ready. Learning from COVID-19, the public health sector had in place the skills, capacity, experience, infrastructure, and relationships to manage another disease threat.

What about three, five, 10 or 20 years from now?

History tells us that, once a disease threat passes, the sense of urgency drops, investments in preparedness are redirected, and readiness wanes.

Despite lessons learned from outbreaks here and in other parts of the world over the past 20 years – including SARS (Severe Acute Respiratory Syndrome), pandemic influenza H1N1, Zika virus, MERS (Middle Eastern Respiratory Syndrome), and Ebola – **Ontario did not maintain its investment in preparedness** before COVID-19 hit.

In recent reports, Ontario's Office of the Auditor General (2020, 2021) highlighted the lack of ongoing investment in:

- public health surge capacity to meet the demand for testing, and case and contact tracing in the event of a pandemic
- public health testing infrastructure and laboratory capacity to respond to public health threats
- stockpiles of personal protective equipment established post SARS
- staffing and infection prevention and control capacity in long-term care homes
- hospital surge and ICU capacity.

How do we learn from the past so the next time is different?

This report is not an assessment of Ontario's response to the COVID-19 pandemic, nor is it specific to COVID-19. It is a call to learn from the past and invest in preparedness so Ontario is ready for the next outbreak or pandemic, whenever it may occur.

While all parts of the health system and other sectors must prepare for any emergency or disaster that can affect their operations and communities, the public health sector is responsible for leading preparedness and response for infectious disease emergencies in Ontario.

> "Public health faces "boom and bust" funding cycles that leave us ill-prepared for new emergencies. As we have seen in the past, public health resources are often scaled back after health emergencies as governments move to address other priorities. This places public health systems at a disadvantage at the onset of each crisis since the capacity and networks required for a rapid response are not there. We need to invest in public health up front and consistently. This investment will be cost saving and provide many long-term social and economic benefits.
>
> *A vision to Transform Canada's Public Health System, The Chief Public Health Officer of Canada's Report on the State of Public Health in Canada, 2021*

> "When COVID-19 hit, Ontario experienced the same problems with laboratory capacity as it had during SARS: "the provincial laboratory in Toronto quickly became swamped with specimens. Like other parts of the health care system, it lacked surge capacity …"
>
> *COVID-19 Preparedness and Management Special Report on Laboratory Testing, Case Management and Contact Tracing, Office of the Auditor General of Ontario, November, 2020*

Outbreaks are inevitable. Preparedness allows us to respond early and decisively, blunting the impact of outbreaks when they occur.

Each year, outbreaks of influenza and other respiratory viruses provide opportunities to work together purposefully to practice and sustain preparedness.

Figure 3: Ontario's public health sector - the "three-legged stool" of
(i) Ministry of Health / Chief Medical Officer of Health; (II) Public Health Ontario; and (iii) Local Public Health Agencies

- Provides leadership and expertise
- Sets policy directions and public health standards for the province

- Provides scientific evidence and technical advice to the Ministry of Health, Chief Medical Officer of Health and local public health agencies
- Provides laboratory testing services
- Is responsible for disease surveillance and monitoring

- Deliver public health programs and services
- Lead health promotion and health protection/ disease prevention services
- Work to improve the health of their populations and reduce health inequities

This report focuses specifically on how to enhance the capacity of Ontario's public health sector to fulfill its lead role in preparedness planning. It:

- lays out the case for ongoing investments in preparedness for infectious disease emergencies
- argues for a more collective "big picture" approach to outbreak preparedness that builds sector and system, community, and societal readiness
- highlights the priorities for outbreak and pandemic preparedness that must be **sustained**, **strengthened** and/or **developed** over the next one to two years.

The Case for Sustained Investment in Outbreak Preparedness

There are compelling social, ethical, and financial reasons why Ontario must invest in being prepared and resilient in the face of outbreaks:

- The risk of serious outbreaks and another pandemic is real and growing.
- The human and economic costs of *not* being ready are too high.
- The burden disproportionately affects populations already facing health inequities.

> Resilience is the capacity of a system, community or society to adapt to disturbances resulting from hazards by persevering, recuperating or changing to reach and maintain an acceptable level of functioning. Resilient capacity is built through a process of empowering citizens, responders, organizations, communities, governments, systems and society to share the responsibility to keep hazards from becoming disasters.
>
> Emergency management strategy for Canada: toward a resilient 2030, Public Safety Canada, 2019

1. The risk of other outbreaks and another pandemic is real and growing

It is not a question of "if", but "when".

Novel pathogens are emerging more rapidly than in the past. In the last 20 years alone, the world has seen more frequent disease threats and serious outbreaks. Most have been caused by zoonotic viruses that spread from wildlife to humans.

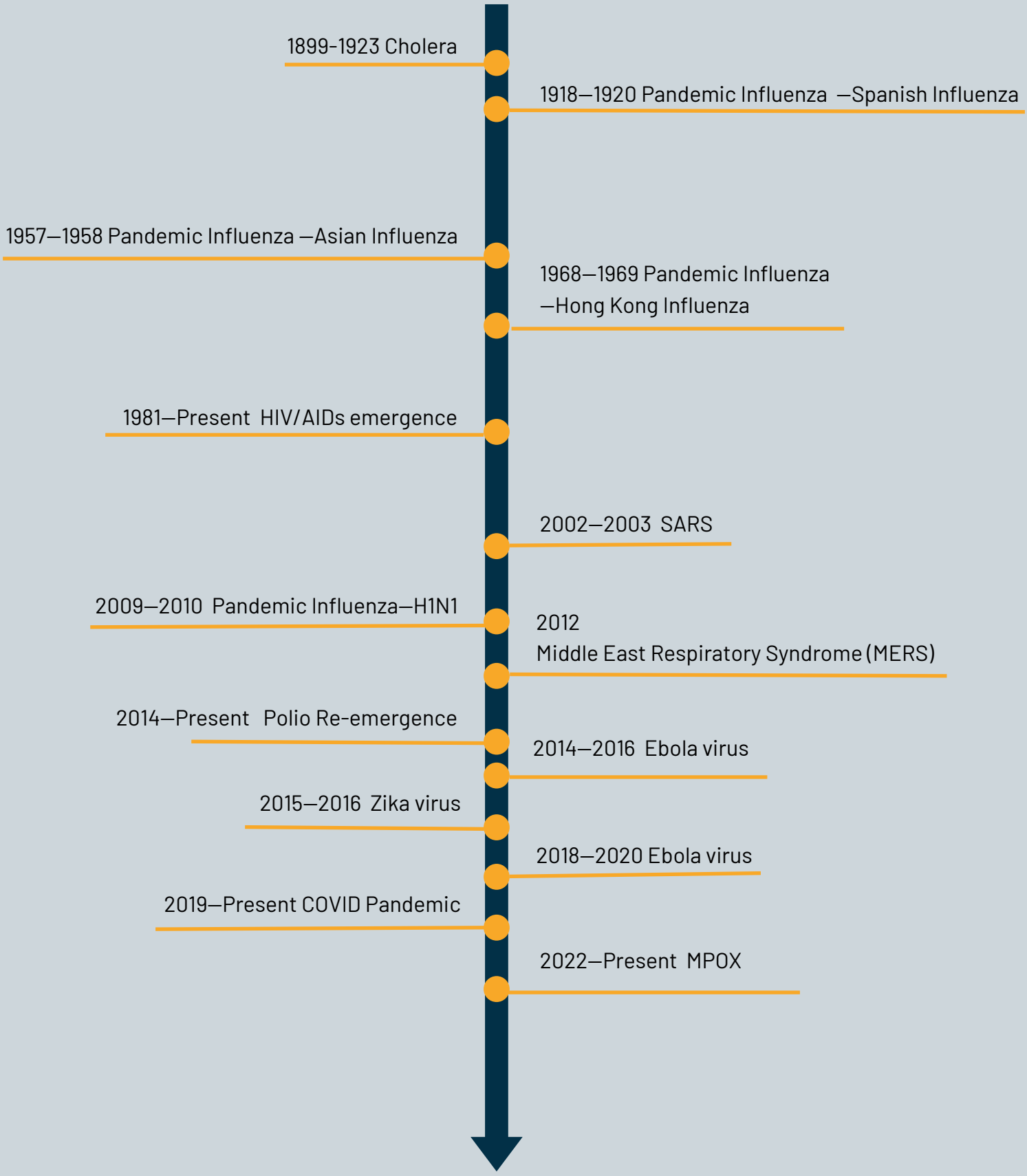
The increasing risk of zoonotic diseases is driven by: human and domestic animal population growth, climate change pushing land use and livestock production into areas inhabited by wild animals, the growing international wildlife trade, industrial-level farming and transportation of wild animals, and human behaviour and travel. As people move into wildlife habitats and animals relocate to more hospitable ecosystems, viruses carried by wild animals have more opportunity to infect domestic animals and humans. (Keusch et al, 2022; The Independent Panel for Pandemic Preparedness and Response, 2021).

> Detecting and stopping the spread of zoonotic diseases requires a One Health approach, which recognizes that human and animal health are closely connected, and brings together experts in human, animal and environmental health as well as other relevant disciplines to learn how diseases spread among people, animals, plants, and the environment.
>
> The One Health approach has the potential to prevent outbreaks in animals and people, improve food safety, reduce antibiotic resistance and protect global health security.
>
> One Health Basics, National Center for Emerging and Zoonotic Infectious Diseases, Centers for Disease Control and Prevention. 2022

There are also growing risks from:

- the resurgence of previously controlled pathogens, such as polio, tuberculosis, and measles
- rapid global spread of emerging infectious diseases, such as MPOX
- antimicrobial resistant organisms
- the accidental or deliberate release of engineered or natural pathogens.

Figure 4: Timeline of major outbreaks over the past 100 years.



The risk of an outbreak becoming a pandemic is exacerbated by our connectedness: diseases that emerge in one part of the globe do not stay there. They travel quickly to other parts of the world – often before the threat has been identified. Geopolitical forces, such as war and economic instability, affect a country's ability to maintain public health programs or respond to emerging diseases, making it more likely they will spread in that country and beyond its borders.

As a society, we know the value of being ready in case of an external threat or disaster.

Countries maintain an intelligence and defense system in case of attack or war. Provinces maintain capacities to respond to wildfires and storms. Municipalities support a network of fire stations and equipment. Individuals install smoke and carbon monoxide detectors in their homes. These investments are a form of insurance and readiness for uncommon events so that we can respond quickly in the event of an emergency. Societies must make the same kind of ongoing investment in the competencies and capacity required to respond to outbreaks and pandemics.

Maintaining and strengthening public health's capacity to plan for outbreaks and pandemics is good risk management. It's a form of insurance that will cost significantly less than another unplanned-for pandemic.

Protecting Ontarians from the threats of tomorrow will improve health today.

Strengthening Ontario's capacity to detect emerging diseases and respond to a pandemic will also enhance our ability to manage less serious or widespread outbreaks. For example, the same rapid, high volume genomic sequencing that allowed Ontario to identify and track the spread of different COVID-19 variants can be used to investigate and link cases of food-borne or other illnesses provincially, nationally – even internationally – and identify the cause of outbreaks.

2. The human and economic costs of not being ready are too high

The personal, health, social/emotional, and economic costs of a pandemic are unacceptably high.

Ontarians are still experiencing the impact of COVID-19 on their lives and health. As of September 2022, COVID-19 had resulted in:

- **>55,000** Ontarians being hospitalized[3]
- **>14,000** deaths
- **thousands** who have experienced long COVID or post-COVID-19 conditions.

What Would have Happened Without Public Health Measures?

As devastating as COVID-19 was in Ontario and Canada, without public health measures such as closures, travel restrictions, contact tracing, masking, and social distancing, and without high rates of vaccination, the toll would have been much worse.

Ogden et al (2022) estimate that, in Canada, there would have been:

10 x
up to 34 million vs 3.3 million cases

13 x
up to 2 million vs 150,602 hospitalizations

20 x
up to 800,000 vs 38,783 deaths

[3]Public Health Ontario. Ontario COVID-19 Data Tool. Numbers as of September 17, 2022. https://www.publichealthontario.ca/en/data-and-analysis/infectious-disease/covid-19-data-surveillance/covid-19-data-tool?tab=summary. Accessed September 24, 2022.

In terms of mental health, Ontarians have had to cope with stresses related both to the direct impacts of COVID-19 and the public health measures adopted to protect people from illness and death, including, but not limited to:

- grief and loss caused by COVID-19 illnesses and deaths
- stress and burnout from caring for people with COVID-19
- fear and anxiety about the virus and feeling that you do not have the capacity to protect yourself and your family
  - ◊ particularly for essential workers who were at risk of getting infected on the job and bringing the virus back to their families and for people with co-morbid conditions who were at high risk
- isolation from family members and friends for months at a time
- caring full-time for children while working from home
- disruptions to children's lives, education, and social development from being out of school or learning remotely for months
- increases in alcohol and cannabis use
- increases in domestic and intimate partner violence
- inaccessible supports for those experiencing homelessness and substance use disorders
- anxiety and mental distress over loss of income
- mental distress over loss of housing due to evictions
- stress from lack of available medical and mental health care.

> "Between March 2020 and January 2022, schools in Ontario were closed for 27 weeks, longer than any other Canadian jurisdiction and most European countries.
>
> Ontario Returns to School: An Overview of the Science, Science Table: COVID-19 Advisory for Ontario, 2022

Economic costs from pandemics are also high. The resulting illness, death, and disability due to COVID-19, and the indirect costs of caring for infected individuals took a toll on the economy. During COVID-19, hundreds of businesses closed and thousands of people were laid off. By February 2021, compared to other provinces, Statistics Canada (2021) reported that Ontario had the lowest percentage of active businesses, and the second lowest employment rate in the country (compared to pre-pandemic levels). Sectors most negatively affected at that time were: hospitality and food services; arts, entertainment, and recreation; and retail. While many sectors rebounded in 2022, the full economic impacts of COVID-19 are still unknown.

Investments in preparedness can cut the health and economic costs of pandemics

When jurisdictions are prepared and can respond quickly to outbreaks, they can reduce illness and deaths, and either avoid implementing stringent public health measures to protect health or reduce their negative impacts.

For example, early in the pandemic, South Korea was able to minimize COVID-19 spread without closing businesses or issuing stay-at-home orders. The country was able to avoid strict measures required in other countries because, after a MERS[4] outbreak in 2015 that resulted in 185 cases and 38 deaths (World Health Organization, Outbreaks and Emergencies), it invested heavily in people and systems to test, detect, and contain infectious diseases. Its preparedness initiatives included hiring more infection control staff, running more outbreak simulations, significantly increasing capacity to scale up testing as well as case and contact management, working with the private sector to ensure an adequate supply of tests, and purchasing personal protective equipment (PPE) centrally. As a result, in the first year of COVID-19, South Korea, a country with a population of 52 million, had fewer than 80,000 cases and 1,500 deaths, and the lowest percentage decrease in gross domestic product of all 37 members of the Organization for Economic Cooperation and Development (OECD) (Kim JH et al., 2021).

[4] Middle East Respiratory Syndrome

3. The burden disproportionately affects populations already facing health inequities.

Health and social inequities are exacerbated during an outbreak or pandemic.

Although Ontario had a comparatively good response to COVID-19, it was not equitable. Populations already experiencing health inequities – including Indigenous, Black, and other racialized, low-income, and newcomer communities – were disproportionately affected by COVID-19, and had more severe outcomes.

According to the Wellesley Institute's analysis of Ontario race-based data to mid-2021, Latino, South Asian, Middle Eastern, South East Asian, and Black populations were 4.6 to 7.1 times more likely to test positive for COVID-19 than white populations (Wellesley Institute, 2021). During the first waves of the pandemic, public health measures failed racialized neighbourhoods where people had fewer options to work from home or isolate if they got sick. Early vaccine rollout also favoured affluent neighbourhoods and provided fewer options for higher risk communities to access vaccine (Black Health Alliance, 2021).

> "While emergencies affect everyone, they disproportionately affect those who are the most vulnerable. The needs and rights of the poorest, as well as women, children, people with disabilities, older persons, migrants, refugees and displaced persons, and people with chronic diseases must be at the centre of our work.
>
> Health Emergency and Disaster Risk Management Framework, World Health Organization, 2019

People living in northern, rural, and remote regions, including First Nations communities, also experienced poorer outcomes. Because of inequities in access to the social determinants of health, many had underlying health conditions that increased their risk. The COVID-19 pandemic also reinforced long-standing geographic inequities in access to services in these parts of the province. For example, early in the pandemic, people in southern Ontario could get a COVID-19 test and their results within two days or less, while individuals in the north could wait as long as two weeks because of distance from laboratories and delays transporting samples. Over the course of the pandemic, the health system invested in laboratory equipment and point-of-care tests to improve access to testing in rural and remote areas, but underlying systemic health disparities were not so easily addressed.

Individuals at highest risk of COVID-19 included:

- essential workers who could not work from home
- people living in congregate settings, such as long-term care homes, as well as those in overcrowded housing that made it difficult for people to self-isolate when ill or exposed
- people with co-morbidities, such as cardiovascular diseases, diabetes, chronic respiratory disease, and cancer
- people and communities coping with long-standing social, economic, and cultural barriers to care and health, particularly those who had higher rates of chronic diseases and poorer health outcomes before COVID-19.

For some populations that experienced more severe COVID-19 outcomes, the risks were not biological. They were related to inequities in income, education and access to services, as well as the impacts of colonization, systemic racism, and discrimination.

The Link Between Poverty and Poor COVID-19 Outcomes

Over the first three waves, the number of COVID-19 cases was highest among people living in neighbourhoods with the highest levels of material deprivation – which refers to the inability of individuals and communities to access and attain their basic material needs. People in these neighbourhoods were also more likely to experience severe outcomes from COVID-19. Compared to people living in neighbourhoods with the lowest levels of material deprivation, they were 2.7 times more likely to be hospitalized and admitted to intensive care, and 2.9 times more likely to die. (Ontario Agency for Health Protection and Promotion, 2022).

It is difficult to address health inequities in the midst of an outbreak or pandemic.

Instead, that important work must be an integral part of outbreak or pandemic preparedness, as well as the ongoing work of the public health sector. The process of preparing for outbreaks includes developing and sustaining trusting partnerships with communities. It means working collaboratively with them to address the social determinants of health and reduce health inequities so communities can be healthier and more resilient during an outbreak. Pandemic responses work best when everyone is properly protected. If parts of society are left behind, the effectiveness of the response decreases for everyone.

Our existing systems are characterized by inequities. These challenges will only be exacerbated when a disease outbreak occurs. The more equitable our communities and health systems are before an outbreak, the more likely Ontario will have a better and more equitable outbreak response.

A Bigger Picture View of Readiness

Recent pandemics including SARS, H1N1, and COVID-19 have taught important lessons about preparedness. In particular, the duration and severity of COVID-19 drove home the challenges of containing a fast-spreading virus and making ethical decisions in a world competing for scarce resources. It also highlighted the critical importance of local public health agencies knowing their communities, and advocating for and delivering services to meet their needs. It is only through collective action – individuals, families, communities, schools, workplaces, the health care system, other sectors, and governments working together – that we can slow or stop outbreaks and pandemics.

While we have learned key lessons from past outbreaks, the next one may be different. To be ready, Ontario needs a supported, adaptive, resilient public health sector that continually learns from previous experiences **and** is ready to respond to new challenges that may require different solutions.

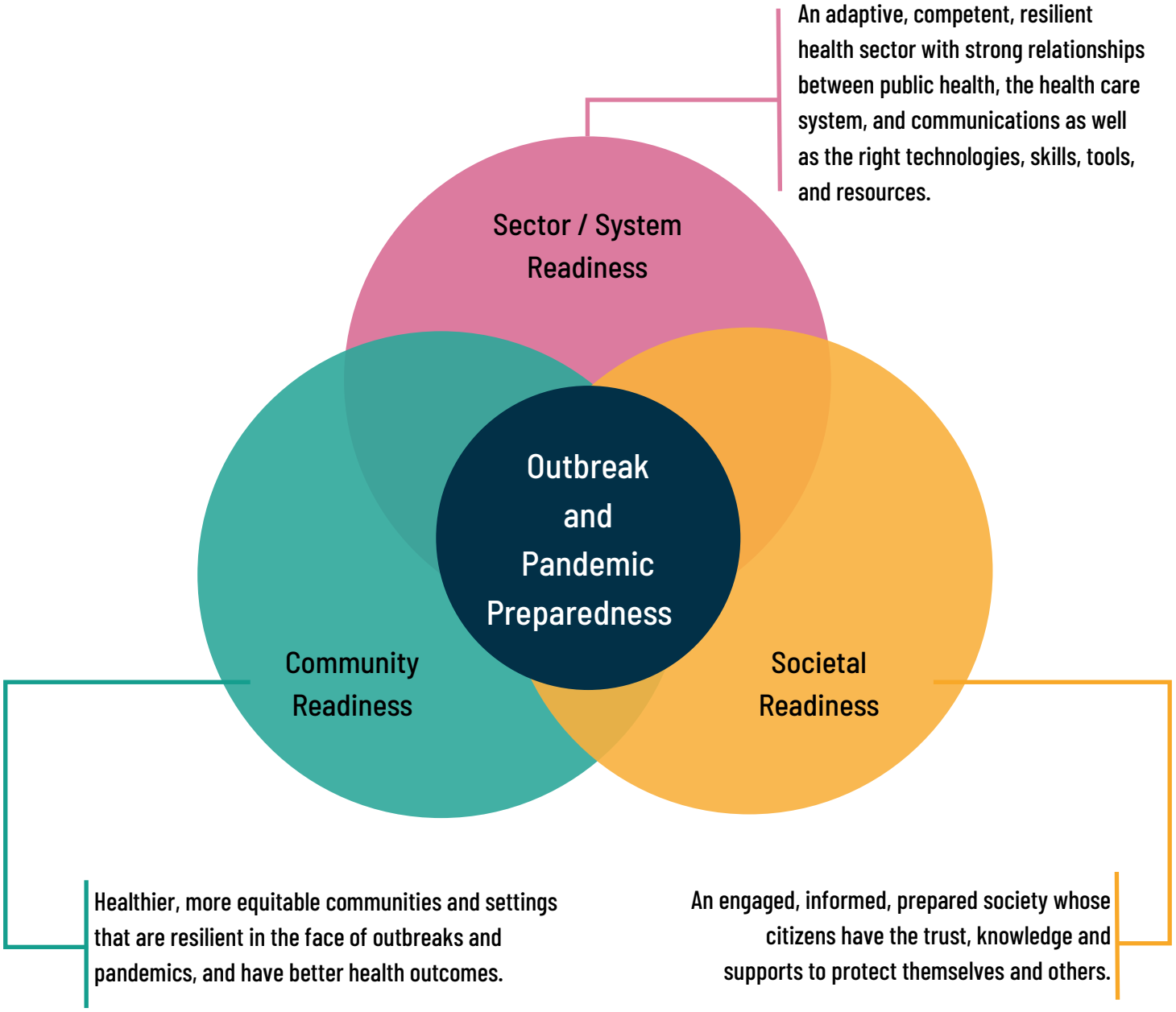
Ontario's public health sector must take a collective, forward-thinking approach to outbreak and pandemic planning that builds:

i) sector and system readiness,

ii) community readiness, and

iii) societal readiness.

Preparedness requires sustained investment in a wide range of relationships, skills, technologies, infrastructure, and capacities.



Sector and System Readiness

Sector readiness means having in place the relationships (networks), people (workforce), competencies and expertise, technologies, data systems, resources, structures, processes, and surge capacity that enable the public health sector and the broader health system to manage and contain an outbreak or pandemic - while continuing to provide other essential public health and health care services and, if necessary, respond to other emergencies that may occur during an outbreak.

Community Readiness

Planning only for sector and system readiness – the main focus of past preparedness efforts – does not address the facts that outbreaks start with people, people live in communities, and not all communities are equal. To reduce health inequities and improve health outcomes (before, during and after outbreaks and pandemics), local public health agencies must forge and maintain strong collaborative partnerships with their communities and, populations at risk, working with them, as well as with their governments and the health system, to improve health equity and resilience (O'Sullivan et al, 2014; O'Sullivan et al, 2013). They must also work closely with congregate living settings in the community, such as long-term care homes and shelters, where residents may be at greater risk.

Societal Readiness

To respond effectively to an emerging disease, Ontarians must trust public health leaders. They must be confident that governments and public health agencies will fulfill their responsibility to protect the health of the public and support Ontarians in their efforts to protect themselves and others. To prepare society for the types of difficult decisions that may have to be made during an outbreak – such as who will be first in line for scarce resources and what measures will be used to interrupt transmission (e.g., isolation, quarantine, closures) – the public health sector must engage an informed public in frank discussions about the ethical values guiding those decisions. Provincial and local public health agencies must also communicate clearly and transparently about the disease risk (i.e. what we do and do not know) and the reasons for implementing different public health measures. Society must be confident that the public health measures are based on best evidence, and reflect shared ethics and values. (Emanuel et al, 2022).

Measuring Preparedness: How Will We Know We are Ready?

The vision of readiness laid out in this report is based on the Public Health Emergency Framework and Indicators, work led by Public Health Ontario (Khan Y et al, 2018; Ontario Agency for Health Protection and Promotion, 2020) to guide planning for a broad range of public health emergencies. In this framework, ethics and values are at the centre of ten preparedness domains, and all domains rely on governance and leadership. The domains are interdependent, reflecting the complex adaptive system required to respond to public health emergencies, such as pandemics.

Figure 5: Resilience framework, adapted from Khan Y et al, 2018

Preparedness is an ongoing process, not an end state.

There is no specific checklist that Ontario can use to guarantee it will be ready for the next outbreak or pandemic. However, the Public Health Emergency Framework provides 67 indicators that public health agencies can use to monitor and assess their preparedness, and the National Collaborating Centres for Infectious Diseases and Determinants of Health (2020) have developed a resource that applies a health equity lens to assess these indicators. In addition, this report highlights some of the **Ontario Public Health Standards** that outline the local public health agencies' current accountabilities for emergency and pandemic preparedness.

Future CMOH reports will adapt and use the Public Health Emergency Framework indicators, as well as indicators from other pandemic preparedness frameworks and the Ontario Public Health Standards, to report regularly on the public health sector's progress in sustaining, strengthening, and developing the capacities required to be ready.

I. Sector/System Readiness

Ontario's public health sector – and the broader health system – must maintain the relationships, people, expertise, technologies, surge capacity, tool, processes, and resources required to quickly detect and respond to outbreaks.

During COVID-19, the public health sector and the health care system built extensive expertise, capacity, and tools to respond to and manage a pandemic. The sector and system have established a solid foundation for future readiness that must be sustained and strengthened.

To improve sector and system readiness for the next pandemic, the public health sector and its partners must focus on:

- Strong collaborative networks across the health system and other partners, including Indigenous health services
- A skilled, adaptable, resilient workforce
- Innovative, leading-edge testing and diagnostics
- Real-time surveillance systems and scientific expertise
- Critical response resources such as:
    - ◊ Infection prevention and control interventions and expertise in both health care and non-health care settings
    - ◊ Dependable supplies of personal protective equipment (PPE)
    - ◊ Timely access to vaccines and therapeutics

Strengthen Collaborative Networks

Pandemic preparedness is a team effort.

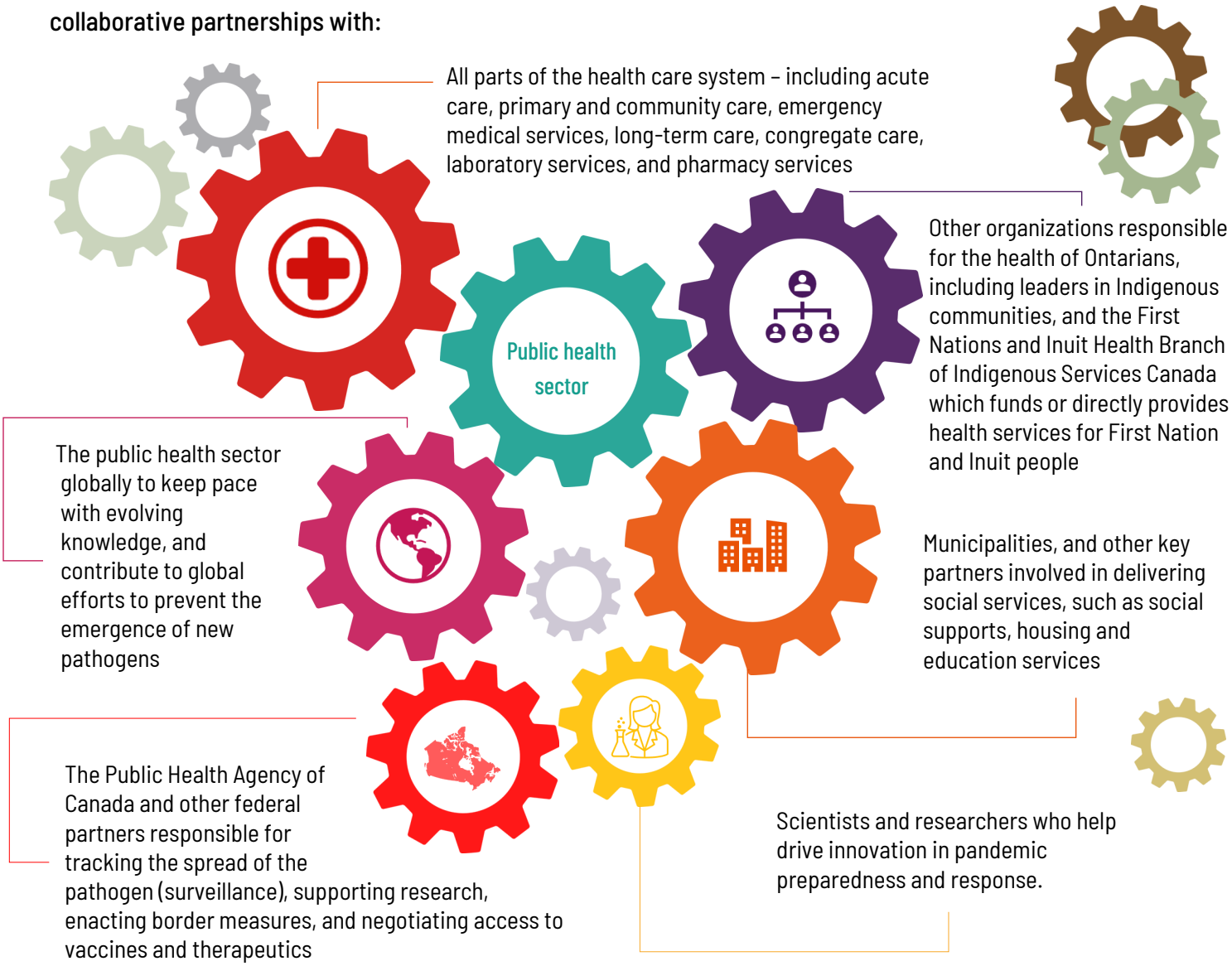
While the public health sector is responsible for leading outbreak planning and response, it relies heavily on other parts of the health care system and different levels of government to co-design and co-implement outbreak plans.

Relevant Ontario Public Health Standards

Conduct emergency planning in co-ordination with community partners and governmental bodies, including co-ordination and management of emergencies or disruptions.

Engage in relationships with Indigenous communities in a way that is meaningful for them.

Effective outbreak planning and response depends on Ontario's public health sector sustaining strong collaborative partnerships with:



These collaborative networks should be in place before an outbreak occurs and sustained over time. All partners should have a clear understanding of their roles, and work together to continually improve readiness.

Achievements and Challenges

Health System Networks

Over the course of the COVID-19 pandemic, the public health sector in some parts of the province was able to leverage existing collaborative relationships to improve access to services:

- With the creation of Ontario Health and Ontario Health Teams in 2019 (Ontario Ministry of Health, 2019), just before the pandemic, local public health agencies had opportunities to become part of new collaborative health care networks and forums to improve service co-ordination.
- Local public health agencies used their pre-existing relationships with long-term care homes, congregate living settings, and primary care, including community health centres, to improve access to testing and immunization particularly for people who are hard to reach.

- Pharmacies already trained to administer annual influenza shots were able to provide COVID-19 immunizations and tests, and can now prescribe and dispense Paxlovid®.
- Many public health agencies made innovative use of community paramedics to conduct health assessments, provide COVID-19 testing, and give immunizations – particularly in communities where it was difficult for people to travel to COVID-19 assessment centres or immunization clinics.
- Primary care physicians staffed mass immunization clinics, assessed and counselled patients, provided therapeutics, and supported local communities.

However, regions of the province with limited primary care and pharmacy services were unable to leverage these networks to the same extent, and a heavier responsibility for COVID-19 testing and immunizations fell on local public health agencies.

Forging Trusting Relationships with Indigenous Health Services

The roles and responsibilities of Ontario's public health sector in supporting the health of Indigenous communities is a long-standing issue, particularly in First Nations communities where the federal government is responsible for health care services. Some local public health agencies had already developed trusting relationships with Indigenous communities, including First Nation, Métis and Inuit communities, and were able to build on these relationships during COVID-19 (see box), but that was not the experience in all parts of the province.

In some cases, the lack of pre-existing partnerships with Indigenous leaders and communities led people to mistrust the services offered. Local public health agencies also experienced both successes and challenges co-ordinating public health services for Indigenous people living in urban and rural areas across the province.

Case Study: Collaboration with Indigenous Communities

Porcupine Health Unit serves a geographic area of more than 270,000 sq km. of northeastern Ontario from Timmins to Moosonee, shares lands with 10 diverse First Nations communities, and works closely with 12 municipalities that have large urban Indigenous populations. The public health unit respects each community's right to self-determination and is mindful in supporting their unique needs and concerns.

During the COVID-19 pandemic, the public health unit worked collaboratively with First Nations community leadership, the Weeneebayko Area Health Authority (WAHA), Tribal Councils, and Indigenous Services Canada to support the COVID-19 response in several First Nations communities. Public health staff attended regular (often weekly) meetings at the invitation of many communities, and provided the level of public health involvement guided by each community.

While public health's role was adapted to each community's needs, activities included: sharing information on the province's COVID-19 guidance and the science behind the guidance; providing advice on how that guidance could be implemented in each community; and being available to answer questions. The public health unit shared daily social media updates with First Nations Chiefs, health directors, hospitals and other health care partners, urban Indigenous partners, directors of education, and business associations. It also shared templates for communications that communities could adapt to meet their needs.

Collaborative Network Priorities

- Strengthen local public health agencies' collaborative networks with local and regional health system partners, including Indigenous leaders and Indigenous health service providers, and continue to clarify structures, roles and responsibilities during outbreaks and in pandemic planning.
- Sustain the province's collaborative networks with local, regional, and provincial forums for public health and health system partnerships.
- Integrate Indigenous models of community public health, and clarify the public health sector's role in supporting the health of Indigenous people and communities.

Build a Skilled, Adaptable, Resilient Workforce

The public health sector's ability to respond to an outbreak or pandemic depends on having a skilled, adaptable, resilient workforce.

The workforce must have the public health competencies, baseline capacity, and surge capacity to provide services at the scale and intensity required during outbreaks or a pandemic – while also being able to respond to other public health emergencies that may occur at the same time **and** maintain essential public health operations. The public health workforce must also have the capacity to provide leadership and expertise to support partner organizations assisting with the outbreak response.

Relevant Ontario Public Health Standards

Support a culture of excellence in professional practice and ensure a culture of quality and continuous organizational self-improvement.

Achievements and Challenges

COVID-19 was and continues to be a stress test of the public health workforce, and its ability to adapt.

The workforce responded, but at the cost of placing heavy demands on individuals, teams, and the public health sector:

- Local public health agencies reallocated staff from all parts of their operations to pandemic activities, such as case and contact management, and vaccinations. A number of local public health agencies had already cross-trained staff in the necessary public health skills as part of their outbreak planning, which made it easier to redeploy staff quickly.
- Local public health agency staff stepped into new roles to meet the needs of their communities, either providing services themselves and/or negotiating with community partners to provide them. For example, to support individuals in isolation or quarantine, local public health agencies coordinated places for them to isolate, delivered supplies, and arranged ways to look after dependents and pets. However, the public health sector's ability to redeploy people was limited by collective bargaining contracts and legislative requirements on health care provider scope of practice. Through the pandemic, these restrictions were eased to allow more effective use of human resources to meet demands.
- Faced with the increasing demand for case and contact management, the government gave local public health agencies additional resources to hire contract workers. Local public health agency staff rapidly recruited, trained, co-ordinated, and supervised a large number and wide variety of people, some with minimal public health or health experience. Hiring inexperienced people was challenging for public health staff who had to spend time training and supervising them, which meant they were less able to do their own jobs. In some parts of the province, there were not enough people to fill available positions.
- Like those working in other parts of the health care system, all public health staff across Ontario's public health sector were stretched extremely thin during the COVID-19 response, working long hours under great pressure, and struggling to recruit to fill vacancies. The ongoing demands affected work-life balance, and resulted in a significant increase in stress and burnout.

Lack of Surge Capacity Disrupted Other Public Health Services

In both 2020 and 2021, 74-78% of local public health agency resources were diverted to the COVID-19 response (alPHa, 2022). Almost all other public health services had to be stopped or scaled back.

Although all local public health agencies have business continuity plans, those plans did not take into account the need to adjust service levels and interrupt service delivery over such a long period of time (currently almost three years). While relatively little harm may be done when a local public health agency has to delay some activities for a few weeks, the longer an emergency continues or the more complex it is (i.e. several concurrent emergencies), the greater the negative impact of the disruption to other public health services.

Public health business continuity and contingency plans must be updated to reflect the resources and strategies required during a long-term disruption of normal business activities. The goal is to put in place plans and contingency measures that will allow the public health sector to respond to an outbreak or pandemic while still delivering other essential public health programs and services.

While the public health sector was able to respond to COVID-19, it was clear that, faced with a pandemic, the public health workforce does not have adequate surge capacity.

Examples of local public health agency services that were severely cut back or delayed during COVID-19:

- routine school immunizations
- children's health services, including Healthy Babies Healthy Children visits
- population health assessments
- upstream work on the social determinants of health
- sexual health services and sexually transmitted infection testing
- clinical and public health follow-up for sexually transmitted infections
- restaurant/food safety inspections
- delivery of substance use and injury prevention programs
- delivery of healthy eating and physical activity initiatives

The negative consequences of the delays in access to public health services may continue for years to come.

COVID-19 tested public health business continuity plans and highlighted the critical importance of planning for outbreaks or pandemics that last a long period of time.

Other Emergencies Don't Stop During a Pandemic

One of the most compelling arguments for investing in the public health workforce and surge capacity is that other public health emergencies and seasonal epidemics, such as influenza and respiratory syncytial virus, don't stop just because there is a pandemic.

One public health agency in northern Ontario reported that, during COVID-19, they were also responding to:

- clusters of tuberculosis
- an outbreak of blastomycosis
- flooding and fire-related community evacuations, including from First Nation communities
- the ongoing opioid epidemic and the need to increase harm reduction services including setting up consumption and treatment services.

Workforce Priorities

- Build a flexible, adaptable and resilient public health workforce within public health agencies locally, regionally, and at the provincial level (Ministry of Health and Public Health Ontario), that:
  - ◊ is cross trained in public health core competencies
  - ◊ has adaptive skills to respond to outbreaks and pandemics as well as other emergencies, while maintaining essential public health services
  - ◊ is supported by healthy work environments.
- Develop the surge capacity to quickly scale up the public health workforce and train additional responders in critical pandemic skills (e.g. vaccination, case and contact management, infection prevention and control).
- Strengthen public health agency continuity of operations plans to account for outbreaks of varying length, and identify the strategies and resources to maintain and restore public health services during prolonged disruptions.

Invest in Innovative, Leading-edge Testing and Diagnostics

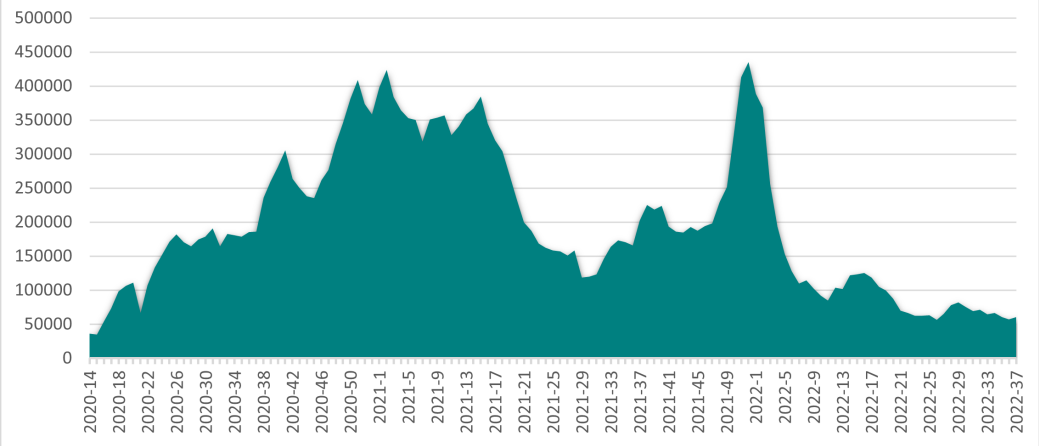
Testing capacity is essential for early detection and outbreak management.

The earlier that public health can pick up a new pathogen, the sooner it can act to contain it. Every early piece of diagnostic information buys time to understand the risk, assess whether a pathogen is emerging, spreading or mutating, and implement measures to slow or to stop its spread.

Achievements and Challenges

- As part of its collaboration with the Canadian Sentinel Practitioner Surveillance Network, Public Heath Ontario (PHO) uses community practitioners to test for influenza and other respiratory viruses to inform influenza epidemiology and vaccine effectiveness. This program allows the testing system to pick up cases early.
- When the COVID-19 pandemic began, the PHO laboratory had the capacity to process about 10,000 tests a day. Early in the pandemic, it significantly increased its capacity, and introduced new testing methodologies. To respond to increasing testing demands, the Provincial COVID-19 Testing Network, supported by Ontario Health, was formed as a network of 40 independent hospitals, public health and community laboratories. More than 170 assessment centres, over 200 pharmacies, and a number of mobile and pop-up facilities provided testing and sent samples to the laboratories in the network. At its peak, the Provincial Testing Network was processing over 100,000 COVID-19 PCR tests a day, and over 75% of people tested were getting their results within 48 hours.

Figure 6: Trends in the number of COVID-19 laboratory tests per week in Ontario over time (April 2020 to September 2022)



While the PHO Laboratory and other laboratories in the network were able to ramp up COVID-19 testing volumes, they didn't have the automated test requisition or reporting systems to support those volumes. Test requisitions were still being completed by hand, creating many person-hours of manual data entry at hospitals, long-term care homes, laboratories, and public health agencies. In the worst cases, these manual processes meant results were delayed or went missing, negatively affecting clinical care and the public health response.

The problem was highlighted in the final report of Ontario's Long-Term Care COVID-19 Commission, which recommended that Ontario "ensure laboratory surge capacity … [that prioritizes] long-term care in accessing effective testing and timely, efficient reporting of testing results, [including] ensuring long-term care homes have the technological capacity to receive electronic medical test results."

There were also geographic inequities related to accessing testing and results. The increases in provincial testing capacity mainly benefited Ontarians who lived in or near major city centres. Many people in rural and remote areas had to travel further to access a testing site, and wait longer for specimens to arrive at testing laboratories and to receive their results. These delays made it harder for public health agencies to identify and isolate people who were infected before the virus had a chance to spread. They also meant that:

- some individuals and their close contacts were in isolation longer than necessary while waiting for delayed test results
- outbreaks in long-term care homes and other settings could not be appropriately managed because of the time it took to identify individuals who were positive.

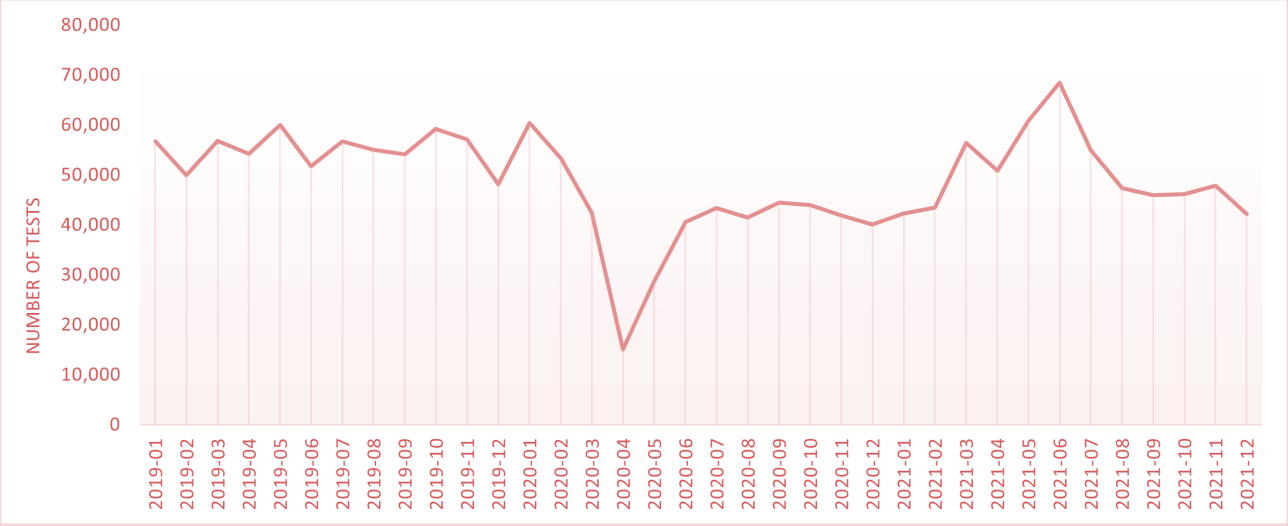
Ontario had to look for alternative strategies to provide more timely testing across the province, such as investing in rapid antigen testing kits, the introduction of ID Now testing (see box), and the use of self-collection of specimens to reduce demands on collection sites.

Lack of Laboratory Surge Capacity Limited Access to Other Testing

Ontario's rapid response to the need for COVID-19 testing came at the expense of other infectious disease testing usually done by Ontario's public health laboratories.

The combination of disruptions in clinical care and laboratory capacity issues meant people did not access the routine lab testing they would have normally received, which may have led to significant delays in diagnoses, and poor health outcomes. For example, in 2020, testing for HIV was down 26%.

Figure 7: Number of HIV diagnostic tests per week at Public Health Ontario Laboratory, January 2019 to December 2021



Outbreak planning should include strategies to ensure ongoing access to regular diagnostic testing as well as the capacity to ramp up testing for an emerging pathogen.

Case Study: ID Now Provides More Timely Testing in First Nations Communities

Northern Ontario had high COVID-19 case rates compared to the southern part of the province. Although people in the north were highly affected by COVID-19, they had less access to timely testing. To close that gap in First Nations communities, Ontario's public health sector worked closely with the Public Health Agency of Canada (PHAC) to implement the Abbott™ ID Now Analyzer: a machine that provides rapid point-of-care molecular test results. Analyzers were installed in 98 First Nations communities across Northern Ontario to provide point-of-care testing, which meant individuals in those communities no longer had to wait the days to weeks it could take to receive laboratory-based results.

Ontario worked with the communities, training local staff to conduct the tests and operate the ID Now analyzer. Challenges in implementing this testing included amending legislation to allow non-regulated health professionals to administer the testing, and finding ways to report test results to the public health agency, as part of provincial surveillance.

In the future, efforts to improve testing capacity should leverage the COVID-19 lessons on: how to provide more equitable access to testing across the province for all communities; and the health service capacities required to collect specimens in a timely and geographically equitable way. For example, providing testing resources in a variety of sites and modalities, such as primary care offices, pharmacies, community paramedics, assessment centres, mobile sites, and self-collected at home, can support rapid ramp-up of testing across the province, avoid unnecessary use of emergency departments as testing sites, and produce timely data to inform public health surveillance and response.

Testing Priorities

- Strengthen the end-to-end provincial testing infrastructure, including specimen collection and processing capacity, leading-edge testing technologies, and data systems that automate the test requisition process and reporting of results.
- Strengthen the provincial laboratory infrastructure to support high volume, province-wide testing during a pandemic while maintaining the capacity to support ongoing routine testing.
- Sustain the PHO Laboratory's capacity and expertise in the detection, monitoring, and genomics of emerging infectious diseases.

Strengthen Real-time Surveillance Systems and Scientific Expertise

Surveillance and monitoring are critical to infectious disease prevention, detection, and management.

Ontario needs timely, accurate, and detailed surveillance information as well as ready access to scientific expertise to: enhance its capacity to detect and monitor disease threats; and guide decisions about public health measures when a threat reaches a certain magnitude.

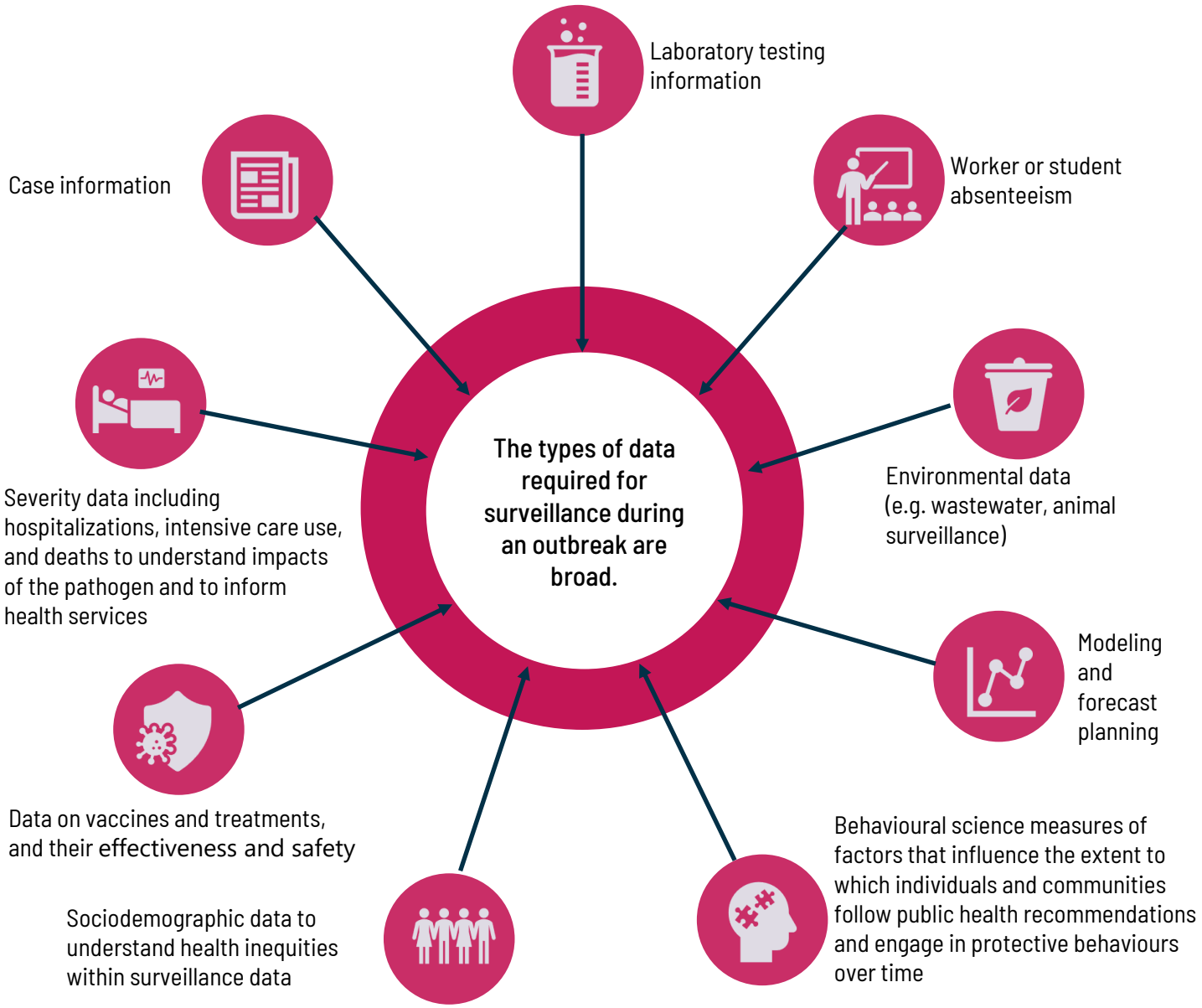
Surveillance is also key to health equity. Surveillance information is used to identify those at high risk of getting infected and/or suffering poor health outcomes, and to guide prevention and treatment. To be useful – particularly during an outbreak or pandemic – surveillance data must be collected, analyzed, synthesized, and shared quickly, preferably in real time, with those trying to understand and interrupt disease spread locally and beyond our borders.

Relevant Ontario Public Health Standards

Interpret and use surveillance data to communicate information on risks to relevant audiences.

Conduct population health assessment and surveillance regarding infectious and communicable diseases and their determinants.

Conduct surveillance and epidemiological analysis, including the monitoring of trends over time, emerging trends, and priority populations.



Achievements and Challenges

Ontario surveillance in action during COVID-19:

- Using local data showing that racially and ethnically diverse, newcomer, and low-income communities and neighbourhoods were disproportionately affected by COVID-19, the public health sector was able to target testing and immunization services to high-risk communities.
- Black, South Asian and other racialized populations were able to use local data on health disparities to advocate for and implement health services for their communities.
- Ontario used newly developed methodologies for testing municipal wastewater to help understand population-wide levels of virus within communities.
- Because of prior PHO Laboratory investments in genomic testing for foodborne illness outbreaks and human immunodeficiency virus (HIV), Ontario was a global leader in whole genome sequencing (WGS) for COVID-19. Ontario leveraged this capacity at the PHO Laboratory and other laboratories across the province to provide ongoing real-time assessments of the evolution of the virus to inform provincial, national, and global surveillance.
- COVAX – the centralized vaccination data collection system – made it possible to track uptake of COVID-19 vaccines across the province in real time. With a supportive data governance structure that made the province the health information custodian (HIC) for COVAX, Ontario had the information it needed to assess vaccine uptake and effectiveness in real time.
- PHO used surveillance data to develop a series of epidemiological reports and knowledge products synthesizing the emerging literature on COVID-19, which were used provincially and internationally.
- Ontario's open data initiatives made information about COVID-19 more transparent, and enabled researchers and scientists, including modelers, to develop analyses and models to support decision makers (Hillmer et al, 2021).
- The Ontario Science Advisory Table (now the Ontario Public Health Emergencies Science Advisory Committee of Public Health Ontario), a multidisciplinary group of researchers and scientists, analyzed provincial data and provided advice to the public health sector and government.

But there were still gaps and challenges. Ontario lacks key elements of surveillance and data system infrastructure, including data collection and use agreements to provide comprehensive and responsive data for decision-making. For example, although the greatest pandemic threat is from zoonotic viruses that spread from wildlife to people, there is a lack of integrated surveillance across human, animal, and environmental data to support a One Health approach to surveillance.

Ontario initially did not have the authority or capacity to collect data on the race, ethnicity, or other sociodemographic characteristics of COVID-19 cases to understand which populations were at greatest risk from COVID-19. It also did not have processes to ensure that the way data were collected and used respected Indigenous data sovereignty as well as the importance of responsible engagement, governance, access, and protection of race-based data.

Lack of Integrated Data Systems

Data systems used by public health agencies, hospitals, primary care, laboratories, and long-term care homes are not integrated and cannot talk to each other. Lack of information system integration results in unnecessary duplication of data collection and missing information. During COVID-19, some progress was made in integrating data to support case and contact management, and vaccination (i.e. COVAX), but those systems can currently only be used for COVID-19. They could not be adapted for MPOX when it emerged in 2022. Public health agencies had to revert to cumbersome, time-consuming manual processes for case and contact investigations and vaccinations, and MPOX case and vaccination data cannot be easily linked.

The province does not have systems that support automatic reporting of hospitalizations and deaths of individuals with diseases of public health significance. As a result, public health agencies had to use labour-intensive manual processes to assess the number of individuals with COVID-19 who had been hospitalized, were in the intensive care unit, or had died due to COVID-19.

The most effective use of scientific expertise relies on a diverse interdisciplinary range of expertise, including biomedical, social sciences, ethics, law, and history, organized to provide a pipeline of research, evidence and knowledge that integrates lessons learned from practice and provides timely, synthesized information for decision-making. During the COVID-19 pandemic, several scientific entities across the province, as well as nationally and internationally, produced similar summaries of the rapidly evolving literature. Lack of co-ordination among these scientific networks resulted in unnecessary duplication. Over the course of the pandemic, organizations in Ontario did establish an evidence synthesis infrastructure to provide rapid evidence syntheses across a range of topics to inform decision makers about the current state of the science. Approaches like this can help ensure more effective and efficient use of scientific expertise .

Case study: Recognizing Indigenous Data Sovereignty

Both the Calls to Action of the Truth and Reconciliation Commission (TRC) and the United Nations Declaration of the Rights of Indigenous Peoples (UNDRIP) reinforce Indigenous Peoples' right to data sovereignty and self-determination.

During COVID-19, Ontario faced challenges ensuring that, when First Nations communities supported efforts to collect public health data on cases and vaccination, the data were collected, entered, and shared in a way that aligned with the OCAP® principles of Ownership, Access to, Control and Possession of First Nations data, OCAP principles for Metis, Inuit Qaujimatuqangit principles for Inuit, or other guiding data sovereignty structures in place, which are crucial to Indigenous data sovereignty and self-determination.

These principles and data sovereignty structures are not yet well established or integrated in Ontario's health care system, and it was difficult to address this gap in the midst of a global pandemic. As a result, it was challenging for First Nations communities, Indigenous Services Canada, Indigenous leaders, and public health agencies to access surveillance data that could inform and guide public health advice and responses.

The process of working with Indigenous communities to determine if and how their data will be collected, accessed, used, and managed in ways that respect their data sovereignty rights should be an integral part of ongoing outbreak and pandemic planning.

Surveillance Priorities

- Strengthen the province's capacity to conduct One Health surveillance of zoonotic viruses and environmental surveillance.
- Strengthen the provincial surveillance infrastructure to provide comprehensive real-time information on laboratory results, cases, severity, immunizations, and sociodemographic data that can be adapted quickly for use with any new or emerging pathogen.
- Develop data governance mechanisms that allow the province to access timely, relevant, local surveillance data during an outbreak or pandemic, including working respectfully with Indigenous, Black, and other racialized communities to determine how their data may be collected and responsibly used to address inequities.
- Develop proactive processes and platforms to co-ordinate the work done by scientific experts to generate evidence and knowledge products to inform public health decision-making.

Provide Critical Response Resources

Having access to the right resources in the right place at the right time is key to pandemic preparedness and response.

Maintaining access to critical response resources is particularly challenging during a global pandemic when there is fierce competition for limited resources and supply chains are disrupted. During COVID-19, jurisdictions that had invested in infection control expertise as well as stockpiles of personal protective equipment (PPE) – including masks, gloves, gowns, and hand sanitizer – as part of pandemic planning were in a much stronger position to respond than those that had not.

While future pandemics may create different resource needs (e.g., ventilators, acute care capacity, therapeutics), all will require logistical planning to ensure access as well as ethical frameworks for allocating resources during shortages. Three types of critical response resources are likely to be required during all outbreaks and pandemics:

- infection prevention and control interventions and expertise in both health care and non-health care congregate settings
- dependable supplies of personal protective equipment
- timely access to vaccines and therapeutics (if/when available).

Infection Prevention and Control Interventions and Expertise

Infection prevention and control (IPAC) interventions and expertise are a critical public health resource – and a key tool in preventing and managing outbreaks.

IPAC expertise has traditionally been focused on acute health care settings, but it is a first line of defence against infectious diseases in all settings where people congregate, including long-term care homes and retirement homes, workplaces, schools, post-secondary residences, correctional facilities, shelters – even our own homes. Effective IPAC interventions and practices can reduce the spread of seasonal illnesses and improve overall health and resilience; they can also help prevent the emergence of new pathogens.

Achievements and Challenges

Outbreaks are quick to find weaknesses in infection prevention and control.

In 2003, SARS revealed IPAC deficiencies in the acute care sector. As part of the post-SARS investment in pandemic preparedness, the health system made a substantial investment in IPAC programs and expertise, which focused on acute care settings and had limited resources to support other settings.

COVID-19 exposed IPAC deficiencies in other parts of the health care system, such as long-term care homes and retirement homes, and in other community settings, such as shelters and workplaces. Many non-acute care health settings did not have access to the IPAC resources and expertise they needed or the right practices consistently in place to prevent the spread of COVID-19. Community settings also faced significant challenges applying IPAC recommendations for health care facilities in their context.

Ontario does not have enough certified infection control practitioners to meet demand. The province also needs more evidence about how to help health care and non-health care settings as well as individuals consistently implement IPAC interventions and practices.

In an effort to address the IPAC gaps, Ontario took steps to improve the quality and consistency of infection control interventions and practices during COVID-19:

- It established regional IPAC hubs responsible for providing expertise and support to community-based congregate living settings funded and overseen by the Ministries of Health, Long -Term Care, Seniors and Accessibility, Municipal Affairs and Housing, and Children, Community and Social Services including: long-term care homes, retirement homes, shelters, supportive housing, and other residential settings.
- The hubs were supported by the Ministry of Health, public health agencies, Public Health Ontario, and Ontario Health, as well as local hospitals, which provided just-in-time advice and assistance on infection control issues. This expertise helped congregate-living settings build their internal IPAC capacity.

The average citizen and employer may also now have a better understanding of the layers of infection prevention and control measures that can help protect against the spread of respiratory pathogens, such as hand hygiene, staying home when sick, wearing a mask in public spaces, and improving indoor air quality and ventilation. Ontarians may be more likely to adopt these measures as part of their day-to-day lives, as well as during outbreaks and pandemics.

However, more must be done to be ready for the next outbreak. Ontario's Long-Term Care COVID-19 Commission (2021) recommended that public health "develop minimum standards, best practices, and principles related to IPAC capacity, training and certification for both IPAC leaders and staff in long-term care homes."

The Role of Policies and Environmental Changes in Infection Prevention and Control

The COVID-19 pandemic highlighted the potential for social policies, technologies, and environmental changes such as better ventilation to help prevent disease transmission. For example:

- The Ontario government compensated people for up to three COVID-19 related sick days so they could stay home when ill.
- Both the provincial and federal governments invested in improvements to ventilation and indoor air quality in a variety of settings, including hospitals and schools (Government of Ontario, 2021; Government of Ontario, 2022).
- Ontario provided direction for businesses, organizations, and individuals on how to reduce the risk of COVID-19 transmission by improving filtration and ventilation (Ontario Agency for Health Protection and Promotion, 2022; Siegel J, 2021).
- Many buildings installed touch-free doors, faucets and toilets, and many redesigned ventilation systems and installed air filtration systems to reduce the spread of respiratory viruses and bacteria.
- Long-term care homes now limit the number of residents sharing rooms and have redesigned rooms to help prevent transmission of infectious diseases.

These types of policy and environmental changes can make communities more resilient in the face of an outbreak, and should be part of the pandemic preparedness toolkit.

Dependable Supplies of Personal Protective Equipment

Although the type of personal protective equipment (PPE) needed for the next outbreak will depend on the pathogen, PPE will always play a role in reducing risk.

Early in the COVID-19 pandemic, Ontario's capacity to provide PPE was limited by both global and local factors, including: massive worldwide demand, supply chain issues, local stockpiles that had expired, competition among sites trying to purchase supplies, distribution challenges, and the lack of local companies producing PPE.

Achievements and Challenges

Over the course of the pandemic:

- The province negotiated agreements with domestic manufacturers to produce PPE to ensure the province would have a stable supply.
- The province co-ordinated the centralized purchasing and distribution of PPE supplies to ensure fair and timely access for health care settings across the province.
- Provincial guidance on the appropriate use of PPE was updated over time to reflect evolving evidence.

However, PPE was a challenge throughout the pandemic, mainly due to changing guidance on the use of PPE in non-health care settings, and the ability of those settings to get appropriate PPE for their staff. As Ontario's Long-Term Care COVID-19 Commission (2021) notes: "As part of its pandemic planning, the province should ensure that there is a central procurement process for personal protective equipment and other necessary supplies [and maintain] within the province of Ontario a capacity to manufacture PPE [and] a provincial pandemic stockpile including personal protective equipment and other necessary supplies."

Timely Equitable Access to Vaccines and Therapeutics

Vaccines, when available, are a critical tool in stopping or controlling the spread of communicable diseases or reducing the risk of severe illness.

In the early stages of an outbreak, there may be global competition for vaccine and, as was the case with COVID-19, demand may exceed supply. The federal government is responsible for vaccine supply, including negotiating contracts to purchase vaccine, and working with academic hubs and manufacturing facilities to develop the capacity to produce vaccines in Canada. However, it is up to the provinces and territories to establish vaccine priorities, manage distribution, and collaborate with academic partners to monitor vaccine effectiveness and safety.

Investing in Innovation

Ontario has a critical mass of scientists and researchers involved in vaccine and therapeutic research and development. Every effort should also be made to build the province's capacity to innovate and contribute to efforts to find better vaccines and treatments as well as more effective ways to detect and protect against emerging pathogens.

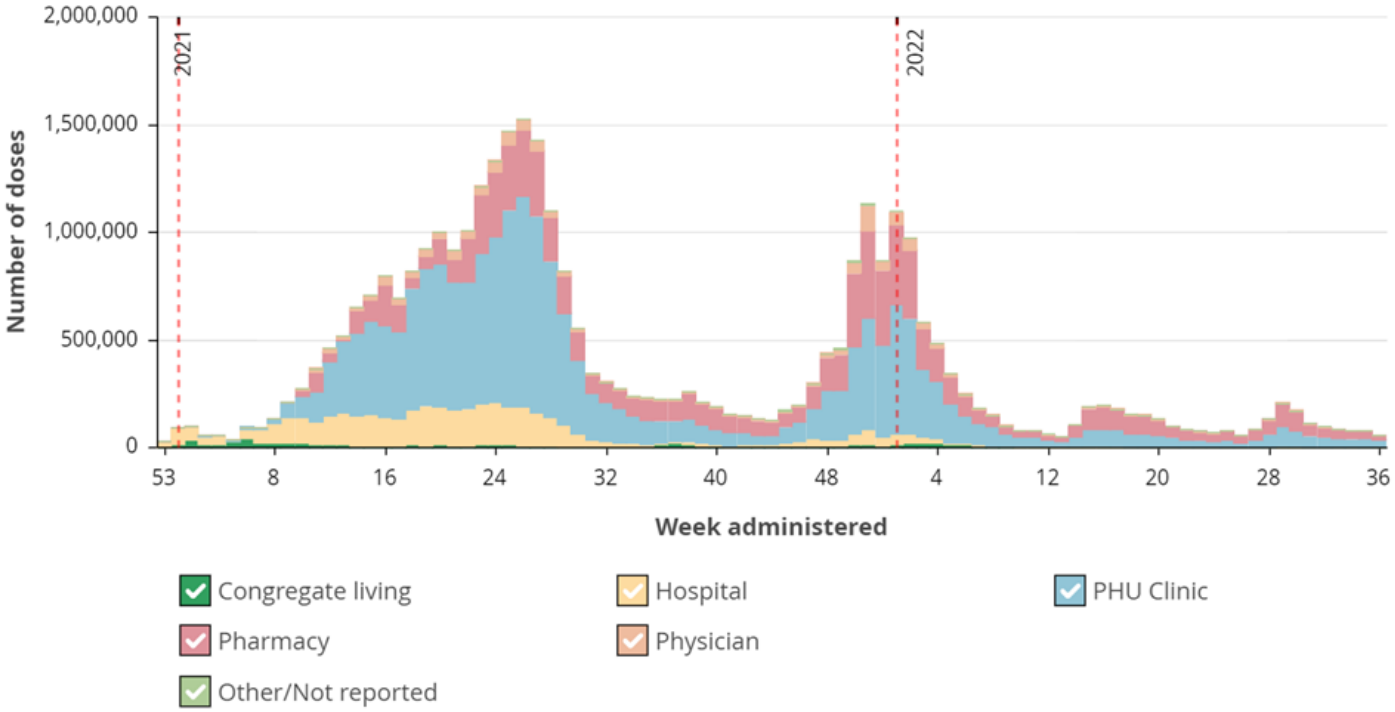
Achievements and Challenges

The world now has the expertise and technologies to rapidly develop highly effective, safe vaccines for some emerging pathogens. Ontario has also demonstrated through two outbreaks – H1N1 and COVID-19 – that it has the infrastructure and capacity to ramp up immunization services. Once a supply of COVID-19 vaccine was available in Canada, Ontario leveraged parts of the health care system to vaccinate the population quickly and efficiently:

- Ontario's public health agencies successfully used a combination of their own staff and other partners, such as hospitals, pharmacies, Indigenous agencies, and paramedics to deliver mass vaccination clinics.

- At the peak of its immunization drive, Ontario delivered over 1.5 million doses in a week.

Figure 8: Weekly number of COVID-19 vaccine doses administered in Ontario by vaccination setting



- Indigenous people were a priority for immunization because of the high risk of poor outcomes from COVID-19, particularly in remote communities that have few health services. To help protect those communities, Ontario launched Operation Remote Immunity. The program successfully delivered immunizations to 31 remote Indigenous communities and Moosonee. Indigenous and public health leaders, community members, and front-line providers worked together, with the support of Ornge, the air ambulance and critical care transport services and Indigenous Services Canada, to get people vaccinated. Community coordinators helped overcome vaccine hesitancy and organized vaccine clinics (Government of Ontario, 2021; Baifuzhiyeva D, 2022).
- The Black Physicians Association of Ontario and the Black Health Alliance worked with local public health agencies and health partners to address the disparities in early vaccine rollout, and increase coverage and protection for Black communities across the province (Black Health Alliance, 2022).
- As the COVID-19 vaccination program expanded and became more complex, public health and health system partners adapted quickly to changing guidance and implemented individual and population level recommendations, while maintaining high levels of vaccine distribution across the province.
- Ontario has also been successful in finding innovative ways to take immunization services to populations and groups who, because of personal health concerns, work schedules, distance from mass immunization clinic sites, lack of public transportation, problems accessing the online booking system, or vaccine hesitancy, may not have received their vaccines. Effective vaccination programs must be able to deliver mass immunization clinics as well as targeted vaccine programs to reach everyone possible.

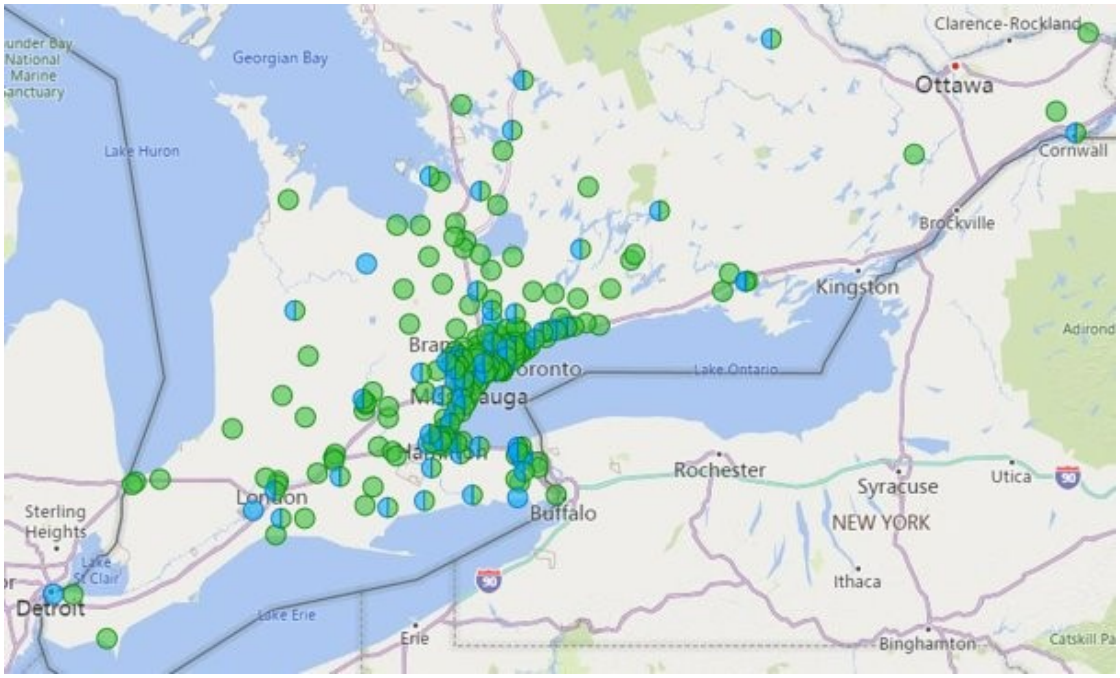
Ontario has been very successful in getting its population vaccinated: 81% of Ontarians are now fully immunized (two doses). However, only 50% have received a third (booster) dose, and vaccine uptake in children is lower than expected. These gaps are not due to lack of access to vaccines but to other factors, such as vaccine hesitancy, less sense of urgency as the number of hospitalizations and deaths drop, and/or the message that younger people are at less risk of serious illness.

Case Study: GO-VAXX Bus and Mobile Clinics Reach Under-vaccinated Groups

Between August 2021 and July 2022, the GO-VAXX Bus and Mobile Vaccine Clinics delivered almost 150,000 doses of COVID-19 vaccine to under-vaccinated groups in 26 of the province's 34 public health unit areas. The initiative, led by the Ministries of the Solicitor General and Health, worked with Metrolinx, local public health agencies, and other ministries and partners, to retrofit buses to serve as mobile vaccine clinics (GO-VAXX), and to operate pop-up clinics in indoor sites. The goal of these clinics was to reach Ontarians who might face barriers scheduling appointments at mass immunization clinics. The clinics set up in a range of settings including: shelters, homes for people with developmental disabilities, senior living facilities, community centres, shopping malls, sporting events, religious and cultural organizations, schools, and post-secondary institutions.

Part of the success of the GO-VAXX bus is that, for people who are anxious about or distrust the health system, it is not a traditional clinical environment. Although it is a fully functioning vaccine clinic, it has a non-clinical feel that makes it easier for people who are hesitant or nervous about getting their vaccines. The mobile vaccination clinics also tailor their approach to the community they are trying to reach: they work with community groups to plan the clinic and make special accommodations to meet community needs.

Figure 9: Sites of GO-VAXX bus and mobile vaccine clinics (August 2021—July 2022)



Access to Therapeutics

In future outbreaks and pandemics, effective treatments may be developed more quickly than vaccines, or there may be an urgent need for widespread delivery of therapeutics. As part of outbreak preparedness, the public health sector must co-ordinate with the broader health system to develop a plan and ethical framework for distributing treatments that may be in short supply. The plan should include strategies to ensure: equitable access across the province, ethical decision-making about how to prioritize groups for treatment, expert advice to develop and update clinical treatment guidelines, and research on the impact of novel therapies.

Priorities for Critical Response Resources

Infection Prevention and Control Expertise

- Develop the evidence, policies, procedures, minimum standards, best practices – including environmental changes, such as better ventilation, and expertise, such more certified infection control practitioners – to support appropriate use of IPAC interventions and practices in non-health care settings (e.g. congregate living settings, workplaces, schools).

- Strengthen Ontario's capacity to provide IPAC evidence, policies, procedures, minimum standards, best practices – including interventions for the built environment and IPAC expertise –– in all health care settings to reduce risks posed by emerging pathogens, particularly zoonotic diseases and antibiotic resistant organisms.

Personal Protective Equipment

- Sustain the local capacity to produce PPE, and establish, manage, and distribute a reliable rolling provincial stockpile of appropriate PPE that will avoid equipment expiring, and ensure sufficient supply to meet demand during a pandemic.

Vaccines and Therapeutics

- Sustain partnerships with the health care system, including with pharmacies, to manage the timely, equitable distribution and delivery of vaccines and therapeutics, using a variety of approaches (e.g. mass, mobile and pop-up clinics, and population-specific programs).

II. Community Readiness

Individuals and communities fare better during disease outbreaks when they are in good health and live in favourable social conditions.

People are healthier and more resilient when they:

- have supportive friends and family
- are educated
- are stably housed
- are employed in jobs where they earn a good living and have paid sick time
- live and work in safe physical environments, have easy access to health services
- healthy food and opportunities to be physically active
- have good coping skills
- do not face discrimination or racism.

While Ontarians are generally healthy, there are people in every community who do not have the same opportunities as their neighbours to enjoy good health. Because they experience inequities in factors such as income, employment, housing, education, and access to health services, and/or the impacts of systemic racism and colonialism, they have worse health outcomes. When outbreaks happen, these individuals and groups are again at higher risk of worse health outcomes.

To strengthen community readiness, the public health sector must work with populations facing health inequities to improve health and resilience before a new pathogen emerges. To do that, public health agencies must:

- Build enduring community partnerships
- Engage communities in co-creating and testing outbreak plans
- Improve health equity and resilience

Relevant Ontario Public Health Standards

Engage in multi-sectoral collaboration with municipalities and other relevant stakeholders in decreasing health inequities.

Engage with Indigenous communities and organizations, as well as with First Nation communities striving to reconcile jurisdictional issues, including fostering and creating meaningful relationships, starting with engagement through to collaborative partnerships.

Lead, support, and participate with other stakeholders in health equity analyses and policy development, and advance healthy public policies that decrease health inequities.

Build Enduring Community Partnerships

To improve health equity, the public health sector must build enduring, trusting partnerships with communities before the next threat occurs.

Collaborative partnerships respect and build on community strengths, including trusted community leaders who have an in-depth understanding of how their communities work, and the barriers they face. Community leaders can provide valuable advice to public health on the community's needs, how to adapt public health services to meet those needs, and how to communicate effectively with community members.

The process of building enduring partnerships must include opportunities to develop trust with communities that have not previously had strong working relationships with provincial public health agencies; and strategies to ensure partnerships are maintained over time (i.e. when the individuals involved in those partnerships change).

As Ontario learned during COVID-19, the process of working with communities must be deeper, more collaborative, and more sustainable than traditional approaches to community development.

True relationship building with First Nation communities must be reciprocal and go beyond "just one more consultation".

Achievements and Challenges

During COVID-19, there were many examples of local public health agencies collaborating with communities to improve health outcomes:

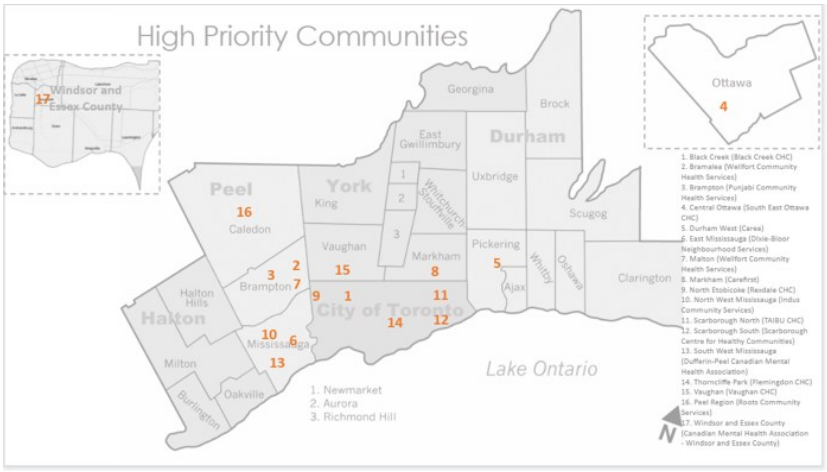
- The High Priority Communities Strategy (see below) was able to increase immunization rates significantly in communities at greater risk of COVID-19 infection and more severe outcomes. However, the strategy was limited to specific neighbourhoods, and not all communities that could have benefited from these supports received them.
- Special efforts were made to reach culturally and linguistically diverse communities. For example, local public health agencies located in areas designated under the French Language Services Act leveraged existing mechanisms and relationships to engage Francophone communities in planning and delivering services that would reach and meet the needs of Francophone Ontarians.
- Provincially funded local community ambassadors helped local public health and community health agencies connect with culturally and linguistically diverse communities with higher needs.
- In some cases, communities worked with local public health agencies to adapt public health guidance to reflect their living conditions, such as modifying hand hygiene recommendations for households without running water, or adapting isolation recommendations for people living in crowded housing conditions.
- Local public health agencies supported First Nations communities' sovereign authority to enact their own by-laws to, for example, close communities to outside people, and reopen borders, schools, and businesses on reserve.
- Some local public health agencies worked collaboratively with community leaders and services to develop strong partnerships to help people in isolation meet their basic needs (e.g. food, social supports, internet connectivity, phones).

The High Priority Communities Strategy: A Model for Greater Health Equity

When it became clear that certain communities were at greater risk of severe COVID-19 outcomes, the province and many local public health agencies worked with those communities to implement the **High Priority Communities Strategy** to reduce health risks and inequities.

The strategy used surveillance data to identify 17 high priority communities across the Greater Toronto Area, Windsor and Ottawa based on: prevalence of COVID-19, low testing and vaccination rates, and other factors (e.g. social determinants of health) that could affect access to health services (racial/ethnic diversity), and challenges meeting basic needs (material deprivation).

Figure 10: High priority communities



The provincial team collaborated with lead agencies in each community to plan and implement culturally and linguistically appropriate initiatives that would reduce barriers and improve access to community outreach and education, testing and vaccination, and wrap-around social supports. The communities developed targeted communications in relevant languages. They hired community ambassadors armed with information to promote COVID-related services and supports, and combat misinformation and myths. Testing and vaccination services were offered by trusted primary care providers in culturally safe settings and in relevant languages, and the clinics ran for longer hours and provided transportation. Each community also provided case management and referrals to other services, such as emotional support, access to PPE, isolation facilities, grocery shopping, food banks, and financial assistance.

Because of these initiatives, testing and first dose vaccination rates in high priority communities are now comparable to those in other parts of the province.

The High Priority Communities Strategy involved:

- focusing proactively on those at increased risk, based on community knowledge of the drivers of poor health outcomes
- engaging the community based on trust, and funding lead agencies, community leaders, and peers to deliver culturally responsive services
- making it a priority to bring health and social services together to solve disparities in access and outcomes
- establishing a sustainable network of partners to maintain relationships between communities and care teams
- developing an infrastructure for effective care management that directed resources where they were needed most.

Even strong community partnerships can be tested in pandemic situations, and those scenarios become more difficult when there is no pre-existing trusting relationship.

Local public health agencies reported that it was challenging to manage outbreaks and implement appropriate public health measures in congregate or crowded living settings, such as shelters (see box).

Case Study: Adapting Public Health Measures to Shelters

Early in the pandemic, outbreak measures for individuals living in shelters were highly restrictive. Every time a case of COVID-19 was diagnosed in a shelter, others using the services had to go into isolation or quarantine for extended periods of time. That meant they were unable to work or access support services. Some clients chose to stop using shelter services rather than live with these restrictions.

While many local public health agencies had strong relationships with local shelters and their clients, and they worked with community partners to support shelter clients, they could not meet all the needs. Staff of all the agencies involved found it very discouraging that efforts to protect vulnerable people from COVID-19 were having such a negative impact on their health and social well-being. In some regions, homeless shelters moved to different models of operation, such as using hotels – but that option wasn't available in all communities.

In some First Nation communities, a large proportion of the community could be in isolation or quarantine for long periods of time while ill individuals waited for test results. In other cases, communities opted to use additional measures to keep COVID-19 from entering their community. For example, members returning to the community had to be tested pre-arrival and then go into an extended quarantine. While these measures protected the community, they increased the stress on individuals and families, and affected people's mental health.

Engage Communities in Co-Creating and Testing Outbreak Plans

> **[P]andemic plans … must be reviewed, assessed and drilled annually. The province should set out a testing strategy that involves a review of the pandemic plans and full simulations that engage all key stakeholders involved in implementing the plan.**
>
> Ontario's Long-Term Care COVID-19 Commission, 2021

Outbreak planning is a process of ongoing learning and continuous quality improvement.

Tabletop and other full-scale simulation exercises are a key tool in emergency preparedness. They provide the opportunity to test assumptions, relationships, and plans, and identify and address problems or gaps.

Tabletop and simulation exercises usually involve people from different organizations collaboratively working through an outbreak or pandemic scenario. Because of the key role that community partners, including at-risk communities, play in outbreak response, they should be part of processes to co-create outbreak plans, exercises to test the plans, and ethical discussions about prioritizing access to scarce resources.

Relevant Public Health Standards

If no lived experience from disruptions or emergencies has occurred in the past 3 years, practice in whole or in part emergency plans and 24/7 notification procedures every three years.

Apply a self-assessment process to emergency management. This process may be applied to tests, exercises, simulations, and/or emergency plan activations and agency responses.

Planning for seasonal community-wide outbreaks, such as influenza, provides ongoing opportunities for local public health agencies to engage communities and the broader health system in tabletop and simulation exercises, assess readiness, and identify gaps and issues.

In addition to organizing tabletop and simulation exercises to test outbreak plans, the public health sector should document lessons learned from actual outbreak responses. What worked? What didn't? What could have been done differently? Evaluating real experiences is a critical part of the adaptive learning process.

Community Readiness Priorities

- Strengthen efforts to build enduring collaborative partnerships between local public health agencies and communities that face health inequities, systemic racism, and discrimination, and work with them to adapt public health services to meet their needs.
- Strengthen the public health sector's capacity to engage the broader health sector and community partners in co-creating and testing outbreak plans, and documenting and applying lessons learned from past outbreaks to emerging threats.
- Conduct regular exercises and simulations to test and improve outbreak plans.

Improve Health Equity and Resilience

The public health sector has a responsibility to assess the health of the population, identify health inequities, and work with partners and governments to implement interventions to reduce those inequities.

To identify individuals or groups coping with health inequities, local public health agencies need to routinely and responsibly gather information about their population's health, as well as the social, economic and demographic factors that can affect health, such as: age, sex, gender, sexual orientation, income, education, race, ethnicity, language, employment and unemployment rates, population growth, the number of seniors living alone, the number of lone-parent families, the number of newcomers, how many people own their own homes and how many rent, access to affordable housing experiences of racism or discrimination, access to healthy foods and physical activity, immunization rates, rates of preventable diseases and their impact on hospitalizations and deaths, and other factors that affect healthy growth and development.

Analyzed at the individual level, sociodemographic data can help the public health sector identify groups experiencing health inequities, and subsequently work with those groups - as well as with governments and other partners - to develop and advocate for upstream interventions that improve health equity and resilience.

Relevant Ontario Public Health Standards

Assess and report on the health of local populations, describing the existence and impact of health inequities and identifying effective local strategies that decrease health inequities.

Use population health, social determinants of health, health inequities, and other sources of information to assess the needs of the local population, including identifying populations at risk of negative health outcomes, to determine the groups that would benefit most from public health programs and services.

Achievements and Challenges

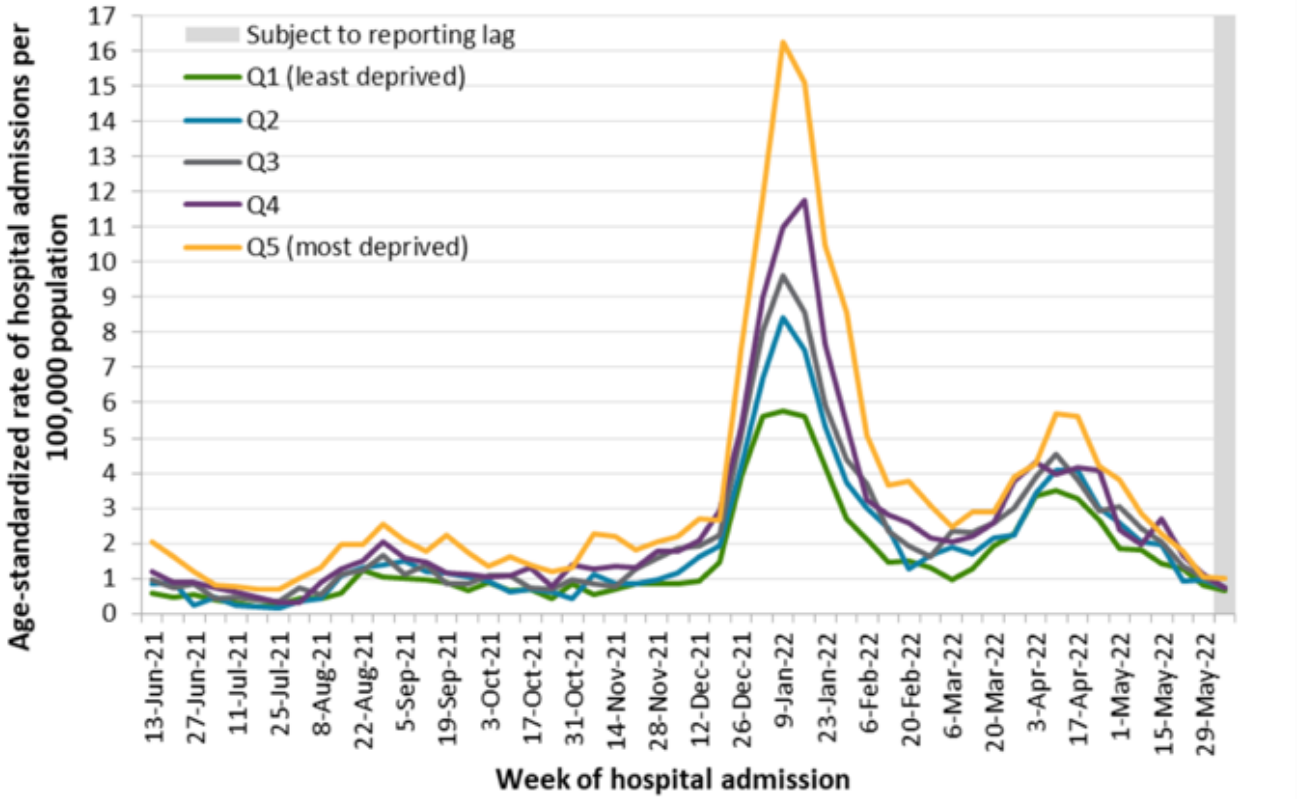
Some sociodemographic data became available as part of COVID-19 vaccine and case management. This information was extremely helpful in guiding initiatives like the High Priority Communities Strategy. However, the data were not complete or easy to collect.

At the current time, Ontario is not able to identify individuals or groups at risk of poor outcomes from future disease threats because it doesn't routinely collect sociodemographic information. To understand and address health inequities – both before and during an outbreak or pandemic – the province needs a more systematic way to routinely collect and update this information for all Ontarians, with the appropriate privacy, data safeguards, data sovereignty, and respect for Indigenous, Black and other racialized populations. Once developed, this capacity to identify groups at risk could be leveraged to improve health inequities beyond pandemics and across the health system.

During COVID-19, Ontario also experienced gaps in information about risk and the impacts of public health measures. For example:

- Local and international outbreak information indicated that some workplaces were at higher risk of having severe COVID-19 outbreaks; however, Ontario did not routinely collect information on the occupation and job type of people diagnosed with COVID-19. As a result, the public health sector was not able to assess the frequency of COVID-19 cases by occupation, understand workplace risks, or evaluate the effectiveness of workplace interventions (Buchan et al, 2022).
- Public health measures used during a pandemic can have unintended consequences for people's health and increase health inequities. For example, school closures have a more negative effect on children in families with low incomes, and families in communities with higher rates of COVID-19 – many of whom were lower income (see Figure 11) – were more likely to choose virtual school for their children even after the schools reopened (Chaabane et al, 2021).

Figure 11: Confirmed COVID-19 cases that were admitted to hospital (per 100,000 population), by quintile of neighbourhood material deprivation and hospital admission week, June 2021 to May 2022

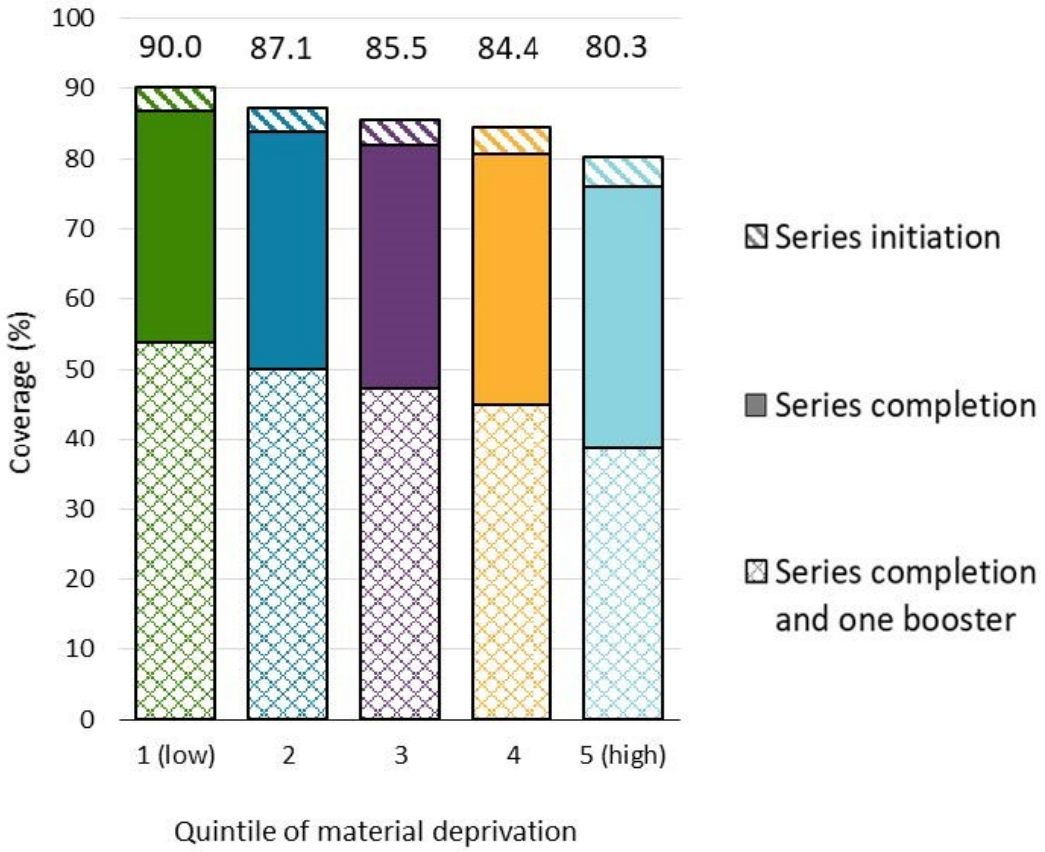


The Role of Sociodemographic Data in Identifying Health Inequities

Sociodemographic information that became available as part of case and vaccination data revealed that communities with a higher proportion of immigrants, Black and other racialized populations, and populations with low socio-economic status had a higher incidence of COVID-19 cases and deaths.

These same communities also faced barriers accessing vaccine (see Figure 12), and their residents were more likely to experience marginalization related to racism, discrimination, or other barriers to accessing resources (Ontario Agency for Health Protection and Promotion, 2022; Amberber et al, 2021).

Figure 12: Vaccination coverage for individuals aged 5 years and older by quintile of neighbourhood material deprivation: Ontario, December 14, 2020 to February 21, 2022



Health Equity Priorities

- Develop provincial systems to support the responsible and respectful collection, linkage, governance, and use of social, economic, health outcomes, and other sociodemographic data (including information on age, sex, gender, sexual orientation, race, ethnicity, language, preferred official language, income, occupation, access to services) to help the public health sector identify and address health inequities in their communities.
- Sustain the public health sector's efforts to work with populations at risk and leverage local innovation to co-design and advocate for upstream interventions that will reduce health inequities, build community strengths, and increase resilience.

III. Societal Readiness

The effective use of public health measures to prevent or manage outbreaks depends on a resilient, supportive society.

Outbreaks and pandemics raise difficult ethical questions that influence all aspects of preparedness and response, including how to allocate scarce resources, and whether or when to limit individual or societal freedoms. In a supportive, "ready" society, citizens are willing to act for the common good. They follow public health advice and recommendations, and they adhere to mandatory measures such as stay-at-home orders, mask mandates, and vaccine passports.

Measures adopted during an outbreak must be consistent with society's ethics and values, and must be clearly and transparently communicated. When people understand why certain decisions are made and have the necessary supports, they are more likely to adhere to public health recommendations.

However, to be ready and supportive, citizens must:

- Have relatively high levels of trust in government
- Understand and accept the ethics and values underlying public health decisions
- Understand and accept the government's and public health's legal authority to implement measures to protect the health of the population
- Have the information and supports they need to follow public health advice (e.g. the risks associated with the particular disease, the populations most affected, the evidence showing the measures are effective, easy access to masks and tests, places to isolate, and supports during isolation and quarantine)

To increase societal readiness for the next outbreak or pandemic, Ontario's public health sector must:

- Build social trust and ethical preparedness
- Communicate clearly and transparently with the public, and counter misinformation

Build Social Trust and Ethical Preparedness

The effectiveness of pandemic responses is related to social trust.

In countries where citizens had higher levels of trust in their government and in one another, infection rates were lower and vaccine coverage was higher (COVID-19 National Preparedness Collaborators, 2022)

Trust is closely correlated with people's sense that the government is doing the right thing: that is, making decisions that are in society's best interests, reflect shared social values, and achieve stated pandemic goals.

Who should be first in line for masks, vaccines, or treatments? How should vulnerable populations be protected or supported? What sectors should remain open? How do we prioritize pandemic health services while maintaining routine health services? When is it acceptable to make some public health measures mandatory? How should we navigate trade-offs between competing objectives or values?

Relevant Ontario Public Health Standards

Ensure a culture of quality and continuous organizational self-improvement that underpins programs and services and public health practice, and demonstrates transparency and accountability to clients, the public, and other stakeholders.

People are more likely to maintain trust in government when the answers to these questions reflect society's shared ethics and values. While it may not be possible to reach consensus on any of these difficult issues, it is incumbent on the public health sector to be transparent about its decisions, the decision-making process, and the rationale for those decisions. The sector must engage communities so that the ethics and values underpinning those decisions reflect the voice of the community, and be willing to revisit decisions at frequent intervals as well as when new information emerges.

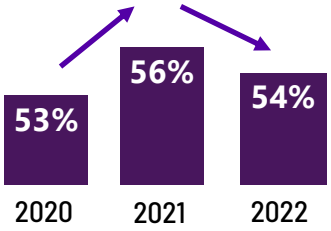
Trust is also closely correlated to reciprocity: individuals are more likely to adhere to public health measures if they have access to the supports and resources needed to follow those measures. For example, an individual who has to isolate for several days to avoid spreading illness to others is more likely to do so if they have a place to isolate and receive the physical, emotional, and financial supports they need while in isolation.

Frank public conversations about shared values, ethical frameworks and trade-offs should happen before an outbreak, as part of outbreak planning. These conversations should be revisited when an outbreak occurs to make sure that society still understands and shares the same values.

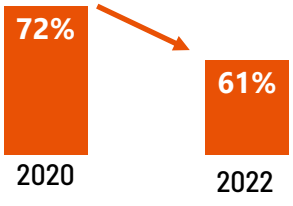
Achievements and Challenges

Measures of social trust have varied in Canada and Ontario over the past three years:

- According to the Edelman Trust Barometer (2022), an international survey assessing the general populations trust in democracies, Canadians have relatively 'neutral' levels of trust that rose and then fell during the pandemic: **53% in 2020, 56% in 2021**, **54% in 2022**. However, Canadians had higher levels of social trust than other comparable countries including the United States, Australia, Germany, and the United Kingdom.



- An Ipsos' international survey of social cohesion found a similar trend: between late 2020 and March 2022, the proportion of Canadians who trusted in other Canadians to "do what is in the best interest of the country" dropped from **72%** to **61%,** while trust in government to "do what is right" dropped from **58%** to **43%** (Sethi, 2022).



- During COVID-19, Ontario used data from behavioural measures surveys to understand where Ontarians were obtaining information, their trusted sources of information, and their awareness and compliance with recommended public health measures. Based on those surveys, Ontario experienced relatively high levels of public trust in government and adherence with public health measures, including high compliance with masking and high rates of immunization, particularly for the first two vaccine doses. There is also evidence that provincial and local medical officers of health were highly trusted and credible sources of information (Ontario Ministry of Health, 2022).
- Not all Ontarians agreed with all public health measures, and support for some measures dropped over time. Many public health officials became the targets of abuse and threats. Early public support for health care workers (e.g. going out each evening to bang pots) was replaced by anti-mask protests outside hospitals.

> "Social cohesion can rise in the aftermath of natural disasters or mass tragedies, but this "coming together" is often short-lived. The early stages of the COVID-19 pandemic witnessed marked increases in kindness and social connection, but as months passed social tensions re-emerged or grew anew. Thus local authorities faced persistent and evolving challenges.
>
> The social cohesion investment: Communities that invested in integration programmes are showing greater social cohesion in the midst of the COVID-19 pandemic, Lalot et al, 2021

Ontario employed a variety of mechanisms to build social trust and ethical preparedness during COVID-19, including:

- The Public Health Measures Table, made up of Medical Officers of Health and Public Health Ontario, provided confidential advice to the Chief Medical Officer of Health on the type and timing of different public health measures throughout the pandemic.
- Ontario's COVID-19 Bioethics Table (2022), developed briefs and guidance on a range of ethical issues, including: priority-setting for personal protective equipment, paid sick leave, a framework for ramping down elective surgeries and other non-emergent activities, and ethical frameworks for drug shortages and vaccine distribution. The public health sector used these frameworks to integrate ethical issues (e.g. harms and benefits, fairness, legitimacy, trust) into the plans to distribute vaccines and therapeutics.

> "There is broad agreement that, even in a crisis, doing the right thing must take account of fairness. … Doing the right thing also means taking proper account of individual rights … while recognizing that, at times and to the least degree possible, those rights may have to be limited for the safety and well-being of others. [It is a] difficult balancing act of reducing harm, tackling unfair health inequities and minimizing measures that are coercive.
>
> Ethical Preparedness
> Archaud, 2022

Because the process of developing ethical briefs and frameworks occurred in the midst of a pandemic, it was not possible to involve society as a whole in the conversations. It was also challenging to communicate to the public "why" certain decisions were made, and the steps that decision makers took to try to balance competing ethical principles and societal objectives.

Most of the briefs from the Bioethics Table focused on making decisions about health services. However, some of the most challenging ethical decisions during COVID-19 were about non-health services, such as public health measures that closed businesses and schools, the restrictions on visitors in long-term care settings, and the use of vaccine passports. Some of these decisions were less transparent: Ontarians did not necessarily understand the ethical values or trade-offs underlying them.

Unintended Negative Consequences of Public Health Measures

Another ethical challenge that should be considered as part of pandemic preparedness is the fact that many public health decisions and interventions required to control an outbreak can have significant unintended negative consequences for individuals, families, communities, and society. For example, during COVID:

- School closings affected parents' and children's mental health. A survey of Ontario parents found one in three had moderate to high levels of anxiety, 57% met the criteria for depression, and 40% reported their children's mood/behaviour had deteriorated. Children have also fallen far behind in their learning, and the education system will need to implement special strategies to help them recover (Gallagher-Mackay et al, 2021). School closures and the stresses associated with moving teaching online or working in hybrid models was also extremely stressful for educators.
- The decision to prioritize COVID-19 services in acute care settings kept many Ontarians who needed surgery or cancer care from getting that care. From delays in just the first three months of the pandemic, one modelling study suggested the province's surgical backlog would take 84 weeks to clear (Wang et al, 2022).
- Business closings hit those in the service, tourism, and arts and culture industries particularly hard. The full health, social and economic impact of job and business losses – although mitigated by federal and provincial income supports – is not known.

When deciding on and managing public health measures, the public health sector must weigh the potential negative unintended consequences, monitor their impact, and continually look for ways to minimize or mitigate them.

Weighing the Economic Impact of Lockdowns vs a High Number of Cases

An analysis by the International Monetary Fund, found that a very high number of COVID-19 cases caused as large a reduction in economic activity as a lockdown, except the reductions in economic activity due to high rates of illness last longer than those associated with lockdowns. Economies bounce back more quickly from the impact of lock-downs than high rates of illness, hospitalizations and deaths (International Monetary Fund, 2020).

Priorities for Ethical Preparedness

- Strengthen public health sector efforts to build and measure social trust, and involve society in conversations about the shared values and ethics that underlie pandemic decision-making, and the role of both government and society in protecting and promoting public health.
- Establish formal consistent mechanisms for the public health sector to access ethical expertise to guide public health decision-making during all phases of a pandemic (i.e. preparedness, response, recovery).

Improve Communication and Counter Misinformation

Clear communication, including effective risk communication, can help build social trust and societal readiness.

Because so much of outbreak response depends on individual and societal behaviour, the public health sector and government must be able to communicate clearly and transparently – in English, French and other languages – why public health measures are needed. It must also be able to assess public opinion and support, and quickly and effectively counter misinformation that can hinder the public health response.

The public health sector has long been a credible, trusted, non-political source of health information. During the COVID-19 pandemic, the sector had to compete in a noisy, demanding media and social media environment to communicate with the public. The World Health Organization (2022) describes that environment as an "infodemic": "too much information including false or misleading information in digital and physical environments during a disease outbreak."

Relevant Ontario Public Health Standards

Public health communication strategies reflect local needs and utilize a variety of communication modalities to ensure effective communication.

Use a variety of communication modalities, including social media, taking advantage of existing resources where possible, and complementing national/provincial health communications strategies.

> "An infodemic can cause confusion and risk-taking behaviours that harm health, lead to mistrust in health authorities, undermine the public health response, and intensify or lengthen outbreaks.
>
> Infodemic, World Health Organization, 2022

Achievements and Challenges

- Over the course of the COVID-19 pandemic, the Canadian public's trust in most information sources, particularly traditional media, declined. However, public trust remained relatively high in scientists and in leaders in their local communities (Edelman Trust Barometer, 2022). This trust in science creates opportunities for the public health sector to communicate accurate information and counter misinformation.
- COVID-19 vaccine uptake was a success in Ontario. Provincial resources and centralized telephone services, such as the Provincial Vaccine Contact Centre and the Hospital for Sick Children Vaccine Consult Service, helped providers communicate with individuals and families about the importance of immunization.
- The public health sector responded rapidly to the emergence of vaccine-related complications, such as vaccine-induced immune thrombotic thrombocytopenia and myocarditis (Science Table, 2021; Ontario Agency for Health Protection and Promotion, 2022). Communications with the public about evolving evidence were clear and transparent, building confidence in the province's strong programs for assessing vaccine safety.
- The public found it confusing when vaccine recommendations changed and became more nuanced over time (e.g. booster doses, new vaccine products), and when recommendations varied from one province or country to the next. This complex communications landscape increased vaccine hesitancy and uncertainty in individuals who readily received their first two doses.
- The public health sector was unable to keep pace with the speed at which information evolved. During the early days of the COVID-19 pandemic, the public's demand for information was insatiable, and public health struggled to produce and distribute culturally appropriate information in English, French, and other languages quickly enough to meet needs.

Countering Misinformation

It is no longer enough to put out accurate information. The public health sector must also actively counter misinformation.

In May 2021, the Center for Countering Digital Hate in the US published the results of an investigation, which showed that 12 people – the disinformation dozen – were responsible for 65% of the misleading claims and lies about COVID-19 vaccines on Facebook, Instagram, and Twitter. The social media companies took steps to reduce their influence, such as labelling posts as misleading, removing falsehoods, and banning people who repeatedly share debunked claims. However, it is relatively easy for people to start new accounts or find ways around the restrictions, and the misinformation continues. To be able to counter misinformation, Ontarians need public education in health literacy, including the skills to assess information and information sources.

> "Misinformation is one of the defining issues of our time. We have a growing body of evidence that tells us that misinformation is killing people.
>
> Too good to be true: Timothy Caulfield on misinformation and trust in health, Nicholson, 2022

Tackling the spread of harmful health information will require a multi-pronged approach, including:

Develop trusted, credible and diverse leaders – both within and outside government – who are strong communicators. In general, the more informed Canadians are, the more likely they are to trust their institutions (Edelman Trust Barometer, 2022).

Support a whole-of- society approach to developing digital strategies to counter infodemics. Health authorities, journalists, fact-checkers, civil society organizations, empowered citizens, and other relevant parties can all play an important role in debunking misinformation and building trust.

Help people develop the scientific literacy and critical thinking skills to be able to assess information and information sources. According to the Edelman survey, only 20% of Canadians have what is described as "good information hygiene", that is: they avoid information echo chambers (i.e. people only engage with information that reinforces their own opinions), verify information before they share it, and do not amplify unvetted information.

Strategies to effectively communicate public health guidance, focus on partnerships, and collaboration, and the importance of roles and relationship-building before public health incident occurs:

1. Anticipate
2. Invest in building relationships and networks
3. Establish liaison roles and redundancy
4. Active communication
5. Consider and respond to the target audience
6. Leverage networks for coordination
7. Acknowledge and address uncertainty

Khan et al, 2017.

Communication Priorities

Strengthen public health sector capacity to provide credible, trusted, transparent information that can counter infodemics and misinformation, and to use evidence-based methods to improve communications, in English, French and other languages.

Next Steps

Ontario's public health sector is committed to a bigger picture view of pandemic and outbreak readiness: one that ensures all the expertise, tools, and technologies are in place, and actively engages communities and society as a whole in pandemic preparedness.

Over the past three years, the province has demonstrated tremendous strength and resilience in terms of sector, community, and societal readiness. We have learned a great deal about how to be better prepared, and we have a clear picture of the challenges that remain as well as the efforts required to be ready for the next outbreak or pandemic.

It seems impossible that we could forget the hard lessons that COVID-19 taught us about the importance of being prepared. But history has often proved otherwise. Memories fade, life goes on, and societies become complacent about a theoretical future threat. But we no longer live in a time when future disease threats are theoretical. The emergence of new pathogens, and the resurgence of old ones mean we now live in a time when we must be constantly vigilant.

Invest in Preparedness

This report lays out the steps the public health sector and its partners must take over the next one to two years to be ready for infectious disease outbreaks. Preparedness is a process of continuous improvement. To get better at detecting and responding to emerging diseases – to reduce the impact of disease outbreaks, including illness, deaths, and social disruption – Ontario must sustain its investment in public health preparedness over time.

It is time to break the "boom and bust" funding cycles that characterized past outbreaks.

Strengthen Accountabilities

Many priorities recommended in this report are part of existing Ontario Public Health Standards. The public health sector and local public health agencies already have the mandate to address these aspects of preparedness. To help ensure accountability for outbreak preparedness and response, the Office of the Chief Medical Officer of Health will review the relevant Ontario Public Health Standards, including the *Emergency Management Guideline*, for opportunities to provide clearer direction about public health agencies' role in building and maintaining readiness.

Assess Progress

Risks and threats may change over time, and the skills, tools, resources, and capabilities to address those threats may also change. We will only know if Ontario is ready if we continue to highlight our successes, progress, challenges, and inequities in achieving system, community, and societal readiness.

The Office of the Chief Medical Officer of Health will adapt and use pandemic preparedness indicators to regularly assess and report on the public health sector's progress in outbreak and pandemic preparedness. The Office will also continue to recommend other ways to sustain, strengthen or develop key aspects of preparedness.

Improve the Health of Indigenous Peoples

Ontario's public health sector is committed to helping to improve the health of Indigenous people. We will continue to work with Indigenous leaders and health service providers, as well as federal partners including Indigenous Services Canada, to: reduce health inequities and improve community relationships; clarify the roles, responsibilities, and governance of health services; and improve data for Indigenous communities in ways that reflect the principles of Indigenous data sovereignty.

Improve the Health of Black and Other Racialized Populations

Ontario is also committed to improving the health of Black and other racialized populations, and reducing health inequities. The public health sector will work with these populations to improve the responsible and respectful collection and use of race-based data to address systemic racism and other health inequities.

Sustain Relationships

To ensure progress on the priorities identified in this report, the Office of the Chief Medical Officer of Health will strengthen partnerships within the public health sector, including with local public health agencies and Public Health Ontario, and with our health sector colleagues.

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And with thanks to the Ministry of Health Internal Advisory Committee

Appendix

Ontario Public Health Units with Vacant Medical Officer of Health (MOH) Positions*

Filled by Acting MOHs as of December 15, 2022

Brant County Health Unit
Chatham-Kent Health Unit
Haldimand-Norfolk Health Unit
Niagara Region Public Health Department
Peel Public Health
Renfrew County & District Health Unit
Timiskaming Health Unit
Windsor-Essex County Health Unit
Total = 8 Public Health Units with MOH Vacancies

*Under 62. (1)(a) of the Health Protection and Promotion Act, every board of health shall appoint a full-time medical officer of health.

Ontario Public Health Units with Vacant Associate Medical Officer of Health (AMOH) Positions* as of December 15, 2022

Grey Bruce Health Unit
Halton Region Health Department**
City of Hamilton, Public Health
Middlesex-London Health Unit
Niagara Region Public Health Department
Ottawa Public Health**
Sudbury and District Health Unit**
Thunder Bay District Health Unit
Total = 8 Public Health Units with AMOH Vacancies

***Under 62. (1)(b) of the Health Protection and Promotion Act, every board of health may appoint one or more associate medical officers of health.

**Vacancies may include less than or more than one FTE position per health unit and positions filled by qualified physicians awaiting ministerial approval.

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