Office of the Auditor General of Ontario

Value-for-Money Audit: COVID-19 Vaccination Program

November 2022

Ministry of Health

Ministry of the Solicitor General

COVID-19 Vaccination Program

1.0 Summary

According to the World Health Organization and the Public Health Agency of Canada, COVID-19 vaccination is one of the most effective ways to protect people in the community against severe illness, hospitalization and death from COVID-19. Ontario began administering the COVID-19 vaccine in December 2020. By mid-August 2022, about 35 million doses had been administered to eligible Ontarians.

While the federal government was responsible for purchasing vaccines for all provinces and territories, in Ontario, the Ministry of Health and the Ministry of the Solicitor General were in charge of co-ordinating the rollout of the COVID-19 vaccines. From April 1, 2020 to May 31, 2022, the ministries spent about $1.5 billion on the rollout of COVID-19 vaccines. Activities included distributing the vaccines to vaccination sites, compensating vaccinators and other support staff at vaccination sites, developing a provincial booking system and an immunization database to track vaccine inventory and vaccination records, and analyzing data on the vaccination program.

Rolling out a mass vaccination program as the pandemic progressed was inherently challenging. The government called on experts in December 2020 to support the development of its vaccination plan and its decisions about prioritizing segments of the population in the face of a limited vaccine supply. By mid-August 2022, more than 80% of Ontarians had been vaccinated with two doses and more than 50% of Ontarians had a third dose or booster, consistent with the rate(s) Canada-wide, yet lower than New Brunswick, Prince Edward Island and Quebec.

Our audit found that the Ministry of Health and the Ministry of the Solicitor General did not consistently adopt advice from experts and key stakeholders, health-care organizations and workers, when formulating their vaccination strategies. The Ministry of Health decided not to implement a vaccine mandate on hospital workers, indicating that its decision was informed by the Chief Medical Officer of Health's analysis of evidence available at that time, but this analysis was not provided to us. As well, when identifying high-risk populations for the "hotspot" strategy to prioritize vaccination when vaccines were scarce, the Ministry of Health (Ministry) did not apply their chosen method of selection consistently across all postal code regions. This resulted in eight lower-risk neighbourhoods receiving vaccines ahead of high-risk neighbourhoods, and nine higher-risk neighbourhoods being excluded from the hotspot strategy.

We also learned that while the Province had a governance structure outlining responsibilities and reporting for high-level decision-making, it did not establish clear reporting relationships for organizations such as pharmacies, hospitals, and public health units in the context of mass vaccination. This resulted in confusion in some regions of the province. We surveyed all public health units and asked them if they believed the Ministry had established clear lines of responsibility for the COVID-19 vaccine rollout. Of the respondents, 67% disagreed. Further, it was unclear what entity was

responsible for investigating fraud at Ontario pharmacies. Two incidents requiring investigation identified by public health units in the summer of 2022 had to wait for a decision from the Ministry's legal team on who would be responsible for this.

From our work, we noted that the province's communication strategy was not always effective in supporting its vaccination program. Our review of the Ministry's approach to communicating factual information to the public indicated that it was disorganized, inconsistent and lacking detail about the benefits of COVID-19 vaccines and vaccination, suggesting that Ontarians may not have been as well informed as possible in their decision-making. We found that the Ministry missed out on opportunities to educate and inform the public on the benefits of the COVID-19 vaccine. For example, the Ministry did not always provide clear information on whether to get additional vaccine doses, and did not effectively combat misinformation about the vaccine. Health experts informed us that they believed the government's communication approach sometimes undermined public confidence in vaccination. The Ministry did not clearly and sufficiently explain its approach to prioritizing certain groups for vaccination when vaccines were scarce. Similarly, it did not clearly address concerns where the public was relying on non-fact-based information about the Moderna vaccine; this may have contributed to higher wastage rates of Moderna, which is both safe and effective for most age groups.

Correcting these issues is essential for responding rapidly to future disease outbreaks, and the large-scale vaccination programs that could be needed.

Other significant issues noted in our audit include:

- **Decentralized and inconsistent vaccination appointment booking systems resulted in confusion and poor end-user experience.** The Ministry of Health launched the provincial COVID-19 vaccination appointment booking system and call centre on March 15, 2021, more than three months after the first vaccine was administered in Ontario. In addition to a provincial booking system, many other booking systems were also in use across different public health units, pharmacies and hospitals. Inconsistent controls across systems created inconsistencies in access and an inability to ensure that the highest risk Ontarians received vaccines first. Multiple booking systems also encouraged Ontarians to "vaccine shop" by registering for multiple appointments to try to get either the quickest appointment or a specific vaccine brand. This phenomenon contributed to about 227,000 no-show appointments in 2021—in the provincial system alone—appointments which could have gone to someone else in need of vaccination. The continued absence of a centralized booking system (as of August 2022) increases the likelihood of unnecessary wastage continuing into the future since such no-show appointments can result in more wasted doses of vaccine.
- **The provincial website on how to book a COVID-19 vaccination was only available in English and French.** In comparison, British Columbia's website had the capability to translate instructions to up to 14 other languages.
- **Physicians were not incentivized to vaccinate at their offices.** The Ministry of Health's compensation structure may cause physicians to prefer working at mass immunization clinics over vaccinating at their offices. Between March 2021 and May 2022, only about 3,000 physicians billed the province for providing COVID-19 vaccines in their offices compared to more than 6,000 who billed for COVID-19-related work in mass clinics even though primary-care offices have traditionally been a trusted place for people, especially children, to get routine vaccinations. Physicians were paid $170–$220 per hour for vaccinating at mass clinics compared to $13 per dose in their own offices.
- **Vaccinators were paid different rates depending on their profession and whether the vaccination site was operated by a private-sector organization, a hospital or a public health unit.** Physicians ($170–$220 per hour) received much higher compensation than nurses ($32–$49 per hour) and pharmacists ($30–$57 per hour) for vaccinating at sites operated by public health units and hospitals.

As well, private-sector operators paid more to various professionals compared to what not-for-profit organizations paid. For example, we found a pharmacist was paid $120 per hour by a private-sector operator (Calian) compared to $62 per hour by a not-for-profit operator (Canadian Red Cross). Neither the Ministry of Health nor the Ministry of the Solicitor General provided the oversight necessary to achieve consistent pay for the same work.

- **Data in Ontario's COVID-19 immunization database was not consistently completed or validated.** The Ministry of Health did not regularly monitor immunization database records to identify unusual or suspicious records until December 2021. As well, the inventory component of the immunization database was not integrated with all systems in the vaccine supply chain, resulting in incomplete inventory data and unnecessary manual input at distribution centres and vaccination sites. This made it difficult for the Ministry to have an accurate picture of inventory to inform ordering and minimize wastage. The Ministry also failed to capitalize on the opportunity to collect and analyze important risk data to better inform future vaccination efforts.
- **Lack of a registry of Ontarians' vaccination records limits Ontario's ability to rapidly adapt to new or existing disease outbreaks and required the Ministry of Health to create a new database for COVID-19.** The Ministry of Health does not keep vaccine records of Ontarians of all ages, despite indicating that this was part of the Ministry's plan in our 2014 audit on Immunization. The Ministry spent about $170 million between 2010 and 2021 on project and operational costs on Panorama, a pan-Canadian immunization registry used by public health units to record all vaccinations included in the *Immunization of School Pupils Act*. However, Panorama's data is incomplete, as it does not require physicians and pharmacists to report vaccinations to public health units.
- **Ontario had wasted at least 3.4 million COVID-19 vaccine doses as of June 30, 2022.** About half of this wastage could have been prevented with better forecasting of the doses required. While the province wasted about 9% of the vaccines received from the federal government from December 2020 to June 2022, the wastage was 38% between February and June 2022 when demand for boosters was much lower than the province anticipated. Two private-sector organizations contracted by the Ministry of the Solicitor General and the Ministry of Health incurred vaccine wastage of 20% and 57%. Targets for minimizing wastage were not included in the contracts with them.
- **Proof of vaccination was not effectively enforced.** Enforcement officers were required to announce themselves at the beginning of a visit to establishments that were required to verify patrons' proof of vaccination, such as restaurants where indoor dining was permitted; therefore, the officers could not observe the normal operations of the business uninfluenced by their presence, including whether the business was using the Verify Ontario app as mandated in early 2022.
- **The COVID-19 Vaccine Distribution Task Force did not have sufficient representation from public health units, which were responsible for implementing the vaccination program.** The Task Force created in November 2020 that guided the early stages of the COVID-19 vaccine rollout did not have sufficient representation from public health units, taking more than a month to enlist its first public health unit representative.

This report contains 11 recommendations, consisting of 33 action items, to address our audit findings. While we acknowledge that we are approaching what seems to be the end of the COVID-19 pandemic, these recommendations should be considered in the context of vaccination programs supporting the remainder of this pandemic and into the future. In addition, they should be incorporated into an updated pandemic response plan so that the government can provide timelier responses.

Overall Conclusion

Our audit concluded that the Ministry of Health and the Ministry of the Solicitor General established a plan to vaccinate Ontarians to minimize transmission of and hospitalization and death from COVID-19, but priorities in the plan were not applied consistently across all regions in Ontario.

The hotspot strategy, part of the overall provincial vaccination plan, prioritized populations at the highest risk for hospitalization and death from COVID-19 according to advice from scientist advisors. Additional factors, such as ethnicity and poverty, were applied to improve equity. While the methodology included relevant risk factors, the Ministry of Health (Ministry) did not consistently apply it. As a result, eight lower-risk communities were included ahead of other communities that had equal or higher risk of hospitalization or death, and poverty and/or ethnicity concentration.

In addition, the Ministry did not provide consistent pay for the same work by vaccinators across the various vaccination clinics. Doctors, nurses and pharmacists were paid differently to do the same work in administering a COVID-19 vaccine. Furthermore, the lack of a single integrated immunization registry increases costs and the risk of error entering data into multiple systems, and misses the opportunity to better analyze trends and improve the Ministry's ability to rapidly adapt to future disease outbreaks.

We found that the Ministry's booking process for COVID-19 vaccination appointments was unorganized. The lack of a central vaccination appointment booking system, or a system that was integrated with other booking systems used by pharmacies and other health providers, resulted in many Ontarians booking multiple appointments. This contributed to significant no-shows for appointment times that could have been filled by others sooner.

The Ministry has not yet determined the causes of sometimes significant wastage at some public health units, private-sector entities that operated vaccination clinics, and other vaccination site operators. While the provincial COVID-19 vaccine wastage average was about 9% between December 2020 and June 2022, a private company wasted 57% of their supply between May 2021 and May 2022.

While to some degree, it was understandable that the province did not have a perfect system at the onset of the vaccination program, rectifying the weaknesses we have identified in this report is important to help Ontario become better equipped and prepared to deal with potential surges in demand for the COVID-19 vaccine and to address future disease outbreaks.

OVERALL MINISTRY OF HEALTH AND MINISTRY OF THE SOLICITOR GENERAL RESPONSE

The Ministry of Health and the Ministry of the Solicitor General thank the Auditor General for her work in developing this report and providing recommendations to inform the future of the COVID-19 vaccination program.

The implementation of Ontario's COVID-19 vaccine program in response to the pandemic was unprecedented. The Province worked with the health sector to vaccinate as many Ontarians for COVID-19 as quickly as possible, saving lives and supporting the reopening of the economy.

The COVID-19 vaccination campaign required collaboration and leadership from many government and non-government partners across the province. Public health units, hospitals, long-term care homes, physicians, nurses, pharmacists, first responders, and many more front-line partners and workers made heroic efforts to vaccinate millions of Ontarians in a matter of months. The Province led this work in a manner that saved the most lives, including by prioritizing vaccines to those most at-risk.

In an ever-changing environment, the Ministry of Health and the Ministry of the Solicitor General adapted their approaches to reflect current information, and were guided by advice from experts, particularly in the absence of scientific consensus, as evidence continued to emerge.

The Ministry of Health looks forward to continuing to work with its many partners to provide Ontarians with access to COVID-19 vaccines, and

is committed to building on its success to date. As the health system recovers and stabilizes, the Ministry of Health looks forward to applying lessons learned from the pandemic and from the Auditor General's report. Consistent with, and as described in the responses to specific recommendations, this will include: developing a scalable accountability framework for public health situations that require vaccines as part of moving to standard response; improving the bookings and associated processes; improving vaccination data and associated processes; establishing criteria, or conditions, to consider regarding any reintroduction of proof of vaccination requirements; and continuously improving vaccine communications.

2.0 Background

2.1 Overview of COVID-19 Vaccines

According to the World Health Organization (WHO) and the Public Health Agency of Canada, COVID-19 vaccination is one of the most effective ways to protect people in the community against severe illness, hospitalization and death from COVID-19, though breakthrough infections in people who are vaccinated still occur.

During the COVID-19 pandemic, multiple and often more infectious variants of concern emerged that have reinforced the importance of vaccination. The most notable of these are the more transmissible Delta and Omicron variants, and the increased severity of symptoms with Delta. The WHO declared Delta as a variant of concern on May 11, 2021 and Omicron on November 26, 2021. In February 2022, the WHO released a statement on a new strain of the Omicron variant; it had become the most dominant strain globally when we completed this audit.

2.1.1 Ontario's COVID-19 Vaccination Program

Ontario's COVID-19 vaccination program started in December 2020. By mid-July 2022, Ontario was offering a fourth dose (also known as the second booster) to adults aged 18 and over, five days after British Columbia made a similar announcement. As of mid-August 2022, almost 35 million doses of the COVID-19 vaccine had been administered in Ontario.

As shown in **Figure 1**, as of August 14, 2022, about 82% of Ontarians aged five and over were fully dosed—the Public Health Agency of Canada defines this as two doses of approved vaccines including either Pfizer and/or Moderna, and one dose of Johnson and Johnson. About 50% of Ontarians had received their third dose (also known as the first booster) and about 13.4% had received their fourth dose. These rates were fairly consistent with or slightly above national rates in Canada, which were 82%, 50% and 12%, respectively.

As of mid-August 2022, third dose uptake in other countries was 73% for adults 18 and over in New Zealand, 69% for people aged 12 and over in the United Kingdom and 72% for people aged 16 and over in Australia, higher than the uptake rate of 61% for adults 18 and over in Ontario.

2.1.2 Roles and Responsibilities in Ontario's COVID-19 Vaccine Rollout

The federal government has responsibilities for approving vaccine use in Canada, and for procuring and allocating vaccines to provinces and territories. As of February 2022, six vaccines have been approved for use in Canada; this includes AstraZeneca, Janssen, Moderna, Pfizer-BioNTech as well as Medicago and Novavax though few doses of the latter two have been administered to Ontarians to date. Medicago and Novavax vaccines are mainly for those who cannot receive Pfizer or Moderna vaccines, often because of ingredients that may cause adverse reactions. **Appendix 1** summarizes the effectiveness rates and side effects of the most commonly used vaccines.

In Ontario, the responsibility for providing the COVID-19 vaccine to Ontarians is shared by the Ministry of Health and the Ministry of the Solicitor General. The Ministry of the Solicitor General is involved because of its role in emergency response and

Figure 1: Percentage of Population Aged Five Years and Over Who Are Vaccinated for COVID-19, as of August 14, 2022 (%)

Source of data: Public Health Agency of Canada

Province/Territory	Fully Dosed[1]	Three Doses (or First Booster)	Four Doses (or Second Booster)
Newfoundland and Labrador	92.4	57.6	7.6
Prince Edward Island	88.0	51.4	15.1
Nova Scotia	86.6	54.2	11.1
New Brunswick	84.0	50.7	15.3
British Columbia	83.8	53.1	9.1
Quebec	83.2	52.3	14.9
Yukon	82.2	48.3	12.3
Ontario	**82.0**	**50.4**	**13.4**
Manitoba	80.1	44.5	11.3
Northwest Territories	77.2	41.9	4.0
Saskatchewan	77.0	42.8	12.0
Alberta	76.8	38.8	8.5
Nunavut	74.7	38.0	n/a[2]
Canada	82.0	49.6	12.4

1. Primary series completed—previously known as "fully vaccinated"—with either two doses of Pfizer, Moderna, AstraZeneca, Novavax, or Medicago, or one dose of Janssen. For people who are moderately to severely immunocompromised, an additional dose of an mRNA vaccine is required to be considered fully vaccinated.
2. Data not available per the Public Health Agency of Canada.

community safety. The Ministry of Health co-ordinated and supported the 34 public health units, which in turn partnered with hospitals, doctors' offices and other primary care settings such as community health centres, work places and long-term care homes. Pharmacies started vaccinations slightly later in March 2021, and were still providing them when we completed this audit.

Figure 2 shows the parties involved in planning, funding and delivering COVID-19 vaccines and administering vaccinations in Ontario; **Appendix 2** describes each party's role in further detail.

By May 31, 2022, the Ministry of Health and the Ministry of the Solicitor General had incurred $1.5 billion in expenditures for the COVID-19 vaccination program. **Appendix 3** shows a breakdown of these costs.

2.2 Vaccine Supply and Distribution

2.2.1 Transportation, Storage and Shelf Life of Vaccines

Vaccines supplied by the federal government are handled by multiple parties, including government-contracted private-sector warehouses and distributors, before getting to vaccination sites, as shown in **Figure 3.**

Vaccines must be maintained at very cold temperatures at all times, including during transportation. These temperatures vary depending on the brand of the vaccine. Advice about temperatures at which vaccines, particularly Pfizer, need to be stored have changed since the beginning of the vaccine rollout from ultra-low temperatures in the early days, to standard freezer temperatures later on.

Figure 2: Ontario Government and Partners Involved in Delivering COVID-19 Vaccines in Ontario

Prepared by the Office of the Auditor General of Ontario

Federal	Provincial	Regional/Local
• Public Services and Procurement Canada • National Advisory Committee on Immunization • Public Health Agency of Canada • Health Canada	• **Ministry of Health**[1] • **Ministry of the Solicitor General**[1] • Ministry of Public and Business Service Delivery • Other Ministries • Public Health Ontario • Ontario Health • Ministers' COVID-19 Vaccine Distribution Task Force[2] • Ontario COVID-19 Science Advisory Table[3] • Ontario Immunization Advisory Committee • Children's Vaccine Table	• Public health units • Pharmacies • Primary care • Hospitals • Ontario Health Teams • Employers and other third parties[4] • Third-party logistics and warehousing providers

Note: Refer to **Appendix 2** for key roles of each of these entities.

1. Primary auditees of this audit.
2. Retired organization.
3. Effective April 4, 2022, operates as part of Public Health Ontario. Dissolved effective September 6, 2022.
4. Examples include Canadian Red Cross, Medavie, Ornge and Switch Health.

2.2.2 Ontario's Three-Phase Vaccination Plan

In December 2020, Ontario developed its initial vaccination plan called the Ontario's Three-Phase Vaccination Plan; this plan was based on Ontario's Ethical Framework for COVID-19 Vaccine Distribution.

The Ethical Framework

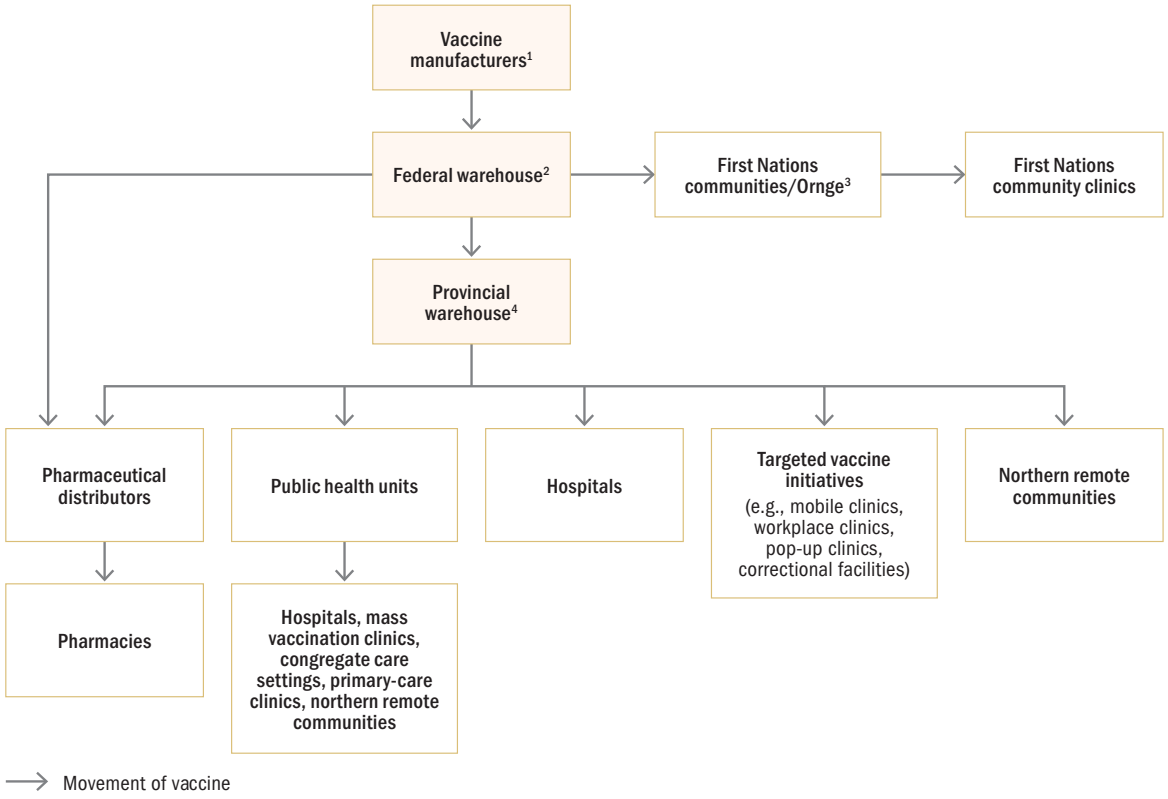
The Ethical Framework set out the general principles for distributing vaccines. It emphasized minimizing harms and maximizing benefits by reducing overall illness and death from COVID-19 and protecting those at the greatest risk, in particular prioritizing vaccines for those at greater risk of severe illness and death from COVID-19, as well as those who care for them. It also highlighted the importance of equity, referring to distributing vaccines in a way that mitigates systemic disparities that may disadvantage people, such as race, ethnicity, gender and socioeconomic status. Both the COVID-19 Distribution Task Force (see **Appendix 4** for full list of members) and the Ontario COVID-19 Science Advisory Table (Science Table) (see **Appendix 5** for full list of members) provided input to this framework, which consisted of six principles as shown in **Figure 4.** The Task Force was accountable to both the Ministry of Health and the Ministry of the Solicitor General.

The First Dose

The initial "first dose" vaccination plan was guided by the overall objectives of preventing death; preventing illness, hospitalization and ICU admission; and reducing transmission. The first priority of those vaccinated in Ontario were health-care professionals who provide direct care as well as hospital staff including those who do not provide direct care, such as hospital support services staff in custodial services or patient registration, due to their risk of contracting COVID-19. After this, priority groups were established based on risk of exposure to COVID-19 and death resulting from contracting COVID-19, starting with long-term care home and high-risk retirement home residents, and workers and seniors in congregate living settings.

Figure 3: Overview of Vaccine Distribution Process in Ontario, March 2022

Prepared by the Office of the Auditor General of Ontario



1. All vaccines arriving in Ontario have been approved by Health Canada and procured by the federal government.
2. The federal warehouse is operated by Innomar Strategies, which provides supply chain and logistics supports for vaccine shipments.
3. Ornge (Ontario's air ambulance service provider) and a federal transfer vendor are responsible for transporting vaccines to Northern Ontario mostly by truck and sometimes by air.
4. The provincial warehouse is operated by Andlauer Healthcare Group, which provides supply chain and logistics supports for vaccine shipments.

Figure 5 shows the highlights of the province's plan for administering first doses of COVID-19 vaccines across Ontario.

The Second, Third and Fourth Doses

Ontario's schedule for second-dose eligibility followed a similar priority schedule to the first-dose three-phase plan. In late May 2021, as two-thirds of adults in Ontario had received at least one dose and a steady flow of vaccine supply had become available, the Ministry of Health began to offer second-dose appointments at an interval of four weeks or more after the first dose for Pfizer or Moderna and 10 weeks for AstraZeneca (later increasing to 12 weeks). **Figure 6** shows the second-dose schedule.

The Ministry began to offer third doses of the vaccine to high-risk population groups such as those who are moderately to severely immunocompromised and aged 70 and over in September and November 2021, respectively, and opened it up to everyone 18 and over in December 2021 then 12 to 18 in February 2022. In comparison, both British Columbia and Nova Scotia offered the third dose to adults 18 and over in January 2022 and those aged 12 to 18 in February 2022.

In late December 2021, the Ministry began to offer fourth doses to vulnerable populations including residents of long-term care homes and assisted living facilities. It expanded the offering to people over 60 as well as First Nations, Inuit and Métis and their non-Indigenous household members aged 18 and over in April 2022, and adults aged 18 to 59 in July 2022.

Figure 4: Components of the Ethical Framework for COVID-19 Vaccine Distribution

Prepared by the Office of the Auditor General of Ontario with information from the Ministry of Health

Minimize harms and maximize benefits	• Reduce overall illness and deaths related to COVID-19 • Protect those at greatest risk of serious illness and death due to biological, social, geographical and occupational factors • Protect critical infrastructure • Promote social and economic well-being
Equity	• Respect the equal moral status and human rights of all individuals • Distribute vaccines without stigma, bias or discrimination • Do not create, and actively work to reduce, disparities in illness and death related to COVID-19, including disparities in the social determinants of health linked to risk of illness and death related to COVID-19* • Ensure benefits for groups experiencing greater burdens from the COVID-19 pandemic
Fairness	• Ensure that every individual within an equally prioritized group (and for whom vaccines have been found safe and effective) has an equal opportunity to be vaccinated • Ensure jurisdictional ambiguity does not interfere with vaccine distribution • Ensure inclusive, consistent, and culturally safe and appropriate processes for decision-making, implementation, and communication
Transparency	• Ensure the underlying principles and rationale, decision-making processes, and plans for COVID-19 vaccine prioritization and distribution are clear, understandable, and communicated publicly
Legitimacy	• Make decisions based on the best available scientific evidence, shared values, and input from affected parties, including those historically under-represented • Account for feasibility and viability to better ensure decisions have intended impact • To the extent possible given the urgency of vaccine distribution, facilitate the participation of affected parties in the creation and review of decisions and decision-making processes
Public Trust	• Ensure decisions and decision-making processes are informed by the above principles to advance relationships of social cohesion and enhance confidence and trust in Ontario's COVID-19 immunization program

* Social determinants of health are non-medical factors that influence health outcomes, which can include (but are not limited to) an individual's income, education or employment.

In September 2022, Ontario began to offer a new "bivalent" COVID-19 vaccine, first to those 70 years old and older and other vulnerable populations, and later in the month to anyone 18 years old or older. The bivalent COVID-19 vaccine contains a component of the original virus strain to provide broad protection against COVID-19, and another component to provide better protection against COVID-19 caused by the Omicron variant.

Vaccinating Indigenous Peoples of Ontario

Operation Remote Immunity was a collaborative plan developed by the federal government, Ornge (air ambulance service provider in Ontario), northern public health units, First Nation health authorities, the Nishnawbe Aski nation, and multiple Ontario ministries, including the Ministry of Health and the Ministry of the Solicitor General, to prioritize COVID-19 vaccination in northern and remote First Nation communities where infection could have disproportionate effects. The federal government announced in February 2022 that the program had ended. By that time, over 42,000 doses had been administered in these communities. **Appendix 6** provides further details on this initiative.

Provincial Pandemic Planning

The Ministry of Health's Emergency Response Plan outlines what the Ministry will do in the event of any emergency that affects the health-care system and the

Figure 5: Ontario's Three-Phase Vaccination Plan, December 2020

Source of data: Ministry of Health

Phase	1. High-risk populations	2. Mass deliveries of vaccines	3. Steady state[1]
# of people (approx.)	1.8 million	9 million	Not specified
Period covered	December 2020–March 2021	April 2021–June 2021	July 2021 onwards
Eligible populations	• Congregate living for seniors • High-risk health-care workers (i.e., direct client contact) • Adults in First Nations, Métis and Inuit populations • Adult chronic home care recipients • Adults aged 80 and older	• Adults aged 55 and older, in decreasing increments (i.e., 50 and older followed by 40 and older, then 18 and older) • High-risk congregate settings • Individuals with certain health conditions[2] • Certain essential caregivers • People who live in hotspot communities • Those who cannot work from home	• All remaining eligible Ontarians
Delivery channels	• Hospital site clinics • Mobile teams • Site-specific clinics including mass immunization clinics	• Mobile teams • Site-specific clinics including mass immunization clinics • Pharmacies • Primary care • Pop-up clinics • Workplace clinics	• Mobile teams • Site-specific clinics including mass immunization clinics • Pharmacies • Primary care • Pop-up clinics

1. The Province planned to expand coverage to anyone else who wanted to be vaccinated and vaccine administration locations to include sites that normally delivered flu vaccines such as pharmacies and physician offices.
2. During this phase, individuals with certain health conditions were prioritized based on the severity of their health conditions, to allow for vaccinations of the following groups, beginning:
   - In the week of April 26, 2021, those with "highest-risk health conditions" such as organ transplant recipients and pregnant women.
   - In the week of May 3, 2021, those with "high-risk health conditions" such as those who have intellectual or developmental disability, those undergoing chemotherapy or those taking medications that weakened their immune system.
   - In the week of May 10, 2021, those with "at-risk health conditions" such as those with diabetes, heart disease or cancer.

Figure 6: Ontario's Schedule for Second-Dose Eligibility

Prepared by the Office of the Auditor General of Ontario using information from the Ministry of Health

Starting in the Week of	Eligibility Criteria
May 31, 2021*	Age 80+
June 4, 2021	Age 70+ as well as individuals who received first dose on or before April 18
June 14, 2021	Received first dose on or before May 9 and also living in Delta hotspots in Halton, Peel, Porcupine, Toronto, Waterloo, Wellington-Dufferin-Guelph and York public health units
June 21, 2021	Received first dose on or before May 9
June 23, 2021	Received first dose on or before May 30 and who live in Delta hotspots including essential workers who cannot work from home
June 28, 2021	Received first dose May 31 and onwards for all adults 18+

* At the time of the May 2021 announcement, Ontario had already begun offering second doses at a shortened interval to certain Phase 1 groups (as shown in **Figure 5**), including high-risk health-care workers, long-term care home residents, individuals with certain health conditions and Indigenous populations.

health of Ontarians. It serves as a guiding document in the Ministry's response to a pandemic.

2.2.3 COVID-19 Hotspot Strategy

The province's COVID-19 vaccination plan (discussed in **Section 2.2.2**), developed in December 2020, was based on a per-capita regional allocation of vaccines with the subsequent distribution reflecting the priorities detailed in its three-phase plan.

On February 26, 2021, the Ontario COVID-19 Science Advisory Table (Science Table) published a document summarizing scientific evidence which showed that based on data from January 2020 to January 2021, COVID-19 infections took a disproportionately heavy toll on older adults and "disadvantaged and racialized urban neighbourhoods". The Science Table suggested that the province take both factors into consideration when allocating vaccines.

About six weeks later, on April 13, 2021, the Ministry of Health revised Phase 2 of its vaccination plan to take into consideration findings from the Science Table brief. The updated provincial plan prioritized areas identified by 114 specific postal code regions ("hotspots") by providing about 875,000 doses of vaccines to these hotspots over three weeks. The remaining 900,000 were equally distributed across the province's 34 public health units, including those with hotspots. These 114 hotspot communities are located in 13 public health units, many in large urban settings including Toronto, Peel and Ottawa. **Appendix 7** shows a list of these communities.

2.3 Technology Solutions Supporting COVID-19 Vaccine Administration

The Ministry of Health introduced the provincial vaccination appointment booking system in March 2021. The online system was intended to allow clients to easily identify vaccination sites around a particular address or postal code. Clients could either book a vaccination appointment in the system directly or call the Provincial Vaccine Contact Centre via a toll-free number for assistance. When a person enters their health card information into the booking system, an identity verification check is done automatically to the Ontario Health Insurance Plan database. However, the Ministry did not require all vaccination sites to use this booking system; for example, pharmacies, many public health units and hospitals opted to use their own locally developed booking systems.

The Ministry also established an immunization database called COVaxON to track COVID-19 vaccines administered and vaccine supply. Since all administered doses are recorded in this database, the risk of administering more doses than permitted is minimized.

The provincial vaccination appointment booking system is integrated with the immunization database to ensure that a booking can only be made with sufficient time between doses.

2.4 Administering Vaccines

2.4.1 Vaccination Sites

The number of vaccination sites has fluctuated since the COVID-19 vaccination program began. At peak activity, there were 3,270 vaccination sites (70% of which were pharmacies) in operation across the province. Vaccination sites included mass immunization clinics in convention centres and skating arenas, pop-up clinics, community events, workplace clinics, drive-in clinics, mobile clinics, hospitals, pharmacies, and physicians' offices. People could access vaccinations at these sites through walk-ins, appointments, or events arranged sometimes by local religious or cultural groups in the community.

A mix of public and private-sector entities operated vaccination sites in Ontario. **Figure 7** shows the different vaccinating entities that operated these sites, the duration for which they have administered vaccines, and the main delivery channels that they operated.

2.4.2 Vaccinators

Vaccinators bill for providing vaccines through several methods. For example, public health units bill the Ministry of Health (Ministry) for vaccination services in addition to their routine operational funding. Physicians who provide vaccination services in their

Figure 7: Operation of Vaccinating Entities

Prepared by the Office of the Auditor General of Ontario with information from the Ministry of Health

Vaccinating Entity	Duration of Vaccine Administration[1]	Main Delivery Channels
Public Sector		
Public health units (34)[2]	Jan 2021–	Mobile and pop-up clinics (including those in schools, long-term care and retirement homes, assisted living facilities and other congregate care settings), and mass vaccination clinics
Hospitals (86)[3]	Dec 2020–	
Private Sector		
Physicians (3,168)[4]	Mar 2021–	Physicians' offices
Pharmacies (2,974)[5]	Mar 2021–	Pharmacies
Switch Health (1)	Apr–Sep 2021, Dec 2021–	Mass vaccination clinics at the International Centre to deliver third doses to the public with priority access for identified vulnerable/at-risk populations (Dec 2021–Feb 2022) Vaccination clinic at Toronto Pearson International Airport for temporary agricultural foreign workers[6] (Jan–Sep 2022)
Canadian Red Cross (1)	May 2021–	Mobile and pop-up clinics for essential workers, communities with low vaccine uptake, and vulnerable/at-risk populations
Medavie (1)	May 2021–	Mobile and pop-up clinics for essential workers, communities with low vaccine uptake, and vulnerable/at-risk populations
FH Health (1)	Jan 8–Mar 4, 2022	Pop-up clinics prioritizing education workers but open to general public
Calian Inc. (1)	Jan 2021	Health human resources support to augment capacity of mass immunization and pop-up clinics run by public health units
Public and Private Sector		
Various professionals hired by workplaces and employers	Apr–May 2021	Employer led and workplace clinics

1. Open-ended date range signifies that as of August 2022, administration of vaccine was ongoing.
2. Total number of public health units that offered vaccines.
3. Total number of hospitals that submitted expense reimbursement claims to the Ministry of Health (Ministry) from December 2020 to May 2022. Many hospitals co-ordinate with their local public health units to administer vaccines.
4. Total number of physicians that submitted claims to the Ministry for vaccinating in locations including their offices and client's home, up to May 31, 2022.
5. Based on the total number of pharmacies that offered COVID-19 vaccination as of May 31, 2022, according to the Ministry.
6. Also provided translation and snacks to encourage attendance at the vaccine clinic.

practice or in mass immunization clinics bill the Ministry through the Ontario Health Insurance Plan (OHIP); the amounts charged for services are negotiated between the Ministry and the Ontario Medical Association. Pharmacies bill the Ministry through the Health Network System, the system used for claims for publicly funded drug programs.

Typically, each vaccination site would have health professionals such as nurses or pharmacists to prepare doses and administer the vaccines, though smaller sites might have the same staff performing multiple roles. Other non-clinical staff help organize activities at each site, including entering data into the immunization database.

Figure 8 shows the cost efficiency of each vaccinating entity during periods of high and low volume and **Figure 9** shows the self-reported vaccinating expenses from public health units.

2.4.3 Adverse Events Following Immunization

Public Health Ontario takes the lead on provincial surveillance of adverse events following immunization (AEFIs), which it defines as any untoward medical occurrence in a vaccine recipient which follows immunization that cannot be clearly attributed to other causes. This is in line with the World Health Organization's definition.

Local public health units receive reports of AEFIs from health-care providers and, less commonly, individuals who have received a vaccine. **Figure 10** shows the flow of information of AEFIs. The local public health unit may investigate if further information is needed, and relevant details are entered into the Case

Figure 8: Cost Efficiency of Vaccinating Entity, by Time Period

Prepared by the Office of the Auditor General of Ontario with data from the Ministry of Health and the Ministry of the Solicitor General

		Public Sector			Private Sector				
Time Period[1]		Public Health Units[2]	Hospitals	Physicians[3]	Pharmacies[3]	Switch Health[4]	Canadian Red Cross[4]	Medavie[4]	FH Health[4]
Average Cost per Dose ($)	a	42	21	13	13	362	104	80	n/a
	b	60	60	13	13	1,119	1,017	124	n/a
	c	69	21	13	13	189	76	40	46
	d	77	120	13	13	840	421	97	239
Total Costs ($000)	a	417,123	120,710	3,980	41,526	2,569	2,782	1,747	n/a
	b	99,202	35,874	598	19,582	666	1,233	1,971	n/a
	c	196,186	21,803	2,977	31,034	10,126	1,378	1,187	344
	d	84,300	21,324[5]	558	13,923	3,989	3,083	3,472	333
Total Doses (000)	a	9,894	5,672	306	3,195	7	27	22	n/a
	b	1,647	595	46	1,507	1	1	16	n/a
	c	2,841	1,014	229	2,389	54	18	30	8
	d	1,078	178	43	1,071	5	7	35	1

1. Different periods are defined as follows:
   a) Dec 2020–July 2021: busy period with the rollout of the first two doses where vaccine supplies were initially short and demand was consistently high.
   b) Aug–Nov 2021: slow-down period started in August as vaccination rate for the first and second dose reached 80% and 70%, respectively. During this time, the ministries launched their "Last Mile Strategy" to increase vaccine uptake, targeting communities and groups with lower vaccination rates.
   c) Dec 2021–Jan 2022: with the onset of the highly transmissible Omicron variant and emerging science on the waning efficacy of the primary series, the Province opened up eligibility for third doses.
   d) Feb–May 2022: demand slowed in February as most eligible Ontarians who wanted third doses would have received them. Also, many people during this period contracted COVID-19 and needed to wait the recommended three months before getting a third dose.
2. Costs by month are calculated as quarterly costs prorated by monthly dosages. Total costs to vaccinate by public health unit include:
   - costs incurred directly by public health units and reported to the Ministry of Health for reimbursement, the majority of which is staffing (including their own staff, staff redeployed from municipalities/hospitals/health-care partners and private agency staff);
   - costs for vaccinators and support staff provided by a private-sector company (Calian) to support public health unit clinics, incurred by the Ministry of the Solicitor General; and
   - costs for physicians to vaccinate and/or supervise at public health unit clinics, incurred by the Ministry of Health.
3. Vaccines administered by physicians (which started in December 2020) and at pharmacies (which started in March 2021) are reimbursed by the Province at $13 per dose. Costs do not vary between periods.
4. Costs paid to the private-sector companies include costs that are not typically paid to public health units and hospitals, such as facility rentals. These companies helped with overflow capacity and held clinics for hard-to-reach populations.
5. As of October 2022, the Ministry of Health had finalized this funding but had not yet approved or flowed it to hospitals.

Figure 9: Cost Efficiency of Public Health Units, by Region, January 2021–June 2022

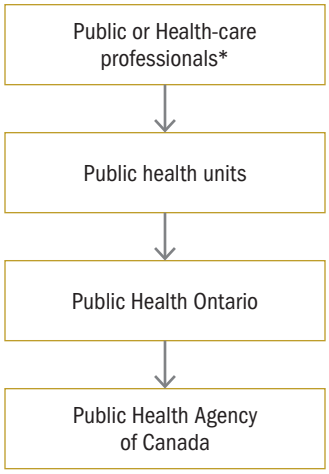
Prepared by the Office of the Auditor General of Ontario based on information provided by the Ministry of Health

Public Health Unit	Total Costs* ($000)	Total Doses (000)	Cost per Dose ($)
Halton Region	63,134	729	87
Peel	127,717	1,620	79
Haldimand-Norfolk	6,190	91	68
Sudbury & Districts	23,816	349	68
Toronto	119,991	1,777	68
Huron Perth	14,915	226	66
Region of Waterloo	32,458	508	64
Durham Region	47,078	810	58
Ottawa	79,680	1,429	56
York Region	61,812	1,136	54
Average	**804,657**	**15,582**	**52**
Eastern Ontario	14,692	293	50
City of Hamilton	31,789	642	50
Wellington-Dufferin-Guelph	22,391	458	49
Windsor-Essex County	10,489	225	47
Niagara Region	17,465	395	44
Middlesex-London	23,850	550	43
Kingston, Frontenac and Lennox & Addington	8,602	238	36
North Bay Parry Sound	7,293	209	35
Porcupine	4,893	147	33
Lambton	6,961	217	32
Peterborough	6,642	213	31
Timiskaming	1,720	57	30
Southwestern	8,847	312	28
Leeds, Grenville & Lanark	7,226	263	27
Haliburton, Kawartha, Pine Ridge	5,467	204	27
Algoma	4,723	183	26
Thunder Bay	5,132	207	25
Chatham-Kent	4,100	183	22
Renfrew	3,370	156	22
Brant County	5,987	282	21
Grey Bruce	4,434	214	21
Northwestern	3,108	166	19
Hastings Prince Edward	4,852	266	18
Simcoe Muskoka	13,834	829	17

* Total costs are costs incurred by the public health units and self-reported to the Ministry of Health for reimbursement. They do not include staff support from private companies paid for by the Ministry of the Solicitor General or physicians paid for by the Ministry of Health. Total spending by the public health units also does not represent total spending by the Ministry of Health, as some of the spending will have been covered by base/operating budget of public health units, which are currently cost-shared between the Ministry of Health and municipalities, and extraordinary costs one-time funding, which is 100% funded by the Ministry of Health.

Figure 10: Overview of Information Flow in the Reporting of Adverse Events Following Immunization

Prepared by the Office of the Auditor General of Ontario



* May include those in vaccination sites such as hospitals, mass vaccination clinics and pharmacies and those who provide health-care services to the public such as primary-care health providers.

and Contact Management System for provincial reporting. This system also manages case and case contacts of patients who have tested positive for COVID-19 via a laboratory-confirmed positive test.

From December 13, 2020 to August 1, 2022, there were a total of 21,237 AEFI reports received by Public Health Ontario, shown in **Figure 11**, representing about 0.06% of the approximately 34 million doses of the COVID-19 vaccine administered at that time. This includes "adverse events of special interest" as defined by the Public Health Agency of Canada.

2.5 Vaccine Mandates and Policies

2.5.1 Vaccine Mandates and Policies in Selected Settings

While vaccine mandates required workers to be vaccinated with two doses to be able to work, vaccine policies allowed for unvaccinated workers to be tested for COVID-19 if they are not vaccinated.

Long-term care homes were the only settings in which Ontario implemented a vaccine mandate. In May 2021, the Ministry of Long-Term Care issued a Minister's directive, which required that all long-term care homes implement vaccination policies by July 2021. These policies allowed workers who were not fully vaccinated to continue to work, including in direct care positions, as long as they attended an education course on COVID-19 vaccination and produced negative test (i.e., "antigen point of care testing", also known as rapid testing) results. In October 2021, the Ministry updated the Minister's directive and mandated all staff, contractors, students and volunteers of long-term care homes to be vaccinated with two doses by December 2021. This was updated in December 2021 to require a third dose for the same groups as well as visitors of the homes. Altogether, the vaccine mandate in Ontario's long-term care homes was in effect from December 2021 to March 2022. In comparison, British Columbia began its long-term care home mandate in October 2021 and has not yet lifted it as of August 2022; Alberta began its mandate in November 2021 and lifted it in July 2022.

2.5.2 Vaccine Passport

Between September 22, 2021 and February 28, 2022, Ontarians were required to present proof of vaccination—commonly known as the vaccine passport—to access certain high-risk indoor venues, including indoor areas of restaurants and bars, nightclubs, meeting and event spaces, sports and fitness facilities, sporting events, casinos, concerts, theatres and cinemas. See **Appendix 8** for a chronology of events from the announcement of proof-of-vaccination to the lifting of this requirement.

2.6 Legislative Authority and Requirements

Legislation and regulations related to COVID-19 vaccination are shown in **Appendix 9.** Some legislation has been in place since well before the start of the COVID-19 pandemic, while some were developed during the pandemic to address it. These laws establish the powers of Ontario's local Medical Officers of Health as well as the Chief Medical Officer of Health, and establish new rules to promote the safe reopening of the province by

Figure 11: Adverse Events Following Immunization (AEFIs) for COVID-19 in Ontario, December 13, 2020–August 1, 2022

Source of data: Public Health Ontario

Adverse events – 21,237 reported to Public Health Ontario (63.2 per 100,000 doses administered)

- 20,049 or about 94% were non-serious events, such as pain where the vaccination was received, fever, rashes
- 1,188 or about 6% were defined as serious events[1]; 27 of these reports were deaths temporally associated with receipt of COVID-19 vaccines that met the provincial surveillance case definition
- 4 in ages < 5 years[2]
- 271 in ages 5–11 years
- 738 in ages 12–17 years
- 14,523 in ages 18–59 years
- 5,701 in ages 60 years and over

Significant "adverse events of special interest" noted:

- 21 reports of thrombosis with thrombocytopenia syndrome (also known as blood clots) after receiving AstraZeneca
  - 16 of these were confirmed as vaccine-induced immune thrombotic thrombocytopenia
- 782 reports of myocarditis (inflammation of the heart muscle) or pericarditis (inflammation of the lining around the heart) following receipt of COVID-19 mRNA vaccines
  - The highest reporting rates were observed in younger age groups (12–17 and 18–24 years of age), among males and following dose two of the primary series.

1. Serious AEFIs are defined using the World Health Organization standard definition: an AEFI that results in death, is life-threatening, requires in-patient hospitalization or prolongs an existing hospitalization, results in persistent or significant disability/incapacity, or in a congenital anomaly/birth defect. Due to data limitations and the relatively brief follow-up period of AEFIs reported in Ontario, AEFI reports that meet serious definition typically have an in-patient hospitalization or death reported.
2. Four cases of AEFIs occurred in four-year-olds who were eligible in 2021 because they turned five by the end of 2021.

requiring certain businesses or organizations to check patrons' proof of COVID-19 vaccination to be permitted to open. The laws also enable more robust data collection related to COVID-19 vaccination and introduced vaccine passports for public places such as restaurants, gyms and movie theatres.

3.0 Audit Objective and Scope

Our audit objective was to assess whether the Ministry of Health and the Ministry of the Solicitor General, in conjunction with other stakeholders such as public health units, established cost-effective processes and policies in compliance with relevant legislation to:

- develop and execute a plan to vaccinate Ontarians in a fair, equitable and cost-effective manner in order to minimize transmission of and hospitalization and death from COVID-19;
- oversee the co-ordinated delivery of the COVID-19 vaccination program; and
- measure and publicly report on the effectiveness of the program.

Our audit did not assess the effectiveness, safety, approval or procurement of vaccines, as these are the federal government's responsibilities. We focused primarily on the Ministry of Health's and the Ministry of the Solicitor General's activities leading to and during the COVID-19 vaccine rollout, but excluding assessments of the areas as shown in **Appendix 10**.

In planning for our work, we identified the audit criteria (see **Appendix 11**) we would use to address our audit objective. These criteria were established based on a review of applicable legislation, policies and procedures, internal and external studies and best practices. Senior management at the Ministries of Health and Solicitor General reviewed and agreed with the suitability of our objective and associated criteria.

We conducted our audit between January 2022 and August 2022. We obtained written representation from Ministries of Health and Solicitor General senior management that, effective November 22, 2022, they had provided us with all the information they were aware of that could significantly affect the findings or the conclusion of this report.

At these two ministries, we:

- reviewed applicable legislation and regulations as well as documents consisting mainly of directives, policy frameworks and guidelines, agreements, meeting minutes, briefing notes, and information reports;
- examined information technology controls such as those that controlled the inclusion of vaccination records in the COVID-19 immunization database (COVaxON);
- interviewed staff responsible for overall oversight and funding of the COVID-19 vaccination program to understand current processes and challenges;
- obtained data and reports on COVID-19 vaccination to identify data anomalies, such as cases where vaccines were administered to populations that were not eligible to receive them; and
- obtained data and reports on payments to physicians and organizations that provided vaccination services to reconcile their billings to the ministries against the volume of services provided as recorded in the immunization database.

We also interviewed representatives from a number of organizations. See **Appendix 12** for this list.

To understand local concerns and perspectives on the vaccination distribution and the extent of public health units' involvement, we spoke to seven Medical Officers of Health (Eastern Ontario, Grey Bruce, Northwest, Peel, Toronto, Wellington-Dufferin-Guelph, Windsor Essex) and surveyed all 34 public health units. Thirty or 88% of the public health units responded to our survey.

To solicit their perspectives on government decisions made in providing the COVID-19 vaccine to Ontarians, we solicited input from 10 individuals with expertise in epidemiology, infectious disease, public health, and behaviour science, including those with expert perspectives in marginalized communities, paediatrics, and geriatric congregate settings, some of whom were members of the Ontario COVID-19 Science Advisory Table (Science Table). We surveyed eight of these experts—those who were familiar with Ontario's vaccination effort but not involved in direct decision-making for the COVID-19 vaccine program. Six of them responded to our survey. We also interviewed the former Scientific Director of the Science Table.

Moreover, we conducted site visits at the following:

- 17 vaccine clinics, consisting of a mix of overt observations to learn about vaccine handling, client flow and information reporting, and covert observations to assess the degree of client traffic; and
- a hospital storage facility at the University Health Network in Toronto; pharmacy distributors operated by McKesson Canada and Shoppers Drug Mart; and the main provincial distribution centre, Andlauer Healthcare Group, to observe storage, cold chain and distribution processes.

We co-ordinated with the audit team of COVID-19 Contracts and Procurement in assessing the two ministries' selection and oversight of private-sector vendors that operated vaccination sites.

We also conducted research from other provinces' COVID-19 vaccination programs to help identify areas where Ontario could improve its operations.

We received several written comments from the public regarding the COVID-19 vaccination program in 2021 and 2022 and considered them in planning this audit; we have grouped these comments into themes, as shown in **Appendix 13**.

We conducted our work and reported on the results of our examination in accordance with the applicable Canadian Standards on Assurance Engagements—Direct Engagements issued by the Auditing and Assurance Standards Board of the Chartered Professional Accountants of Canada. This included obtaining a reasonable level of assurance.

The Office of the Auditor General of Ontario applies the Canadian Standards of Quality Control and, as a result, maintains a comprehensive quality control system that includes documented policies

and procedures with respect to compliance with rules of professional conduct, professional standards and applicable legal and regulatory requirements.

We have complied with the independence and other ethical requirements of the Code of Professional Conduct of the Chartered Professional Accountants of Ontario, which are founded on fundamental principles of integrity, objectivity, professional competence and due care, confidentiality and professional behaviour.

4.0 Detailed Audit Observations

4.1 Vaccine Distribution and Uptake

4.1.1 Vaccine Distribution Not Always Equitable

In many respects, the Ministry of Health (Ministry), in partnership with the COVID-19 Distribution Task Force (Task Force), distributed the COVID-19 vaccine to those who were at highest risk of serious illness and death, according to the principles set out in the Ethical Framework developed by the Task Force. However, for long-term care home residents and those living in communities that were at higher risk from COVID-19, distribution was not always consistent with this goal.

Health-care Workers Vaccinated Before Long-Term Care Home Residents Despite Expert Advice

Some health-care workers received the first dose of the COVID-19 vaccine before long-term care home residents, even though many expert groups, including the National Advisory Committee on Immunization, the Ontario COVID-19 Vaccine Distribution Task Force (Task Force) and the Ontario COVID-19 Science Advisory Table (Science Table) identified how important it was to prioritize vaccinating long-term care home residents.

The Science Table issued a brief on January 21, 2021 noting that the Ministry should speed up the vaccine rollout to ensure all long-term care home residents received the first dose of a COVID-19 vaccine by January 31, 2021 to prevent a projected 600 COVID-19 cases and 115 deaths by March 31, 2021.

However, due to logistical constraints, the rollout of the plan to vaccinate long-term care home residents did not start until December 30, 2020, and was not completed until February 14, 2021, about two weeks after the target deadline set by the Science Table. As shown in **Appendix 14**, the Task Force announced that about one-third of residents and staff had been offered the first dose of COVID-19 vaccine by January 15, 2021. This rate increased to 50% by January 21, 2021 and to 100% on February 14, 2021.

Although Ontario received Pfizer vaccine doses in mid-December 2020, they required ultra-cold freezing and therefore were not approved for transportation out of hospitals or centralized vaccination sites because the required temperatures could not be maintained. As a result, all of the Pfizer vaccine doses were made available to health-care workers and long-term care home staff who could travel to a nearby hospital or vaccination sites.

Meanwhile, we noted that Ontario had received its first shipment of Moderna vaccine doses on December 30, 2020, which were approved for onward transportation to the long-term care homes.

Hotspot Community Selection Mostly Consistent, But Some Inequity Noted

In spring 2021, the Ministry of Health (Ministry), in partnership with the COVID-19 Vaccine Distribution Task Force (Task Force), prioritized the rollout of COVID-19 vaccines to 114 "hotspot" communities. As mentioned in **Section 2.2.3**, the Ministry provided about 875,000 doses, or 44% of all vaccines available to these hotspots over three weeks in April and May 2021. We found that the Ministry applied the selection methodology inconsistently, resulting in certain high-risk communities not being prioritized. This impacted the equity goal set out by the Ethical Framework. Moreover, the Ministry did not clearly communicate how scientific data was used to support their selection of hotspot postal code regions, leaving the public confused about why some communities were selected and others were excluded.

In summer 2020, the Ministry assessed all 509 Ontario postal code regions based on three risk factors—"material deprivation" (poverty) and/or ethnicity concentration, and high COVID-19 testing needs defined as high incidence of positive COVID-19 cases, combined

with low testing rates. The Ministry told us that this assessment, together with discussions with public health units, indicated that 32 postal code regions were impacted more significantly by COVID-19 than others. In response, the Ministry announced the High Priority Communities Strategy in December 2020, which identified 32 postal code regions with high COVID-19 testing needs, and high poverty and/or ethnicity concentration, located in communities of public health units in Toronto, Peel, York and Ottawa. These public health units were designated to receive more resources for tailored community outreach, increased access to testing and wrap-around support for case management.

In February 2021, another risk ranking exercise took place. The Science Table ranked all 509 Ontario postal code regions based on their risk for COVID-19 hospitalization or death. The Science Table told us that they believed these two risk factors were the most reliable indicators of a community's COVID-19 risks.

Upon receiving the Science Table's ranking, the Ministry, in partnership with the Task Force, selected 114 postal code regions as COVID-19 hotspots using a three-step approach involving three risk factors:

- **Risk 1**: 74 (65% of 114) were selected for having the highest risk of COVID-19 hospitalization or death as ranked by the Science Table.
- **Risk 2**: 32 (28% of 114) were added for having high risk of COVID-19 hospitalization or death as ranked by the Science Table, as well as high risk of poverty and/or ethnicity concentration.
- **Risk 3**: eight (7% of 114) were selected because they were already a part of the High Priority Communities Strategy.

We reviewed the hotspots selected by the Ministry, and noted while the overall methodology included relevant risk factors, it was not applied consistently across all postal code regions. Anomalies of the postal code regions included and excluded are outlined in **Figure 12** and noted below.

- When expanding the hotspot selection to include postal code regions that met criteria for both Risk 1 and Risk 2, the Ministry excluded five postal code regions that had a high risk of COVID-19 hospitalization or death, because they did not have a high enough risk of poverty and/or ethnicity concentration.
- When expanding the hotspot selection to include postal code regions that met criteria for Risk 3, the Ministry included eight postal code regions from the High Priority Communities Strategy, even though they did not have a high risk of COVID-19 hospitalization or death. Five of these postal code regions are in York Region, with the remainder in Ottawa and Windsor. The Ministry

Figure 12: Communities Excluded or Included in COVID-19 Hotspot Strategy and Ministry of Health Rationale

Prepared by the Office of the Auditor General of Ontario

Risk 1: COVID-19 Hospitalization or Death[1]	
Ranked High but Excluded (5)[2]	**Ranked Low but Included (8)[3]**
N0P (Kent County)	K1V (Ottawa)
N8R (Windsor)	N8X (Windsor)
L2H (Niagara Falls)	N8Y (Windsor)
L7B (King City)	L3T (Eastern York Region)
L7E (Peel)	L6E (Eastern York Region)
	L4B (Western York Region)
	L4E (Western York Region)
	L6C (Eastern York Region)
Risk 2: Poverty and/or Ethnicity Concentration[4]	
Ranked High but Excluded (4)[5]	
L9T (Milton)	
L8M (Hamilton)	
L8P (Hamilton)	
L3R (Eastern York Region)	
Risk 3: Testing Needs (High Priority Communities Strategy)[6]	

1. Risk 1: Risk of hospitalization or death was the first and primary consideration in assigning priority.
2. These communities were excluded despite having higher risk of COVID-19 hospitalization or death. They did not rank high for poverty and/or ethnicity concentration.
3. The Ministry of Health included these communities because they were part of the High Priority Communities Strategy, and had needs identified through COVID-19 testing data from summer 2020 as well as poverty and/or ethnicity concentration (Risk 3). The Ministry explained that these were grandfathered into the hotspot strategy, as a third consideration after Risk 1 and Risk 2.
4. Risk 2: High concentration of poverty and/or ethnicity concentration was the next consideration in assigning priority, after Risk 1.
5. These communities were excluded despite equal or higher risk of hospitalization or death (Risk 1) and poverty and/or ethnicity concentration (Risk 2) than the eight communities that were included in Risk 3. The Ministry indicated that these communities were not part of the High Priority Communities Strategy; as such, they were not further assessed for Risk 2 or Risk 1.
6. Risk 3: High COVID-19 testing needs, defined as high incidence of positive COVID-19 cases, combined with low testing rates, was the third and last consideration in assigning priority, after Risk 2.

explained that these eight lower-risk postal code regions were included in the final hotspot strategy because they were grandfathered in from the High Priority Communities Strategy. However, part of the data and analyses that supported the High Priority Communities Strategy came from the public health units; the Ministry could not provide these analyses at the time of this audit.

- We identified four postal code regions that were excluded even though they had a higher risk of both hospitalization or death, and poverty and/or ethnicity concentration than the eight lower-risk postal code regions that were grandfathered into the hotspot strategy.

RECOMMENDATION 1

So that in future disease outbreaks, high-risk populations are allocated scarce vaccines according to priority need, we recommend that the Ministry of Health, in conjunction with the Ministry of the Solicitor General, incorporate into its future pandemic response plan the need to consistently apply prioritization methodologies supported by scientific data and make this information publicly available.

MINISTRY OF HEALTH RESPONSE

The Ministry of Health agrees with this recommendation and will continue to protect high-risk populations—including long-term care residents, health-care workers, and individuals with high risk medical conditions or social factors placing them at high risk for severe outcomes—through access to and delivery of safe and effective vaccinations. This serves the province's overall goal of preventing death, severe illness, hospitalizations, and intensive care unit admissions.

At the beginning of the COVID-19 vaccination campaign, the COVID-19 Vaccine Distribution Task Force developed the Ethical Framework for COVID-19 Vaccine Distribution that guided COVID-19 vaccine prioritization and distribution decisions. This publicly communicated framework promoted consistency, stewardship, accountability, and public trust in the province's COVID-19 vaccine program.

In alignment with the Ethical Framework, Ontario developed the hotspot strategy to prioritize high-risk communities for vaccination. Hotspot communities were selected based on their COVID-19 burden (at the time), material deprivation indicators, and if communities were previously selected as a High Priority Community.

For future pandemic responses, the Ministry will continue to use scientific evidence to inform the prioritization of mass vaccination strategies, to be incorporated into response plans such as the Ontario Health Plan for an Influenza Pandemic and ensure this information is available publicly.

4.1.2 Responsibilities in Vaccine Rollout Not Always Well Co-ordinated

Incomplete Accountability Framework for All Parties Involved in Vaccine Distribution and Implementation

Although the Province had a governance structure outlining responsibilities and reporting relationships to support high-level decision-making, that structure did not include organizations such as hospitals, public health units and pharmacies that were integral to delivering the COVID-19 vaccine to the public until after vaccines arrived in Ontario. This left public health units and others involved in the vaccine rollout unclear on their responsibilities at a time when quick responses were critical.

A 2009 order-in-council lays out assignments for various ministries in different types of emergency. According to this document, the Ministry of Health is typically the lead for any health-related emergency. However, the Ministry of the Solicitor General informed us that the pandemic required more logistical support and security for vaccines and vaccination sites; therefore, Ministry of the Solicitor General led the vaccination program jointly with the Ministry of Health, under the *Emergency Management and Civil Protection Act*.

The Ministry of the Solicitor General also informed us that COVID-19 required a whole-of-government emergency management approach and significant intergovernmental and inter-ministerial co-operation. However, without an accountability framework that fully outlined responsibilities and reporting

relationships of all relevant parties, we found there was confusion amongst key parties, such as public health units, hospitals and pharmacies.

We surveyed all 34 public health units and asked them if they believed that the province established clear lines of responsibility for those involved in the COVID-19 vaccine rollout, such as public health units, hospitals, pharmacies, private-sector vendors and various ministries. Of the respondents, 67% disagreed, while 13% agreed, and 20% did not have an opinion. Half of the respondents also disagreed that the province clearly identified to partners in the vaccine rollout that public health units were to take the lead on the operational aspects of the COVID-19 vaccine rollout, such as the setup of clinics and allocation of inventory within a public health unit, while 33% agreed and 17% remained neutral. For example, early in the vaccine rollout, hospitals were the only entities that had freezers capable of storing the vaccines. This effectively gave hospitals control of the vaccine inventory. Because the Province did not clearly assign public health units the responsibility to direct inventory, their ability to get the vaccine where they believed it was needed most was impacted. Six public health units indicated that having the vaccines stored in hospitals resulted in complications in inventory decisions. For example, some hospitals asserted to public health units that they would determine how it should be used given vaccines were stored within their facilities.

While public health units were asked to co-ordinate the vaccine rollouts in their regions, the Ministry of Health would often independently determine how other service delivery partners would supplement the public health units' efforts. For example, the Ministry selected pharmacies to participate based on factors such as their participation in previous influenza vaccination programs and the pharmacies were not necessarily located in the best places to increase access to the COVID-19 vaccine. Five public health units indicated that a more tailored approach was needed in their regions to support more equitable distribution to rural and lower income areas.

The Ontario Medical Association (OMA) noted that the province's decision to include family physicians as vaccinators along with pharmacies came late, leaving physicians with little time to prepare and plan. The OMA also emphasized roles in reaching different populations, stating "pharmacies were good for people who wanted vaccine, and primary care was good for people who needed vaccine."

During our audit, it was unclear what entity is responsible for investigating immunization database fraud involving Ontario pharmacies. Two situations needing investigation identified by public health units in the summer of 2022 had to await a determination from the Ministry of Health's legal team on who would be responsible for investigating, leaving the database still susceptible to further fraudulent activity at pharmacies. This meant that potentially more unvaccinated individuals may be able to gain access to places where proof of vaccination is needed. The Ministry has since identified a process for pharmacy investigations, but it had not been implemented at the conclusion of our audit. We discuss the potential for fraud in the immunization database further in **Section 4.4.1**.

As the COVID-19 vaccination program transitions from a pandemic response model to more standard response, these gaps in accountability need to be addressed to clearly outline how COVID-19 vaccinations will fit into the province's existing routine vaccination program.

Vaccine Distribution Task Force Did Not Have Sufficient Representation from Public Health Units

The COVID-19 Vaccine Distribution Task Force did not include public health unit representatives until more than one month after it was first established—a significant period considering the urgency to determine distribution priority during a time of scarcity in vaccine supply. Public health units are primarily responsible for implementing vaccination programs in Ontario. Over half of the public health units that responded to our survey noted that the Task Force should have included preventive medicine expertise from public health from inception. As well, Public Health Ontario was not represented on the Task Force. While it participated in some of the working groups, its representatives informed us that in their view, they could have contributed more scientific/technical expertise and support on vaccine distribution decisions. This is consistent with

findings from our 2020 Special Report on Outbreak Planning and Decision Making, where we noted that Public Health Ontario played a diminished role, despite the fact that the agency was created after the Severe Acute Respiratory Syndrome (SARS) outbreak in 2003 specifically to provide scientific and technical expertise during health emergencies.

The same audit report also noted that regional responses were not led by public health experts. We found that although a local Medical Officer of Health (who later became the provincial Chief Medical Officer of Health) was eventually added to the Task Force, his appointment came on January 8, 2021, more than a month after the rest of the Task Force had started their work on December 4, 2020. The urgency and need for establishing priorities for vaccine access made it more critical to have expertise among decision-makers who understood the tenets of the Ethical Framework (described in **Section 2.2.2**) and equitable access to vaccination for those in greatest need.

We asked all 34 public health units if the Task Force included the appropriate expertise and used it to inform its decision-making. Of the public health units that responded, 57% disagreed with this statement, 10% agreed, and 33% did not have an opinion. All public health units that disagreed identified public health and preventive medicine specialists as an area of need. We also surveyed medical experts on this issue and while 17% of respondents agreed, 33% disagreed and the other 50% had no opinion. For example, one expert informed us: "The problem was not access to expertise…The problem was that the leadership of the Task Force did not know and/or did not recognize the nature of the expertise needed. They knew too little to see what they needed to know." (For a description of the experts surveyed, see **Section 3.0.**)

We also found it difficult to evaluate the effectiveness of the Task Force. When we asked the Ministry of Health and the Ministry of the Solicitor General whether they followed all the advice of the Task Force, they informed us that they considered all advice provided by the Task Force, as well as other factors, when making decisions on the vaccination program. The ministries advised us that the Task Force's proposed actions were generally aligned with the actions ultimately taken by the government, but the ministries did not maintain records to demonstrate this.

A number of medical experts and public health units also questioned the choice of Task Force leadership. While they acknowledged that the logistics expertise of a retired general was valuable, they would have rather had someone with a public health background as the leader. Their concerns centred around a lack of understanding of Ontario's existing distribution system for vaccines and experience with mass immunization clinics, which may have enabled a more efficient implementation. We raised a similar issue with the Health Command Table established by the Ministry of Health in the 2020 Special Report on Outbreak Planning and Decision-Making.

We surveyed all 34 public health units and asked whether the province made an appropriate decision in appointing a retired general to lead the Vaccine Distribution Task Force. Of the respondents, 67% disagreed, compared to 10% that agreed, while 23% did not have an opinion. We also surveyed medical experts on this issue and 50% of respondents disagreed and the other 50% had no opinion.

RECOMMENDATION 2

To better respond to disease outbreaks and to transition the COVID-19 vaccination program from pandemic response to standard response, we recommend that the Ministry of Health:

- establish a clear, scalable accountability framework that includes all relevant parties for public health situations that require emergency action involving vaccines; and
- incorporate the framework and a requirement to review it annually for continued relevance in its future pandemic response plan.

MINISTRY OF HEALTH RESPONSE

The Ministry of Health agrees with this recommendation and will continue to implement its scalable accountability framework as it transitions from pandemic response to standard response. The COVID-19 vaccination program required the collaboration of many ministries, agencies, levels of

government and partners. The province's COVID-19 vaccine governance framework guided the implementation of the COVID-19 vaccine program and ensured that key partners understand their roles and responsibilities in the program.

Currently, the Ministry's status is in "recovery", which means it is resuming regular operations and supporting health sector stabilization. As the transition to standard response is completed, the accountability framework will be reviewed annually and adapted as appropriate.

4.1.3 Young Adult First Booster Vaccination Rates Only 40% by Summer 2022 at Emergence of Highly Contagious Variant

Targets Not Set to Guide Efforts on Third and Fourth Doses

Since December 2021, the Ministry of Health's goal for boosters has been to maximize coverage as quickly as possible, without establishing any specific vaccination rate goal or time frame to achieve it. The Ministry informed us that it did not set more specific goals because in its view, targets were problematic, given the Omicron variant's increased transmissibility compared to previous COVID-19 variants, meaning many would be required to delay receiving a dose due to a recent infection. In addition, the Ministry believed the public was fatigued and uninterested in additional doses of the COVID-19 vaccine. However, without a vaccination coverage target, it could not effectively order the appropriate quantities of COVID-19 vaccines for Ontarians to limit wastage. The Ministry informed us that in its experience, demand forecasting is more effective than working toward a minimum wastage target.

In contrast, the Ministry established targets and achieved them for vaccinating adults 18 and over with the first and second doses, as noted in **Appendix 15**.

Public Health Ontario has analyzed the impact of the first booster (or third dose) on a reduction in hospitalization—between December 15, 2021 and March 27, 2022, when Omicron was the dominant circulating strain, about 5,848 hospitalizations were prevented among people 18 and older.

As discussed in **Section 2.1.1**, Ontario's third dose coverage as of mid-August 2022 lagged behind rates in British Columbia, Quebec and the Atlantic provinces. At that time, 50% of Ontarians had received the third dose. We examined the vaccination rates by age group and found that while older adults had higher rates for third doses—at least 80% of people 60 and over—the coverage rates for younger Ontarians were lower, ranging from 40% for people aged 18 to 29 to 64% for people aged 50 to 59, as shown in **Figure 13**.

While experts have noted that contracting Omicron, which emerged in late 2021, conferred immunity for three months, delaying the need for a third dose for some, in most cases there would have been an opportunity to obtain a third dose by mid-August 2022.

Also, as of mid-August 2022, less than 40% of children aged five to 11 had received the second dose.

Meanwhile, the National Advisory Committee on Immunization recommended in 2022 timings for third and fourth doses for certain groups (see **Appendix 16**). However, the Ministry did not establish any coverage rate targets or time frames, and therefore, it could not measure the vaccination coverage rates against targets to identify any corrective actions needed.

Figure 13: Vaccination Rates in Ontario by Dose and Age Group, as of August 2022 (%)

Source of data: Ministry of Health

Age Group	First Dose	Second Dose	Third Dose
5–11	58	38	See Note
12–17	91	94	19
18–29	90	87	40
30–39	92	89	48
40–49	91	90	55
50–59	92	90	64
60–69	98	97	80
70–79	100	100	90
80+	100	100	91

Note: 335 children, or 0.03% of children aged 5–11 have received the third dose as of August 18, 2022 due to their immunocompromised conditions.

Vaccination Rates Unknown for Most Population Groups with Risk Factors

While the most significant risk factor for COVID-19 is age, health conditions can also make people more vulnerable to COVID-19. As activities move indoors and in-class learning continues in fall and winter 2022, having local data on and targets for vaccination rates for population groups with higher risk factors could help direct vaccination efforts toward the most vulnerable people in Ontario. The Ministry of Long-Term Care measures vaccination rates of long-term care residents, but the Ministry of Health does not keep similar records for those who are immunocompromised or who live in other congregate settings. We discuss the lack of data collection in this area in **Section 4.4.1**.

RECOMMENDATION 3

To protect Ontarians, especially those who are at higher risk of becoming severely ill from COVID-19, we recommend that the Ministry of Health:

- seek expert advice on and set appropriate, clinically sound vaccination targets by risk group;
- collect and measure vaccination uptake rates against these established targets; and
- update its vaccination strategy on a timely basis in response to new information.

MINISTRY OF HEALTH RESPONSE

The Ministry of Health agrees with this recommendation and will continue to work with federal and provincial partners around the development of evidence-based targets by risk group and set targets, if appropriate, based on clinical guidance, epidemiologic data, and strategic objectives. This includes ongoing collaboration and discussion with the Pan-Canadian Public Health Network structure (e.g., Canadian Immunization Committee), Public Health Ontario and the Ontario Immunization Advisory Committee.

The Ministry will continue to work with ICES to collect, measure, and monitor vaccination uptake rates for high-risk groups in Ontario. The Ministry will continue to share vaccination uptake rates for high-risk groups on a routine basis with key stakeholders involved in the delivery of COVID-19 vaccines, provincial program clinical leads at Ontario Health, public health units, pharmacies, primary care providers, and hospitals.

Based on these collaborations, as well as epidemiological information monitored through the Ontario Chief Medical Officer of Health's office, the Ministry continues to review and update guidance for COVID-19 vaccines and recommendations for high-risk groups on a routine basis.

4.2 Vaccination Appointment Booking

4.2.1 Provincial Booking System Was Released Three Months after Vaccines Arrived, Resulting in an Unco-ordinated System

Ontario received its first shipment of vaccines in mid-December 2020. However, the Ministry of Health did not introduce a provincial vaccination booking system until March 15, 2021. This system includes bookings made through the provincial vaccination appointment website and telephone appointments made by calling the toll-free number for the Provincial Vaccine Contact Centre. Because vaccinations commenced in Ontario in December 2020, before the implementation of the provincial booking system, many public health units and other vaccination site operators developed their own booking tools.

Medical experts and public health unit staff have told us that the provincial government should have made centralized vaccination booking ready and available sooner than when it was delivered. We asked all 34 public health units whether they believed that the provincial government had the vaccination appointment booking system ready on time. Of the public health units that responded to our survey, 73% disagreed that the system was ready in time, compared to only 17% that indicated they agreed; 10% had no opinion on this issue.

In addition, 83% of the public health unit respondents agreed that they spent time, effort and resources to produce their own vaccination booking systems.

By April 2021, of the 34 public health units, 13 (38%) were using both online and telephone booking through the provincial booking system, six (18%) were using the provincial online booking site but continued to operate their own service desks for telephone booking, and 15 (44%) opted to use their own online booking tools and service desks for telephone booking.

By April 2022, 16 (47%) public health units were using the provincial booking system, with the remaining 18 (53%) opting to use their own booking tools and service desks for telephone booking. We surveyed all public health units and asked whether they believed that the province should have required the use of its vaccination appointment booking system province-wide. Interestingly, only about 27% of the public health units that responded to our survey agreed with this, compared to 58% that disagreed. Several public health units indicated the use of their own booking system allowed for local flexibility. About 23% of the public health units had no opinion on this.

In comparison, most other vaccination site operators did not use the provincial booking system either. Most hospitals used their own vaccination appointment booking tools, with the exception of six hospitals that were using the provincial system at the time of our audit. Pharmacies and primary care facilities used their own vaccination appointment booking systems.

The Ministry informed us that it does not know how many different COVID-19 booking systems have been used across the province. The provincial vaccination booking system remains decentralized.

In comparison, Nova Scotia and Quebec had centralized vaccination appointment booking systems from the time vaccines arrived. As well, in Nova Scotia's booking system, clients enter their age and postal code and the system provides a list of the next available appointments and locations. Alberta informed us that its booking system allowed for booking appointments at pharmacies as of August 23, 2021.

4.2.2 Eligibility Inconsistencies across Multiple Booking Systems Resulted in Confusion, Poor User Experience and Access, and Missed Opportunities for Health Data Collection

While the Ministry of Health can control eligibility criteria for vaccination site operators through the provincial vaccination booking system, other vaccination site operators using their own booking systems, such as some public health units, most hospitals and all pharmacies, could relax the timing of COVID-19 vaccine availability to eligible populations. In some instances, this allowed people who booked through these systems to get an appointment before those who booked through the provincial booking system. Ministry staff confirmed that though site operators using their own booking system are expected and obligated to follow eligibility rules provided by the Ministry, decentralized booking systems undermined the Ministry's ability to control vaccination eligibility decisions for specific groups. Over 70% of the public health units that responded to our survey found that the multiple booking systems resulted in confusion for Ontarians. As well, some public health units responded that multiple booking systems prevented data collection on social determinants of health to better address equity concerns, and skewed the number of vaccination bookings to those with time and resources to vaccine shop.

The lack of a centralized booking system, especially at the start of the rollout when vaccines were scarce, resulted in inconsistent controls and checks when booking an appointment for priority groups, such as health-care workers and people who are immunocompromised, to ensure that people belonging to these priority groups were the only people allowed to book an appointment. According to the public health units that responded to our survey, 80% of public health units had established registration processes and about 87% had established vaccination site processes to verify priority when vaccines were scarce. Two-thirds of the medical experts who responded to our survey also indicated the multiple vaccine appointment booking systems resulted in confusion for Ontarians; reduced

the ability to obtain a vaccination appointment in a timely manner; reduced public trust in the Ontario government; and reduced the positive reputation of the Ontario government. Half of the medical expert respondents indicated it reduced the ability to provide vaccines equitably and that it increased no-shows due to vaccine shopping.

Because of the rapidly changing criteria, the Ministry tracked eligibility by public health unit to assist the Ministry of Public and Business Service Delivery's call centre staff in directing callers from across Ontario seeking vaccination. For example, on April 4, 2021, of the 34 public health units, two were booking individuals 60 years of age and older, four were booking those 65 years of age and older, 26 were booking those 70 years of age and older, and two were booking those 75 years of age and older.

Some hospitals requested to use the provincial booking system, even where the public health unit in which they are located did not. This meant that a person living close to the hospital would need to know to check both the provincial booking system and the hospital's website to ensure they were aware of all of the vaccination openings close to home.

4.2.3 No Centralized Booking System Resulted in Ontarians Booking Multiple Appointments Which Led to No-Show Appointments at Critical Times

Many unco-ordinated booking systems, compounded by different vaccination site operators applying eligibility criteria differently in their booking systems, resulted in Ontarians "vaccine shopping" or signing up for more than one appointment at a time. This resulted in many "no-show" appointments.

Vaccine shopping had detrimental impacts on the efficiency of vaccination appointment booking. A "no-show" appointment represents a missed opportunity for another person to be vaccinated sooner. We surveyed all 34 public health units and found that 80% of those that responded believed that multiple booking systems resulted in a high number of no-show appointments due to vaccine shopping.

In mid-June 2021, the Ministry of Health partially addressed multiple bookings by programming the provincial booking system to run a daily check on the immunization database to cancel any appointments for a person who had already received the dose. However, this would only identify multiple appointments made in the provincial booking system, and would not help where multiple appointments are made through other booking systems.

According to data provided by the Ministry, in 2021, there were over 227,000 no-show appointments booked in the provincial booking system. This number does not include no-shows in pharmacy, hospital, primary-care and public health unit systems.

We surveyed all 34 public health units to ask whether they would like to see future system enhancements restrict duplicate appointments. Of those that responded to our survey, 90% agreed and 10% had no opinion on this issue. Two-thirds of responding medical experts also agreed.

4.2.4 Third-Party Organization Intervened to Assist the Public with Vaccination Appointment Booking

The Ministry of Health has not assessed the value of organizations such as Vaccine Hunters Canada in helping Ontarians find vaccination appointments quickly, how they may have helped to improve equity and what lessons could be learned.

To help members of the public more easily access vaccination appointments, Vaccine Hunters Canada—a group of volunteers from across Canada, with many in Ontario—developed tools and used social media to help Canadians navigate eligibility and appointment booking. Vaccine Hunters Canada was established in March 2021. It is an independent, non-partisan, volunteer-run community service founded by a concerned Ontarian who had difficulties booking vaccination for his parents, and recognized a gap in co-ordination.

In March 2022, the organization scaled back operations due to a reduced need for their services as the demand for vaccines declined.

The founder of Vaccine Hunters Canada set up an online forum using Discord and a Twitter account and started using popular social media platforms such as Instagram, Facebook, Snapchat and TikTok to raise awareness of available vaccination appointments. Through these platforms, volunteers who joined him in his efforts and the public posted appointment availability by region. This includes posting cancelled appointments to help avoid empty appointment times. One of the most popular tools the organization used was its online forum, where Ontarians could select their province and region to be directed to local open vaccination appointment times.

Vaccine Hunters Canada also attempted to aid in the consolidation of information about open appointment times through the "Find your Immunization" tool, a web-based application. This tool allowed individuals looking for vaccination appointments to obtain more streamlined access to some pharmacy bookings through partnerships with providers such as Sobeys and Walmart.

Vaccine Hunters Canada also partnered with the City of Toronto, which provided the city's vaccination clinic appointment availability for the next day, at the end of each day.

The Ontario Ministry of Health informed us that it had made a deliberate decision not to reach out to Vaccine Hunters Canada, or refer to Vaccine Hunters Canada by name in media conferences, because it did not want to show preference for any third party that was attempting to help Ontarians co-ordinate their bookings.

4.2.5 Provincial and Local Booking Information Websites Not Accessible to All Ontarians

Online Information on How to Book a Vaccine Available in English and French but Not in Other Languages

Ontario's government website provides information on how to book a COVID-19 vaccination appointment, but only in English and French. Census data from 2016 found that 3.7 million Ontarians, or about 28% of the population, have a mother tongue other than English or French. In comparison, British Columbia's website on how to access a COVID-19 vaccine had the capacity to translate instructions on its vaccine booking website in up to 14 other languages, including Tagalog, Russian, Mandarin, Cantonese, and Farsi. Alberta's COVID-19 websites included direct access to resources that provided translations in over a dozen languages.

The Ministry utilized the Provincial Vaccine Contact Centre, which had access to translation in over 300 languages by phone call. However, we found that there was no reference to the Contact Centre on the Ministry's general COVID-19 webpage or its webpage on how to book a vaccine. The Ministry's COVID-19 vaccine webpage mentions the Contact Centre's capacity to translate to over 300 languages only at the bottom of the webpage, distant from the link to "book an appointment".

Booking System Not Built to Ensure that Priority Groups Get Appointments First

On December 15, 2020, the Ontario Medical Association (OMA) proactively released a white paper titled "Shining a Light at the End of the Tunnel—Guiding Considerations for a Safe, Accessible and Equitable COVID-19 Vaccination Framework in Ontario." The paper included recommendations based on its extensive knowledge of the health-care system, including the need to integrate information systems, surveillance and monitoring, vaccine distribution and administration, defining priority populations, as well as public education and addressing vaccine hesitancy. **Appendix 17** outlines the Association's recommendations.

This white paper recommended that the government use an integrated online information system for vaccination appointments that should also account for differences in patients' access to technology and digital literacy to ensure that "this system does not exclude some patients, particularly those who may be most vulnerable." We surveyed medical experts regarding whether in their view the provincial vaccination appointment booking system was user-friendly and accessible for Ontarians of all ages and all socioeconomic

statuses; 67% disagreed. One noted that "it was clear that community dwelling seniors especially in poorer neighbourhoods did not get their vaccines as fast as internet savvy people in wealthy neighbourhoods" and another that "it was a 'hunger games' approach that favoured those with the time and resources to pounce upon limited openings … those who needed it least were getting it first, and the cause is privilege of education, time, and tools."

One public health unit (Wellington-Dufferin-Guelph) partially addressed this concern by using a pre-registration system, where Ontarians in this region looking to obtain vaccines could pre-register their profile online, and be contacted when it is their turn for a vaccine based on their risk profile. This system was intended to support that the highest priority individuals would have access to vaccination appointments, regardless of how tech savvy they were. It also enabled the health unit to identify local communities that had lower rates of pre-registration, signalling a need for outreach.

We surveyed all 34 public health units to ask if they would like to see a pre-registration function in the provincial vaccination appointment booking system. Of those that responded to our survey, 47% agreed and 23% disagreed. The remaining 30% had no opinion on this issue. Over 80% of the responding medical experts agreed.

RECOMMENDATION 4

To promote effectiveness and equity in vaccination appointment booking for both on-going COVID-19 and any future provincial mass vaccination programs, we recommend that the Ministry of Health:

- co-ordinate with vaccination site operators, including public health units, hospitals and pharmacies, to consistently apply vaccine eligibility criteria across booking sites;
- develop and implement technology options such as that used by Vaccine Hunters Canada to assist the public with finding openings for vaccination appointments centrally;
- assess the feasibility of identifying and pre-registering high-risk individuals so that they are given priority for vaccine appointments and incorporate this in its future pandemic response plan; and
- develop an online communication strategy for future mass vaccination program appointment booking to accommodate languages other than English and French, and incorporate this in its future pandemic response plan.

MINISTRY OF HEALTH RESPONSE

The Ministry of Health agrees with this recommendation and continues to co-ordinate with vaccination site operators to consistently apply eligibility criteria through multiple channels and will continue to evaluate and explore other methods to align the application of eligibility criteria across booking sites.

The Ministry will assess the value of creating a technology solution to assist the public with finding openings for vaccination appointments centrally, if in a situation where there is insufficient vaccine supply to meet demand.

The Ministry continues to adopt the recommendations of the National Advisory Council on Immunization, which determines which populations are considered to be high-risk. The Ministry will continue to evaluate and explore opportunities for assisting high-risk individuals to get vaccinated, including an assessment of the feasibility of using a pre-registration system in Ontario.

The Ministry will continue to evaluate and explore opportunities to expand the language selections available to those booking vaccination appointments, including undertaking an assessment of other provinces and regions in Ontario accommodating languages other than English and French for appointment booking. Throughout the vaccine program, the Provincial Vaccine Contact Centre made booking available in 300 languages for clients whose public health unit used the provincial booking system. The province created resources in multiple languages at points throughout the vaccine program (e.g., Indigenous languages, Spanish, Arabic, etc.) which included information on how to book a vaccine and will continue to do so.

4.3 Vaccination Sites and Vaccine Administration

4.3.1 Compensation Rates and Methods Varied Between Vaccinators

Wide Range of Vaccination Rates Paid to Vaccination Site Operators

As expected, our analysis of cost per dose across public-sector and private-sector entities, as discussed in **Section 2.4.2**, indicated that cost per dose is significantly higher during periods of low demand compared to periods of high demand due to economies of scale, and fixed costs such as rent, advertising, IT and staffing.

Overall, our analysis also indicated that public health units, hospitals, pharmacies, doctors' offices and other primary care settings, responsible for the majority of vaccines administered by the province, are more cost-efficient than the private clinics contracted by the ministries. Public health units and hospitals operate mass immunization clinics, which are the most cost-efficient delivery channels, and are capable of vaccinating many people at the same time. Physicians' offices and pharmacies are reimbursed by the province at $13 per dose, regardless of the costs they incur to vaccinate.

Private-sector companies were primarily engaged by the ministries to provide support for public health units in vaccinating hard-to-reach and/or priority populations such as temporary foreign workers, essential workers who cannot work from home, and communities with low vaccine uptake. We would expect them to be costlier per dose than the public sector due to the challenges of reaching these populations; however, our analysis indicates significant variations in cost per dose, as shown in **Figure 8**.

Variations in cost per dose also occurred across public health units. Our analysis of self-reported vaccinating expenses from public health units, as shown in **Figure 9**, indicated the cost per dose varied widely from a low of $17 to a high of $87, averaging $52 per dose. According to the Ministry of Health, the majority of these costs are for staff, such as vaccinators and clinic support staff. The Ministry explained that costs associated with delivering the COVID-19 vaccination program vary based on local conditions at public health units such as: existing capacity, available infrastructure, unique population needs, geography, municipal government support, and assistance from local hospitals, primary care settings and pharmacies.

While we recognize that the Ministry was facing unprecedented time constraints due to the pandemic, looking forward, it would be prudent for the Ministry to identify more cost-efficient channels, as well as the potential use of volunteers, particularly during a crisis point in a pandemic, for future mass vaccination campaigns.

The Ministry of Health and the Ministry of the Solicitor General Paid Very Different Compensation Rates to Vaccinators Depending on Profession or Vaccination Site

We found that the Ministry of Health and the Ministry of the Solicitor General paid different rates to vaccinators depending on their profession and whether they worked in a site operated by a private-sector organization, a hospital or a public health unit. Physicians received much higher compensation than nurses and pharmacists for vaccinating the public at vaccination sites operated by public health units and hospitals. Where private-sector organizations provided staff for vaccination sites operated by public health units or hospitals, those private-sector staff were paid more than staff who work at and are compensated directly by public or not-for-profit organizations such as public health units or hospitals. Vaccination compensation rates are shown in **Figure 14**.

The Ministry of Health and the Ministry of the Solicitor General did not oversee equitable and reasonable payment processes for vaccinators. For example, while the Ministry of Health informed us that it paid physicians more than nurses because doctors generally are paid more, it did not have an analysis to show this was fair given that health-care professionals all performed this task at vaccination sites. Further, the Ministry of Health had already provided $642 million in interest-free advances to eligible OHIP billers, which includes physicians, by July 31, 2020 to address any cash flow issues that may have arisen during the initial stages of the COVID-19 outbreak. This payment was described in our 2020 Special Report on Management of Health-Related COVID-19 Expenditures.

Figure 14: Comparison of Hourly Compensation Rates for Selected Vaccinators in Selected Settings ($)

Source of data: Ministry of Health, Ministry of the Solicitor General and five selected public health units

	Physicians	Pharmacists	Registered Nurses	Registered Practical Nurses	Paramedics
Vaccination clinic with vaccinators[1] provided by a private-sector company[2]	n/a[3]	120	120	82	95
Mobile vaccination clinic operated by a not-for-profit organization[1]	62	62	62	62	62
Mass vaccination or mobile/pop-up clinic operated by a public health unit[4,5]	170	30	33–49	25–37	30–49
Mass vaccination clinic or mobile/pop-up clinic operated by a hospital[4,6]	170	43–57	32–49	30–31	n/a[7]

1. Hourly rate listed is for working days of up to 12 hours per day, where the vaccinator lives within 100 km of the clinic to which they have been assigned. The rate increases if vaccinators do not live within 100 km of the clinic, work on statutory holidays, or work over 12 hours per day.
2. The Ministry of the Solicitor General entered into a contractual agreement with this company in April 2021 to provide vaccinators and support staff to various clinics in the province operated by public health units, hospitals and the Province.
3. As per the terms of the contractual agreement, physicians provided medical oversight at an hourly rate of $250 but not vaccinator services. Medical oversight includes medical guidance and enhanced care to patients at the clinic if required.
4. Hourly rate listed is for Monday through Friday from 7am to 5pm. The rate increases if the vaccinators work on holidays or for hours worked from 5pm to 7am.
5. Data provided by five public health units that we surveyed to obtain vaccinator compensation information. These public health units are located in different parts of Ontario. The range represents the lowest and highest of all responses we received. In addition to the five professions listed, public health units also used retired nurses, retired physicians, veterinarian students, pharmacy and nursing students, dentists and firefighters. The public health units paid them a standard hourly rate of $21–$30 regardless of their occupation.
6. Data taken from publicly available documents such as collective agreements and job postings for a sample of five hospitals.
7. Paramedics are employed by the municipality or local public health units.

Equitable compensation across all vaccine clinic models that are used to provide the COVID-19 vaccine to the public is of increasing importance going forward.

In an effort to address pay inequality amongst different health professionals who performed the same task administering vaccines, one public health unit we spoke with paid all vaccinators a standard hourly rate as set out in existing compensation arrangements regardless of the vaccinator's profession.

Physicians Are Not Financially Incentivized to Vaccinate at Their Offices

Primary-care offices were considered to be a good location to address vaccine hesitancy by leveraging existing trust in doctors. Physicians could work at their own offices, and also at mass immunization clinics operated by public health units or hospitals. However, we found that the billing structure established by the Ministry of Health did not incentivize physicians to provide vaccination services at their offices. In fact, the Ministry had not compared the benefits of vaccinating in mass clinics versus vaccinating in physician offices.

Physicians were paid $170–$220 an hour by the Ministry under the ministry-negotiated agreement for working at vaccination sites operated by a public health unit or a hospital. In comparison, physicians who vaccinate patients in their own offices receive $13 per dose, a rate also meant to cover overhead and administrative costs of vaccinating, such as personnel for data entry. The significant discrepancy in these rates paid to physicians may have effectively disincentivized physicians to vaccinate patients in their offices. The Ministry informed us that it did not have any policy goals regarding whether physicians vaccinate in their offices or at mass clinics, and had no analyses, including expenses and time incurred in each model, to justify the differences in pay.

The Ministry created two hourly billing codes related to all COVID-19 work performed by physicians: H409A ($170 per hour for regular work hours on weekdays)

and H410A ($220 per hour for work performed outside of usual Monday to Friday business hours). These two codes can be used by physicians to bill the province not only for vaccine administration, supervision and adverse events monitoring at vaccination sites, but also COVID-19 assessment services run by hospitals. Due to the lack of distinct billing codes for other COVID-19-related physician services, the Ministry could not determine how much of the funding was paid for vaccinating patients versus assessing patients.

From March 2021 onwards, physicians began to administer COVID-19 vaccines at their offices. **Figure 15** compares statistics for physicians who billed by the hour for working with public health units and hospitals and those who billed by the dose for vaccinating at their offices from March 2021 to May 2022. More than 6,000 physicians billed the province at the hourly rate for COVID-19-related work, while just over 3,000 billed the province for office vaccinations during this period.

We surveyed all 34 public health units about their views on the way physicians were compensated. Of the public health units that responded, 40% thought physicians were overpaid for their work at mass immunization clinics, and their workloads were not in line with their compensation. Nine public health units' staff had heard from physicians that they were influenced to work at mass immunization clinics instead of at their own offices due to the difference in compensation.

When asked to comment on challenges faced during the vaccine rollout and what additional support they would like to see from the province, nine public health units flagged the lack of involvement from doctors and primary-care offices as a major issue, as they were the most trusted places for many people, especially children, to get vaccinated. Public health units also said that physicians were not properly incentivized to vaccinate in their own offices. Furthermore, public health units reported that the physician compensation rates for working in clinics resulted in low morale in other vaccinators working at the same sites who were paid far less, and were already feeling burned out and under-appreciated.

4.3.2 Weak Reconciliation Processes for Vaccinating Entities Compensated Based on Vaccination Volume

We found that the Ministry of Health and the Ministry of the Solicitor General did not consistently reconcile payments made to pharmacies and other vaccinating entities that bill the ministries based on the number of doses administered. Such an exercise would confirm that the ministries only pay for services Ontarians receive.

- The Ministry of Health paid more than $8 million to physicians for administering vaccines at locations chosen by the physicians, usually their

Figure 15: Physician Billing for Vaccination, Supervision and Monitoring, March 2021–May 2022

Prepared by the Office of the Auditor General of Ontario with information from the Ministry of Health

Work Location	Physicians Billing (#)	Pay Rate ($)	Average Billed per Physician	Total Physician Billings	Total Amount Billed ($ million)	Average Billed per Physician ($)
Vaccination Site or Assessment Centre Operated by a Hospital	4,339[1]	170 per hour (daytime), 220 per hour (after hours)	160 hours	695,998 hours	**132**	**30,488**
Vaccination Site or Assessment Centre Operated by a Public Health Unit[2]	3,472[1]	170 per hour (daytime), 220 per hour (after hours)	114 hours	394,158 hours	**77**	**22,124**
Physician Office	3,168	13 per dose	197 doses	623,711 doses	**8**	**2,565**

1. 1,690 physicians billed for work done for public health units and hospitals and are thus included in both totals.
2. We included data for physicians belonging to the family practice or general practice specialty only, as those physicians are most likely to also have a primary care practice. This billing includes not only COVID-19 vaccination at clinics but also supervision and monitoring at those clinics (public health units and hospitals), as well as work performed at COVID-19 assessment centres (hospitals only).

offices, between March 2021 and May 2022, but it has not reconciled these payments with doses administered, as recorded in the immunization database. The Ministry reviewed payments to these physicians and identified the top biller. The top billing doctor was asked to provide proof of vaccination for the doses administered at their office between May 2021 and February 2022. The Ministry found that the vaccination location identified in the database was a mass vaccination site, not the doctor's office. This finding necessitated further follow-up; the case remained unresolved as of August 2022.

- The Ministry of the Solicitor General reviewed a report of daily doses administered by each FH Health location to ensure that the expenses were reasonable based on vaccination volume. However, this report was prepared by FH Health and was not verified with records in the immunization database to ensure accuracy. We reviewed FH Health's billing against the immunization database and noted that the billing was reasonable.

4.3.3 Adverse Events Not Regularly Monitored across Vaccination Sites

The Ministry of Health and Public Health Ontario do not monitor trends in adverse events following immunization or breakthrough infections at all vaccination sites to detect potential concerns with sites or vaccinators. Breakthrough infections occur when a vaccinated person is found to be infected with the disease against which the person was vaccinated.

Public Health Ontario performs surveillance, and publishes public reports on breakthrough infections and adverse events following immunization (weekly, later reduced to bi-weekly). However, it does not analyze the data to identify trends at vaccination sites or with specific vaccinators.

Public Health Ontario informed us that identifying these trends in cases following vaccination at a specific clinic may lead to biased results due to factors unrelated to vaccination sites or vaccinators. For example, a vaccination site may have been targeting a higher risk group, or an age group more likely to have waning immunity, potentially resulting in higher breakthrough cases in a certain population. Analyses of breakthrough cases by lot number would be expected to have similar limitations and challenges, in addition to others related to variability in lot sizes and the distribution of vaccine lots across multiple provinces and territories in Canada. However, these types of analyses may still provide the Ministry with areas of concern to investigate, given the delicate nature of the vaccines, and the expansion of eligible vaccinators.

4.3.4 No Scalable Mass Delivery System Ready for Future Emergency Use

Over the course of the vaccine rollout, the Ministry of Health has not fully studied ways to improve the efficiency of vaccination sites in Ontario. This work could identify, for example, how quickly a patient can be moved through the screening, check-in, and vaccination, and any time spent waiting between steps.

Media reported on significant line-ups outside vaccination sites in winter, often including vulnerable seniors with mobility issues. For example, in early March 2021, a vaccination site in Newmarket for people 80 years or older with appointments reportedly had lines outside; the report also noted minimal physical distancing in the line. Also, when demand for vaccines surged in late December 2021 during the rollout of third doses, one mass immunization clinic in Ottawa had people with appointments wait outside for up to two hours.

The Ministry studied the processes, procedures, layouts and practices at nine different mass immunization clinics between summer 2021 and December 2021. This study, which was finalized in July 2022, looked at:

- pros and cons of each mass immunization clinic model as shown in **Figure 16**;
- efficiency as measured by the number of doses of vaccine administered per staff member per hour in each model;
- the average time spent in a clinic from entering the clinic, to check-in, to vaccine administration, including wait times between steps, but excluding the post-vaccination observation period and the time to line-up before check-in; and

Figure 16: Models of Mass Immunization Clinics Reviewed by the Ministry of Health

Source of data: Ministry of Health

Clinic Model	Description
Traditional	Each step in the process (i.e., check-in, vaccine administration, post-vaccine observation) occurs at a different station and clients move through the stations.
Circular and/or Hockey hub	Clients remain in the same seat throughout the vaccination process and vaccinators and support staff come to them to check-in, administer a vaccination and observe them after vaccination. Clients' seats are arranged in circles.
Drive through	Clients remain in their vehicles throughout the process.

- qualitative measures including COVID-19 safety protocols, security (for example, from anti-vaccination protesters), ease of access and staff workload.

The Ministry acknowledged the limitations of the study since it examined only nine high-volume clinics that were considered better-performing clinics according to self-reported data. The study did not assess low-efficiency clinics that likely could have most benefited from identifying areas for improvement. Also, the report indicates that periods reviewed were different for each clinic, and only included the booster rollout in December 2021 for some of the clinics studied.

One third of the medical experts that responded to our survey disagreed that the provincial government had established a flexible vaccination clinic model that allows for adaptation should mass vaccinations be needed in the future. One expert noted, "I don't see a clear model, I see an unco-ordinated scramble." Another stated, "I think family doctors and pharmacists should be…vaccine givers…line-ups for mass vaccination were ineffective and older people or disabled or people who worked long hours couldn't access them."

As of August 31, 2022, the Ministry had not shared the study and its recommendations with public health units to help them plan for the fall vaccination surge expected for the new bivalent COVID-19 booster. As well, at that time, the Ministry still had no plans to ask public health units to report performance indicators developed in the study, such as measuring vaccine doses administered per staff member per hour, and average time spent by a client inside the clinic from entrance to vaccination, due to concerns about the administrative burden on public health units.

RECOMMENDATION 5

So that payments made to vaccinating entities are commensurate with expected performance and output, we recommend that the Ministry of Health, in conjunction with the Ministry of the Solicitor General:

- review the differences in compensation to health-care professionals and update compensation rates to address differences for future vaccination campaigns;
- create distinct physician billing codes for different services performed in future vaccination campaigns to enable meaningful analysis of the specific services rendered, and incorporate this process in its future pandemic response plan;
- reconcile payments made to vaccinating entities that bill by doses administered against vaccination data at least on a quarterly basis; and
- develop performance indicators that measure the efficiency of mass vaccination sites, collect this data and compare across vaccination sites at least on a semi-annual basis to learn from this information and make improvements.

MINISTRY OF HEALTH RESPONSE

Compensation of health-care professionals, whether it be for pandemic-related activities or for routine duties, is subject to numerous influences, including, but not limited to, collective agreements, negotiations with professional associations, labour market factors, private-sector companies establishing agency rates (which may differ from

compensation paid to agency staff), sector norms and job specifications. The Ministry of Health will review compensation rates for future vaccination campaigns with these factors in mind.

The Ministry will assess the feasibility and necessity of more granular billing codes for future vaccination pandemic responses based on its experience during the COVID-19 pandemic. Physician billing codes and compensation are subject to negotiation between the Ministry and the Ontario Medical Association.

While direct reconciliation between vaccination data and billing systems will be limited, the Ministry will better monitor vaccine volumes and payments through available systems to identify risks as part of its stewardship of vaccine funding.

The Ministry will work with public health units who continue to offer large vaccine clinics to develop a measure of efficiency to be piloted.

4.4 Immunization Database

4.4.1 Data in Immunization Database Was Not Consistently Updated and Validated

Immunization Database Built Without Sufficient Controls and Processes to Catch Erroneous Entries

The Ministry of Health did not have processes to regularly validate or check for possible erroneous entries until December 2021, despite the significant risk of inappropriate entries from the beginning of the vaccine rollout in late 2020.

While the Ministry monitors the immunization database for potential security breaches from external sources, it has done little to proactively validate records being entered into the database. Between November 2021 and June 2022, public health units and the public flagged 11 instances of fraudulent activity in the database with the Ministry. These activities included falsifying vaccine records, altering existing records, and using personal information for malicious activities like "phishing." The Ministry relies on certain vaccination site operators, such as public health units, hospitals, and pharmacies, to ensure that they initiate their own investigations. Investigations are often prompted by complaints or reports from the public. The Ministry does no actual investigations on its own, and offers only administrative support by providing requested reports for public health units and other partners to assist them in completing their own investigations. However, this presents a problem if the vaccinating site operator is the source of the suspicious activity, for example in pharmacies, as discussed in **Section 4.1.2**.

Since December 2021, the Ministry has monitored the vaccination database records to identify unusual or suspicious activity (for example, a user account being accessed from multiple locations, or high counts of records accessed by end users). However, this was introduced three months after proof of vaccination became mandatory in September 2021. The Ministry confirmed with us that once a fraudulent record has been created, such as a proof of vaccination, there is no ability to revoke the system-generated QR code. This means that a person with a QR code generated from falsified information will have continued use of the code, potentially increasing risk to the public. (For more information on proof of vaccination, see **Section 4.6.1**.)

Patient Profile Information Not Consistently Captured in Immunization Database, Reducing Ability to Identify High-risk Areas and Population Groups

The immunization database has several limitations in its capacity to collect important data, which has hindered efficient targeting of high-risk populations.

Ontario's immunization database was built rapidly to address the information needs of mass vaccination during a pandemic. The Ministry of Health indicated that it updated the database as needs were identified by program staff. Experts in public health have indicated that sociodemographic information, such as race, household size, and total income helps identify marginalized populations and facilitates equitable vaccine distribution. Even though the database was designed to house this information, the Ministry did not require its collection and many vaccinating entities did not collect it. We analyzed all database records from December 2020 to May 2022 and found that about 95% of the records did not include any sociodemographic information. Of the records that did include this information,

we noted that some were missing data. For example, 18% of records that had information were missing the client's ethnicity, and about 10% were missing total household income. In August 2022 during the course of our audit, the Ministry added a component to the immunization database that required vaccinators to ask for consent to collect sociodemographic information, but still did not require that vaccinators try to collect it.

In addition, the immunization database has a field for "reason for immunization," for vaccination site staff to enter eligibility information. Ministry documents indicate that this field is currently used to provide insights for planning the vaccination program delivery and monitoring coverage for key populations. Clients may have several relevant risk traits that collectively describe their risk profile—for example, a person may be a 60-year-old health-care worker who is Indigenous. However, only one reason is allowed in the immunization database. For example, according to Ministry guidelines on selecting reason for immunization, this person would only be identified as a health-care worker, as that is higher on the data-entry guidance. Consequently, many important risk factors are not collected, even though they could be used to help identify vaccination coverage and design outreach efforts in high-risk areas and population groups.

At the time of our audit, the only way that data on high-risk groups could be collected was through an Ontario-based, not-for-profit research group, ICES (formerly known as the Institute for Clinical Evaluative Sciences). The Ministry provides funding to and relies on monthly reports from ICES for information from other large databases, the cancer and kidney registries for example, to fill in the data gaps.

Seven public health units that responded to our survey also agreed that the less-than-complete client profiles being collected for the "reason for immunization" field in the immunization database is an area of concern. Some Ministry staff see the value of collecting more than one "reason for immunization" on client profiles in the immunization database to obtain a more complete risk profile, but the Ministry has not made this change nor had it planned the change at the time we completed this audit. The Ministry informed us that it needed to balance clinical workflow with desired information, and that this decision to include only one reason was endorsed by an internal table on vaccine reporting.

In June 2021, the Ontario COVID-19 Science Advisory Table also noted that Ontario does not track and report vaccination rates among people with disabilities. The Ministry still relied on ICES (formerly known as the Institute for Clinical Evaluative Sciences) for this at the time we completed this audit. Evidence from other jurisdictions shows that this population experiences an increased risk of COVID-19-related hospitalization and death.

Inventory Component of Immunization Database Not Integrated with All Systems in Vaccine Supply Chain, Resulting in Incomplete Data and Unnecessary Manual Data Entry

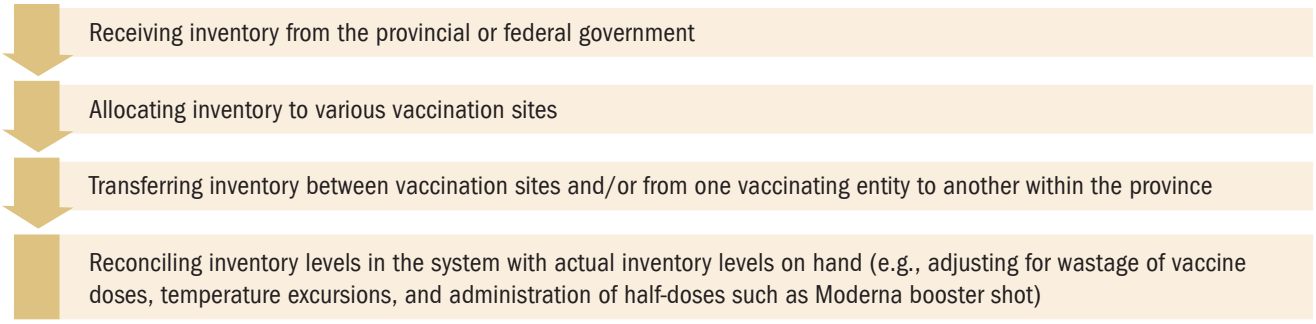
The immunization database is both a vaccination records database and a support for inventory management of COVID-19 vaccines in the province. This inventory component of the database currently requires information inputs at various stages, as shown in **Figure 17**.

The Ministry of Health (Ministry) relies on the provincial warehouse and two major pharmacy distributors for the storage of vaccine inventory upon arrival from the federal warehouse, as shown in **Figure 3**. All three of these distributors have their own individual in-house inventory systems, but these systems are not integrated with the immunization database. This means that distributors need to enter shipments received from the federal warehouse, as well as outgoing shipments to vaccinating entities (such as public health units and pharmacies) twice—once in their own systems, and again in the immunization database. This administrative burden has resulted in distributors not entering detailed data into the immunization database in a timely manner, which creates issues as the vaccines flow through the supply chain.

This lack of integration has also resulted in unnecessary, repeated manual data entry for vaccinating entities, who have to manually enter details about vaccines received into the immunization database, such as quantity and lot number, when they receive vaccines

Figure 17: Steps in COVID-19 Vaccine Inventory Management

Prepared by the Office of the Auditor General of Ontario



from distributors. One major drawback of requiring manual inputs for most inventory-related transactions is human error, which results in inventory errors and increased workload to correct these errors. An accurate picture of available inventory at all vaccination sites and storage spaces in the province is important, as it allows the Ministry to more accurately assess how many more vaccine doses it will need to fulfill predicted demand. Inaccurate inventory reporting can result in vaccine shortages or unnecessary stockpiles.

Starting in March 2021, the Ministry required public health units to perform physical inventory counts of vaccines and reconcile them to the number of doses available in the immunization database on a daily basis, due to discrepancies in inventory tracking. This process gradually decreased to weekly and eventually was phased out in June 2022. If the immunization database was integrated with inventory systems used by distributors, fewer manual inputs would have been required, and public health units may not have needed to reconcile as frequently during the busiest periods of the vaccine rollout. We surveyed all 34 public health units and asked if they believed that the immunization database was effective in supporting vaccine inventory processes. Of the public health units that responded to our survey, 43% disagreed, compared to 30% that agreed; 27% of the respondents did not have an opinion on this. Those that did not feel the database was effective in supporting vaccine inventory processes had concerns with the manual process, especially when public health units are responsible for managing inventory for themselves and for external partners such as primary-care practitioners and retirement homes in their areas.

In January 2022, the Ministry conducted a data validation exercise with 28 public health units that voluntarily participated. The four main themes that public health units highlighted as the reasons for discrepancies, and the percentage of units that identified these reasons are shown in **Figure 18**.

4.4.2 Immunization Database Designed for Mass Immunization Clinics Not Integrated with Systems Used by Physicians and Pharmacists

Despite warnings from stakeholders as early as December 2020 highlighting the importance of integrating the immunization database with health records, no integration has been achieved. The Ministry of Health informed us that the immunization database was originally designed for use in mass immunization clinics, and acknowledged that in its current form it is not as efficient in other settings, such as primary care and pharmacies. Primary-care service providers vaccinating in their own clinics bill through the Ontario Health Insurance Plan, record vaccination information into the database and also update their own electronic or other medical records because the immunization database is not integrated with other electronic medical record systems. This is an administrative burden for service providers and increases the risk of incomplete patient medical records.

The white paper published by the Ontario Medical Association (OMA) in December 2020 (described in

Figure 18: Reasons for Inventory Discrepancies Reported by 28 Public Health Units

Prepared by the Office of the Auditor General

Reason	# of Public Health Units reporting
Incomplete inventory reporting at vaccination sites, and when external partners are involved in vaccination efforts	**16**
Backlog in data entry, mainly resulting from wastage, transfers, and reconciliation of lot numbers	**12**
Half-dose data entry for Moderna booster, where six half-doses of booster are counted as six full doses, requiring manual adjustments to add three doses back into the system	**10**
General data entry errors caused by, for instance, inexperienced staff or staff shortages	**8**

Section 4.2.5) noted the importance of information systems meeting providers' needs, and that any vaccine systems must be co-developed with end users to align better with their workflows. Representatives of the OMA also informed us they had concerns about the lack of integration of the two systems.

The Office of the Chief Medical Officer of Health informed us that integration of these systems could occur only through negotiations with electronic medical record vendors. Work to determine the strategy and approach to integration began with Ontario Health in May 2022, but as of August 2022, no progress had been made.

Pharmacies are also required to perform duplicate administrative activities to submit billing information—billing through the Health Network System (the pharmacy billing system) and separately enter data into the immunization database.

4.4.3 Lack of a Proper Immunization Registry Limits Ontario's Ability to Rapidly Respond to Future Disease Outbreaks

Significant Deficiencies with Previous Immunization Databases Resulted in the Lack of a Reliable Immunization Registry in the Pandemic

Ontario does not have an effective and operational immunization registry to support vaccination efforts and data analysis, despite previous, costly attempts to create one. Immunization registries support public health work such as planning for and evaluating targeted programs for populations with lower rates of vaccination, managing vaccine inventory, and identifying individuals who are overdue for vaccinations.

In 2007, Ontario made the decision to replace the Immunization Records Information System (IRIS) with the pan-Canadian system known as Panorama—a system that cost the province over $115 million from 2010 to 2016, with annual average maintenance costs of over $10 million since then, for a total of about $170 million since 2010. However, despite the significant costs incurred, both IRIS and Panorama had similar weaknesses. They only included vaccinations required under the *Immunization of School Pupils Act*, even though the Ministry of Health informed us in 2014 during our audit on Immunization that it had a "vision" to expand Panorama to include all vaccinations for all Ontarians.

Our 2014 Immunization audit also noted that the systems did not consistently include vaccinations administered by vaccine providers other than public health unit staff, such as pharmacies, primary care and hospitals, since there was no legislative requirement for these providers to report vaccinations. Furthermore, these vaccine providers could not directly access either system. Our 2014 audit also noted that until all health-care providers enter information at the time of a vaccination, Panorama cannot provide the data needed to identify areas with low coverage rates. Such data is needed to help prevent future outbreaks and identify vulnerable people during an outbreak. The Ministry acknowledged in 2014 that this was an important component of ensuring a robust provincial immunization database.

In 2017, the government attempted to rectify this issue with an amendment to the *Immunization of School Pupils Act*. This amendment would have resulted in a requirement for all vaccine providers to report information on any vaccination to the public health unit in the area the vaccine was administered. However, this section of the legislation was never proclaimed. In June 2021, during the COVID-19 pandemic, the government recognized the importance of obtaining a record of vaccinations for COVID-19, and enacted the *Covid-19 Vaccination Reporting Act, 2021*. This new Act requires persons or entities who administer COVID-19 vaccines to report vaccine-related data to the Ministry of Health's new COVID-19 immunization database, which has cost over $144 million from the beginning of its development in April 2020 to May 2022.

Currently, three distinct systems, as shown in **Figure 19**, support the province's vaccination records. The Ministry informed us that Panorama was not being used as a COVID-19 immunization database because of its limitations, which meant an immunization registry was not available for use in Ontario when the COVID-19 pandemic occurred in 2020. The Ministry was required to start from the beginning with a new database. British Columbia uses Panorama to record COVID-19 vaccination data.

The Ministry also informed us that the new COVID-19 immunization database it developed has the technological capability to be an immunization registry for all immunizations. During our audit, a review was being done by a consulting firm appointed by the Ministry to determine an approach to long-term technology for Ontario's evolving provincial vaccination program, but no decisions had been made on the expansion of the database. All medical experts that responded to our survey agreed that they would like to see a provincial immunization registry (for all vaccines including COVID-19 vaccines and those covered by the *Immunization of School Pupils Act*) since this would allow health-care professionals to better deliver tailored vaccine strategies to the people who need them most. This registry would also allow public health professionals to adapt more quickly to the emergence of future outbreaks.

Significant Costs and Time Required to Train Vaccinators on New Immunization Database Without an Existing Functional Immunization Registry

Ministry analyses indicate that vaccination site staff training to use the COVID-19 immunization database was time-consuming because the database was completely new. This increased the administrative burden and lowered efficiency at a time when public health units and other health-care professionals were trying to respond to the pandemic early in the health care crisis. A survey of all 34 public health units conducted by the

Figure 19: Vaccination Record Systems in Ontario

Prepared by the Office of the Auditor General of Ontario

System	Description
Panorama	Includes data on vaccines in the *Immunization of School Pupils Act*, as well as inventory for routine vaccines and vaccine-related supplies, including those used in the administration of the COVID-19 vaccines.
Immunization Connect Ontario (ICON)	Supports vaccine providers and members of the public in reporting their vaccination records to public health units.
COVID-19 vaccination database (COVaxON)	Contains all data related to COVID-19 vaccinations.

Ministry of Health in July 2021 found that most public health units required six to 14 days to train primary-care providers to use the immunization database, and that 88% of public health units had a dedicated lead to manage both staff training and support for using the system. The Ministry informed us that even if Panorama was used as Ontario's immunization database, at least three to five days of training for all non-public health unit staff would have been needed.

We conducted a survey of all 34 public health units in August 2022. Of those that responded to our survey, 47% agreed that they spent extensive time training staff to use the immunization database. For example, 60% of the public health units that responded indicated they developed their own guidance documents on how to use the immunization database.

RECOMMENDATION 6

To better protect Ontarians from COVID-19 and other vaccine-preventable diseases in the future, and to improve data quality on vaccination activities, we recommend that the Ministry of Health, in conjunction with Ontario Health and the Information and Privacy Commissioner of Ontario:

- use findings from investigations on misrepresentation and fraud to implement processing controls to improve the security and integrity of vaccination data;
- improve and update the immunization database to allow vaccination site staff to collect multiple data elements on client risk factors to support efforts to equitably distribute vaccines;
- consult with distribution partners and other parts of the vaccine supply chain to evaluate user experience of the inventory component of the immunization database, to identify ways to provide better oversight of inventory across Ontario, and to reduce waste;
- consult with health-care providers in different settings to evaluate the user experience of the immunization database and streamline it as much as possible;
- if separate systems remain, undertake needed work such as engaging with vendors or developing interim solutions, to integrate external information systems, such as electronic medical records and third-party inventory systems, with the immunization database,
- create a comprehensive immunization registry that will allow for more efficient service delivery for all vaccines; and
- explore legislative options to require collection of data about the vaccine recipient, vaccinator and vaccine for all vaccinations including the COVID-19 and other routine vaccines for adults and children.

MINISTRY OF HEALTH RESPONSE

The Ministry of Health agrees with this recommendation and will review and make improvements to vaccine-related information technology (IT) solutions to ensure they meet the needs of the program and users. The Ministry will work with Ontario Health and the Privacy Commissioner on exploring appropriate updates to the system that also respect individuals' privacy and are operationally feasible.

The Ministry recognizes the importance of identifying vaccine fraud attempts and will continue to work with key partners to enhance controls in IT solutions, where possible.

The Ministry looks forward to continuing to consult with health-care providers to improve user experiences for existing and new IT solutions. The Ministry will continue to make progress on its planned IT solutions, including the integration of electronic medical records with other health system solutions. A discovery project is under way to assess provincial immunization systems and develop an approach to an integrated immunization solution, which includes a comprehensive immunization registry.

4.5 Vaccine Wastage

4.5.1 Ontario Wasted at Least 3.4 Million or 9% of the Vaccine Doses Received from the Federal Government as of June 30, 2022

The decline in demand for vaccines in 2022 resulted in vaccine inventory challenges. The Ministry of Health has not taken sufficient action to date to guard against excessive vaccine waste. Some wastage is due to weaknesses in the immunization database used for vaccine inventory management. As noted in **Section 4.4.1**, inventory tracking is manual and the Ministry acknowledges this can result in the inefficient use of provincial vaccine inventories. While the Ministry does not pay directly for these vaccines, unnecessary vaccine wastage impacts Ontarians through federal government expenditures. In addition, wasted vaccines could have been used to address inequity of vaccine distribution across the world in less affluent countries, resulting in increased global immunity, reduced COVID-19 spread, and possibly the prevention of new variants.

Ministry records show that between December 23, 2020 and July 5, 2022, 3.4 million doses of COVID-19 vaccine, or 9% of the 37.5 million doses received from the federal government during this period had been wasted.

This wastage is understated as it excludes data from the province's distribution centres run by private companies. These companies use their own warehouse inventory systems to track vaccine inventory, and there is no interface between these systems and the Ministry's immunization database. Companies are required to report wastage to the Ministry, and the Ministry informed us that such wastage is minimal. However, in August 2022, the Ministry did not have complete information from all of the private companies, and had not confirmed the accuracy of the reporting, such as by reconciling the wastage with the amount of vaccine that flows into and out of the distribution centres. The Ministry told us that accurate reporting of distribution centre inventory data, including wastage, is an ongoing project it is undertaking with distribution centre operators. As of August 2022, distribution centres were required to adjust inventory levels in the Province's database manually every week.

Our examination of wastage data indicates that wastage is low in periods of high demand, but increases as demand slows. This is evident in the four periods between the months of December 2020 and June 2022, as shown in **Figure 20**.

Figure 21 compares the two main types of wastage in Ontario from December 23, 2020 to June 30, 2022. While open-vial wastage fluctuates based on shifts in demand, as discussed above, about one million doses amounts of closed-vial wastage occurred in the first half of 2022 as vaccines reached their manufacturers' expiry dates.

Much of the wastage was the result of a Ministry overestimate; the Ministry informed us that it orders vaccines from the federal government which purchases them based on its evaluation of demand. The demand for boosters fell far short of demand for first and second doses. The Ministry also did not establish vaccination targets as discussed in **Section 4.1.3,** or support demand with public advertising and other communications as effectively. The Ministry's analysis from July 2022 indicated that if demand for third and fourth booster doses by the eligible population had been comparable to the first and second doses, the province would have administered 4.4 million more third doses and 2.4 million more fourth doses. Moreover, while the Ministry informed us that the federal government advised that these expiring vaccines could not be donated to another jurisdiction because they were too close to expiry, the Ministry had not obtained information about the amount of time that is required prior to vaccine expiry for a vaccine to still be donated. This information could have helped minimize vaccine wastage.

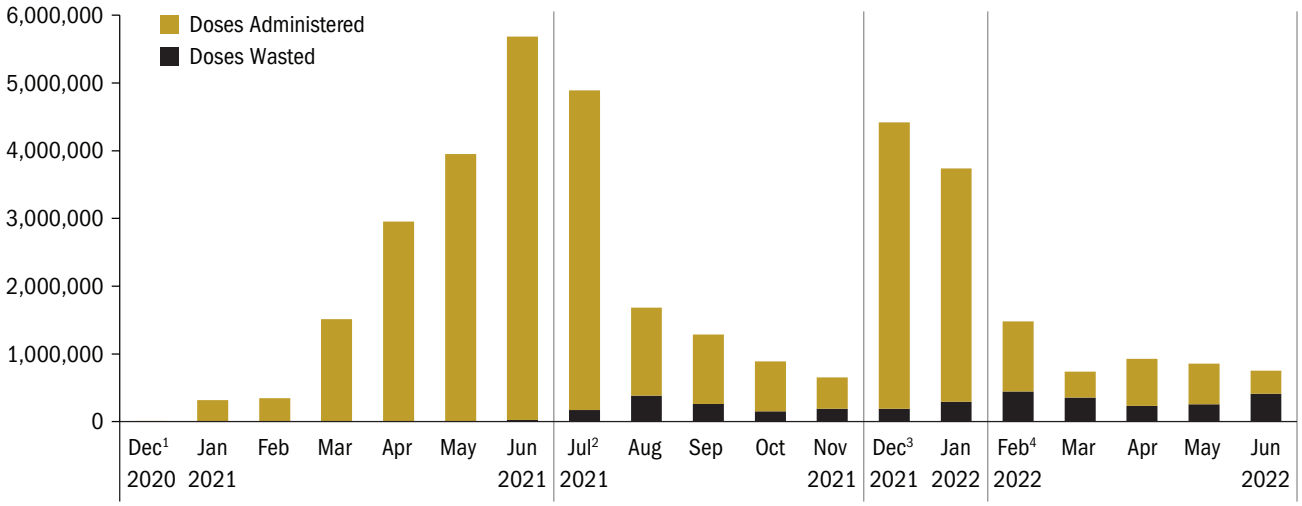
4.5.2 Wastage Varies Greatly by Vaccinating Entity and Public Health Unit

Pharmacies Wasted 22% of the Vaccines Delivered to Them, Compared to Provincial Average of 9%

Figure 22 shows that from December 22, 2020 to June 30, 2022, over 70% of all wasted vaccines came from pharmacies. Pharmacies wasted 22% of the vaccines that were delivered to them, while hospitals wasted 1%

Figure 20: Vaccine Doses Administered and Wasted, December 23, 2020–June 30, 2022

Source of data: Ministry of Health



1. Dec 2020-Jun 2021: Wastage rate was 0.3% when vaccines were initially rolled out and the first two doses were being administered. Generally, vaccines were scarce and supply often could not keep up with demand. Most of this waste resulted from insufficient doses from a vial of vaccines or damaged/defective vaccines.
2. Jul 2021-Nov 2021: Wastage rose to 12% after the initial rollout period when the majority of the eligible population had already received two doses and vaccine demand was in decline. This wastage was mostly due to expiry of thawed vaccines after 30 days and not enough people showing up to get vaccinated to use up a full vial of vaccines.
3. Dec 2021-Jan 2022: Wastage dropped to 6% amid the surge of Omicron when Ontarians were seeking vaccination to reduce the risk posed by this variant.
4. Feb 2022-Jun 2022: Wastage surged to 38% as demand for boosters was much lower than the province anticipated, and certain lots of vaccines ordered in December 2021 and January 2022 during the vaccine rollout reached expiry dates between May and June 2022.

and public health units wasted 4%. Appointment double booking as well as the resulting no-shows described in **Section 4.2.3** also contributed to this wastage.

Vaccine wastage in pharmacies occurred at more than 2,900 locations. Though there were small amounts of wastage at each pharmacy, there was disproportionate waste in this setting overall. Ministry of Health data on pharmacy wastage from this period shows that:

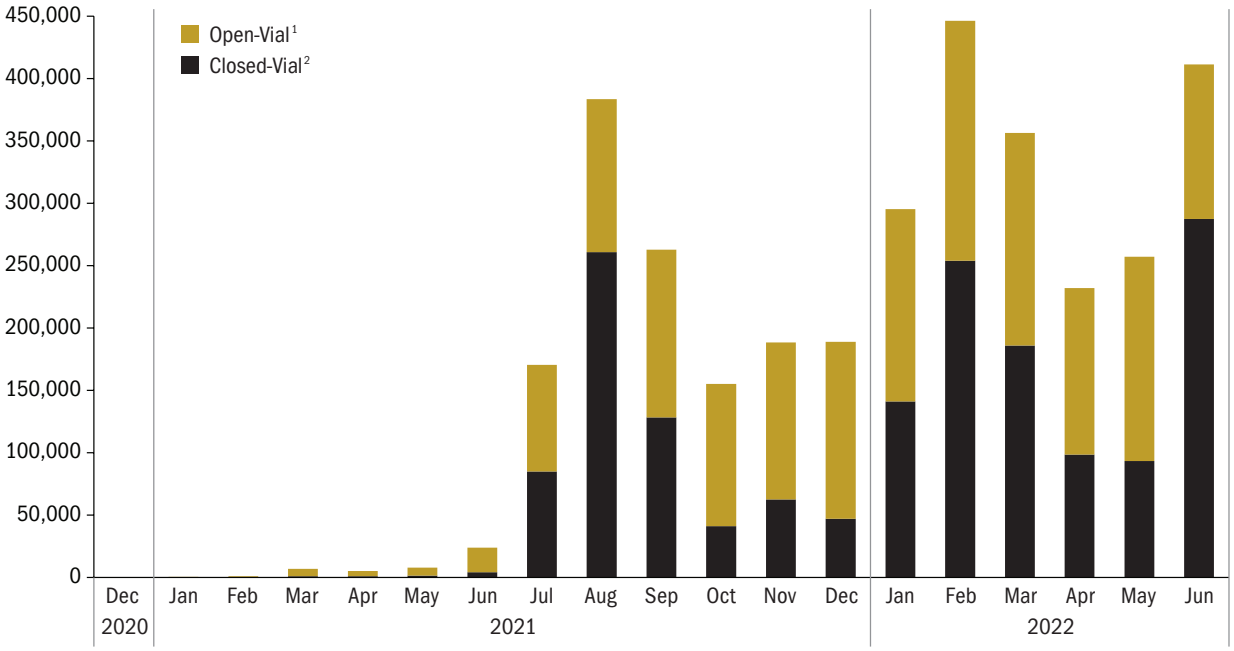
- 30% was due to unopened vials of vaccines stored at refrigerated temperatures for more than 30 days; these vials could have been stored at a lower temperature in a freezer to prolong their efficacy. Since pharmacies do not have vaccine freezers—public health units and hospitals do—it is more important for them to order only a month's worth of supply. The Ministry indicated that it sought to limit vaccine waste by sending no more than an estimate of four weeks of supply for each pharmacy based on its recent use.
- 34% was from opened vials unused after 24 hours, suggesting that pharmacies are more likely than public health units and hospitals to open a vial without a sufficient number of clients to use all its doses within 24 hours.

Wastage Varied between Public Health Units

All public health units accounted for 23% of the wasted vaccines generated in Ontario as shown in **Figure 22**. We analyzed vaccine wastage by public health unit and noted that rates varied from 2% at Brant County, York Region, Simcoe Muskoka and Sudbury and Districts public health units to almost 17% at the Grey Bruce public health unit from December 2020 to June 2022, as shown in **Appendix 18**. We noted that two public health units—Grey Bruce and Windsor-Essex—had significantly higher rates of waste than other public health units, exceeding the 9% provincial rate. The Ministry of Health has not assessed the cause of variations between public health units or reasons for the wastage at the

Figure 21: Monthly Open-Vial and Closed-Vial Wastage, December 23, 2020–June 30, 2022

Source of data: Ministry of Health



1. Open-vial wastage results from vials that were opened and not fully used, primarily due to insufficient immediate demand at vaccination sites. As vaccines come in vials containing six to 10 doses, there may not always be enough people to use up all doses in the vial before they go bad. In times of low demand, some open-vial wastage is unavoidable when trying to maximize vaccine uptake due to the multi-use vials chosen by vaccine manufacturers to package vaccines. An August 2021 memo from the Chief Medical Officer of Health indicated that all vaccinating entities should not hesitate to open a new vial even if only one person was available to be vaccinated and this would mean the rest of the vial might be wasted. The Ministry of Health (Ministry) says in its vaccine storage and handling guidelines that "unused doses in open vials are expected to increase as overall vaccination rates decrease."
2. Closed-vial wastage results from expired vaccines that were not used. It is an indication that the Ministry and vaccinating entities overestimated the number of people who were interested in or eligible for vaccination. The Ministry told us that when vaccine supplies stabilized, it ordered from the federal government based on forecasted demand informed by eligible population and estimated uptake.

two public health units with the highest rates. Public health units likely overestimated demand and the vaccines they ordered expired before they could transfer or return them. The Ministry informed us that it shared some wastage data with public health units in summer of 2022, and that it will begin to share this data with public health units regularly starting in fall 2022.

Private-sector Vaccination Sites Wasted 24% of the Vaccines Delivered to Them

Four private-sector companies engaged by the Ministry of the Solicitor General and the Ministry of Health to operate vaccination sites together wasted over 74,000 doses, or 24% of the vaccines that the Ministry of Health delivered to them as shown in **Appendix 18**. While two of these companies incurred 6% to 7% of waste from May 1, 2021 to June 30, 2022, the other two—FH Health and Switch Health—incurred waste at 20% and 57% of the vaccines that the Ministry delivered to them, respectively.

FH Health was responsible for administering vaccines at nine locations across Toronto and the surrounding area, as well as a mass immunization clinic at the Toronto Zoo in two months between January 8 and March 4, 2022. During this period, this company wasted 3,223 doses and administered 8,919 doses. In the four days in March 2022 before the clinics closed, it wasted more vaccines (488 doses) than it administered (95 doses).

None of the contracts with these private-sector companies contained a clause requiring the company to minimize wastage or charging the company penalties for excessive wastage. The lack of external signage indicating that vaccinations were available likely

Figure 22: Number of Vaccine Doses Received and Wasted by Vaccinating Entities, December 2020–June 2022 (millions)

Source of data: Ministry of Health

Vaccinating Entity	Doses Received		Doses Wasted				Wastage (%)
	Total	%	Closed-Vial	Open-Vial	Total	%	
Pharmacies	10.90	29	1.17	1.27	2.44	72	**22**
Public health units	18.40	49	0.39	0.38	0.77	23	**4**
Hospitals	7.34	20	0.07	0.04	0.11	3	**1**
Other*	0.86	2	0.06	0.02	0.08	2	**9**
Total	**37.50**	**100**	**1.69**	**1.71**	**3.40**	**100**	**9**

* Consists mainly of private-sector vaccinating entities and workplaces that operated clinics at their own cost.

contributed to the high wastage rates at these sites. In the week ending January 4, 2022, we visited nine locations of FH Health and found no external signage on the vaccine clinics except for one sign some distance from the building at the Toronto Zoo.

Limited Guidance from Province on Wastage Targets and Prevention

Once vaccine supplies began arriving steadily in May 2021, the Ministry of Health instructed pharmacies and public health units to order vaccines from the province based on anticipated demand—specifically, booked appointments over the next two weeks—and inventory on hand at the time of ordering. However, the instructions did not specify a waste-minimization target to encourage more precision in ordering, nor had the federal government set any official wastage target.

The Ministry informed us that because it was so important to vaccinate as many people as possible who wanted a vaccine, it did not inform vaccination site operators to limit waste by reserving multiple-dose vials if just one person required vaccination.

However, a waste-minimization target that focuses on closed vials would still be appropriate, as without a clear target to minimize wastage, vaccinating entities had little incentive to limit orders.

According to a report on vaccine wastage that the World Health Organization (WHO) issued in 2019 before the COVID-19 pandemic, an acceptable amount of vaccine wastage from multi-dose vials is:

- a 10% wastage target for vaccines that come in two-to-five-dose vials; and
- a 15% wastage target for vaccines that come in 10 or 20-dose vials.

All COVID-19 vaccines used in Ontario come in vials of six to 10 doses. Based on the WHO estimates, a reasonable wastage rate would be 10–15%. Ontario's wastage rate of 9% appears to be below this threshold. However, this rate does not include wastage at the province's distribution centres, as mentioned in **Section 4.5.1**, so the actual wastage rate could be higher than the amount calculated by the Ministry.

RECOMMENDATION 7

To better inform future demand forecasting and minimize vaccine wastage, we recommend that the Ministry of Health:

- establish a provincial waste-minimization target with a focus on closed vials;
- require all vaccination entities and distribution centres to report on wastage, include a clause in future contracts with these entities to keep wastage below this waste-minimization target, and incorporate these in its future pandemic response plan; and
- analyze all reports of vaccine wastage, including from distribution centres, follow up on unusual trends or excessive wastage and take corrective action as needed.

MINISTRY OF HEALTH RESPONSE

The Ministry of Health has proactively monitored and managed COVID-19 vaccine wastage with partners throughout the pandemic and is within the World Health Organization waste target for multi-dose vials. In addition, the Ministry has returned over 4.4 million doses to the federal government for international donation. The Ministry will continue to conduct analysis of wastage data, as well as consult with its federal partners and other jurisdictions in Canada and internationally (e.g., World Health Organization), to help inform what appropriate targets for closed-vial wastage would be and if/when they should be implemented. Targets will take into consideration factors including availability of single and multi-dose vials, supply and expected product demand, delivery channel mix, and vaccine strategy (e.g., campaign type). Upon establishment of appropriate wastage targets, the Ministry will work with distribution centres to meet the targets set out.

4.6 Vaccine Mandates and Policies, and Evaluation of Evidence-Based Alternatives

4.6.1 Vaccine Passport Requirement Was Not Effectively Enforced

We found that the provincial government did not effectively enforce the proof of vaccination (vaccine passport) requirements leading to inconsistent adoption across the province and reducing its intended effect of reducing transmission and increasing vaccine uptake. Half of the medical experts that responded to our survey did not agree that the Ontario government used vaccine mandates effectively to encourage vaccination and protect Ontarians from exposure to COVID-19.

As discussed in **Section 2.5.2**, on September 1, 2021, the provincial government announced it would be implementing a vaccine certificate program, commonly referred to as the vaccine passport. Under the *Reopening Ontario (A Flexible Response to COVID-19) Act, 2020* (Act), Ontarians were required to show proof of two-dose vaccination to access certain venues from September 21, 2021 to March 1, 2022. The announced purpose of the vaccine passport was to reduce transmission in high-risk establishments and encourage eligible Ontarians to get vaccinated.

Recognizing that effective enforcement supported the success of the vaccine passport system, the Solicitor General gave provincial offences officers (officers), including public health inspectors, bylaw officers and police officers, the authority to enforce the Act, which includes vaccine passport requirements. Enforcing these requirements was a collective effort that involved officers from nine ministries and three public agencies, with the Ministry of Labour, Immigration, Training and Skills Development (Ministry) as the lead, as shown in **Figure 23**. The ministries, agencies and administrative authorities involved often worked in collaboration with public health units.

Limited Power Conferred to Officers to Enforce Vaccine Passport Legislation

We found that the province's legislation did not provide officers with sufficient powers to enforce vaccine passport requirements at businesses.

The Act only allowed officers to "require an individual to provide the officer with the individual's correct name, date of birth and address if the officer has reasonable and probable grounds to believe that the individual has committed an offence." The Ministry of the Solicitor General informed us that it was able to promote and enforce the legislation by using a voluntary consent approach to entry, and noted that when enforcing the vaccine passport, officers had to make observations from the entrance of the business, announce themselves, and explain their purpose to the business owner. In short, they could not assess "normal" operations of the business uninfluenced by the announced presence of inspectors. This is unlike the *Occupational Health and Safety Act*, which is used by inspectors to inspect workplaces for hazards and safety contraventions.

Figure 23: Ministries, Agencies and Administrative Authorities Involved in Enforcement of COVID-19 Proof of Vaccination

Source of data: Ministry of Labour, Immigration, Training and Skills Development

Ministries	Ministry of Agriculture, Food and Rural Affairs Ministry of Education Ministry of the Environment, Conservation and Parks Ministry of Finance Ministry of Labour, Immigration, Training and Skills Development* Ministry of Northern Development, Mines, Natural Resources and Forestry Ministry of Public and Business Service Delivery Ministry of the Solicitor General Ministry of Transportation
Agencies/Administrative Authorities	Alcohol and Gaming Commission of Ontario Electrical Safety Authority Technical Standards and Safety Authority

* Lead ministry for all enforcement efforts.

As well, when officers announced themselves upon arrival, the business owner could deny entry. While the Ministry informed us that officers were rarely denied entry, they had not tracked how often this occurred.

In British Columbia, enforcement teams of police, liquor inspectors and municipal bylaw officers were tasked with ensuring compliance with the vaccine passport. Depending on the violation, fines ranged from $230 to $575 for individuals and $2,300 for event organizers or owners/operators of event locations.

Limited Tracking of Inspections Conducted to Verify Compliance

Officers from the 12 provincial ministries, agencies, administrative authorities and some public health units identified only about 220 cases of non-compliance with vaccine passport requirements over five months between September 21, 2021 and March 1, 2022. Violations included not checking government-issued identification and not checking proof of vaccination at all. However, the Ministry did not track how many visits it made to venues where the vaccine passport was required, as officers were also enforcing other public health requirements such as mask-wearing. Its data therefore did not show how many times it had assessed non-compliance with passport requirements, and we were unable to determine how prevalent this type of non-compliance was.

QR Code Scanner Technology Developed but Only Mandatory for About a Third of the Time that Vaccine Passport Requirements Were in Place

We found that although the Ministry of Health announced on October 15, 2021 that it had developed the Verify Ontario application (app) to help businesses verify enhanced vaccine certificates starting in October, it did not require businesses subject to the Act to use it until January 4, 2022. The Ministry explained that the delay gave Ontarians time to download the enhanced vaccine certificate or receive it from the government by mail, and gave businesses time to adopt the app, which might have included purchasing equipment to verify the QR code, such as a smartphone for staff. Of the 160 days that vaccine passport requirements were in place, use of the app was only required for 54 days in the later part of the enforcement period, when most Ontarians already had their first two doses, limiting the full impact of the vaccine passport in reducing transmission in high-risk establishments and encouraging eligible Ontarians to get vaccinated. The Ministry could not provide any information on the extent of individuals presenting fraudulent proof of vaccination at venues.

The Ministry noted that compared to visually inspecting electronic or paper copies of the vaccine passport, the Verify Ontario app was a more secure and reliable method of verifying Ontarians' proof of vaccination—since it also allowed verification of vaccination without requiring clients to present personal health information. Staff at designated venues could use the Verify Ontario app to scan a QR code on a person's enhanced vaccine certificate and verify the validity of the vaccine passport without requiring or retaining personal health information.

The Ministry of Labour, Immigration, Training and Skills Development informed us that based on its analyses, the Verify Ontario app's overall adoption rate was low between October 2021 and January 2022. The rate increased after the Ministry of Health made the app mandatory on January 4, 2022. For example, officers observed—after announcing themselves—that Verify Ontario app compliance was 100%.

Future Vaccine Passport Not Being Considered Despite Benefits and COVID-19 Uncertainties

The Ministry of Health did not evaluate the effectiveness of a vaccine passport in achieving its goals. We noted that all other provinces implemented similar requirements, some before and some after Ontario. In the weeks following the announcement of the vaccine passport requirement to enter high-risk establishments, four of Canada's biggest provinces—Ontario, Quebec, British Columbia and Alberta—saw increases in daily first doses administered. **Figure 24** shows that Ontario saw a 23% increase in first doses administered; British Columbia and Alberta saw even larger increases.

The Ministry lifted vaccine passport requirements on March 1, 2022, and the Ministry of Health informed us that it did not have any plans to resurrect the vaccine passport. The apparent lack of willingness to consider its reintroduction under any circumstances indicates a lack of evidence-based decision making.

Experts have informed us that COVID-19 conditions in the community may one day result in a need to reconsider the use of the vaccine passport. In March 2022, the Science Table similarly suggested that such policy action should be considered, in conjunction with a recent booster dose. The Ministry informed us that it will assess the effectiveness of the vaccine passport and lessons learned from its use once the pandemic subsides.

RECOMMENDATION 8

To support enforcement efforts to limit transmission and encourage vaccination of vaccine-preventable diseases such as COVID-19 and those that may emerge in the future when science-based evidence indicates this is a societal benefit, we recommend that the Ministry of Health, in conjunction with

Figure 24: Comparison of Average Daily First Doses Administered in Four Provinces Before and After Announcement of Vaccine Passport Requirements

Source of data: Public Health Agency of Canada, Governments of Alberta, British Columbia and Quebec

			Average # of Daily First Doses[1] Administered		
	Announcement Date	Effective Date	10 Days Before Announcement	20 Days[2] After Announcement	Increase (%)
QC	Aug 10, 2021	Sep 1, 2021	6,898	7,745	12
BC	Aug 23, 2021	Sep 13, 2021	3,683	5,861	59
ON	Sep 1, 2021	Sep 22, 2021	11,361	13,946	23
AB	Sep 15, 2021	Sep 20, 2021[3]	4,037	9,401	133

1. First-dose administration data shows that those who had not received any COVID-19 vaccine were vaccinated at a higher rate (starting with first doses) following the announcement of the vaccine passport requirements.
2. Three of the four provinces gave three weeks' notice before the vaccine passport requirement came into effect; therefore, we measured vaccination data 20 days (approximately three weeks) following the announcement.
3. Albertans were required to have one dose by September 20, 2021 and two doses by October 25, 2021.

the Ministry of Labour, Immigration, Training and Skills Development:

- assess what authority is needed to enable enforcement officers to effectively enforce compliance with public health measures such as proof of vaccination requirements, and incorporate this in its future pandemic response plan;
- develop an inspection process to identify the venues that are subject to proof of vaccination requirements and track the compliance activities; and
- investigate what barriers businesses faced when using the Verify Ontario application, such as lack of understanding of how to use the technology or Internet connection, take corrective action as needed and incorporate this in its future pandemic response plan.

MINISTRY OF LABOUR, IMMIGRATION, TRAINING AND SKILLS DEVELOPMENT RESPONSE

The Ministry of Labour, Immigration, Training and Skills Development agrees with the recommendations to assess what authority is needed to effectively enforce public health measures, and to establish inspection processes to track its compliance activities. In order to guide the work of the officers involved in the *Reopening Ontario (A Flexible Response to COVID-19) Act, 2020* (Reopening Ontario) enforcement, in the future, the Ministry will develop and implement an inspection process that identifies the venues specifically subject to proof of vaccination requirements versus those that are not, and will track compliance accordingly. The Ministry has evaluated Reopening Ontario compliance and enforcement, including proof of vaccination, and the number of businesses visited during the various multi-ministry team initiatives and campaigns. The Ministry collected sector data for each business visit and evaluated the level of compliance for proof of vaccination requirements in the sectors where it was required, i.e., restaurants, cinemas and gyms. However, the data collected for restaurants did not distinguish between restaurants that offered only take-out, and restaurants that offered dine-in service where patrons' proof of vaccination was required. However, when proof of vaccination was required, officers were asked to focus inspections on dine-in restaurants, and we believe that the majority of restaurants inspected offered dine-in service. Our analysis demonstrates the overall level of proof of vaccination compliance that multi-ministry team officers observed during their visits to all workplaces.

Moving forward, for any future public health measures enforcement, the Ministry will leverage its knowledge and expertise in enforcement, as well as lessons learned during the COVID-19 pandemic, to inform the development of effective authorities and to be able to differentiate between workplaces required to check for vaccination and those not required to meet these requirements.

MINISTRY OF HEALTH RESPONSE

The Ministry of Health accepts the recommendation involving the Verify Ontario application. Should this requirement be implemented in the future, the Ministry will reflect on the feedback it has received and explore more opportunities to increase communication, guidance and collaboration with the business community.

RECOMMENDATION 9

To better protect Ontarians from COVID-19, and other highly transmissible vaccine-preventable diseases as may be required in the future, we recommend that the Ministry of Health, in conjunction with the Chief Medical Officer of Health, establish criteria to use when deciding whether to reintroduce proof of vaccination requirements and incorporate these in its future pandemic response plan.

MINISTRY OF HEALTH RESPONSE

The Ministry of Health agrees with this recommendation and will look to establish criteria, or conditions, to consider regarding any reintroduction of proof of vaccination requirements and their inclusion in

future pandemic response plans and/or appropriate emergency response plans.

Throughout the COVID-19 pandemic, the Chief Medical Officer of Health and Ministry used data and evidence to inform its advice to government, which included an overall assessment of key public health and health system indicators. These were publicly communicated and used to guide advice on the application of public health and workplace safety measures and reopening plans.

4.6.2 Decisions to Enact Vaccine Mandates Not Evidence-Based

No Evidence to Support Delayed Economic Reopening Once Vaccination Target Was Achieved

In 2021, soon after vaccines arrived in Ontario, the Ministry of Health established first and second dose public vaccination rate targets for adults 18 years of age and older that corresponded with a three-step economic reopening process, described in **Appendix 15**. At that time, the resumption of a more normal way of life—a provincial "reopening"—hinged on achieving these targets. However, the first step to reopen was delayed by about three weeks after the required first-dose vaccination rate was reached on May 22. The first step to reopen was not approved until June 11. The Ministry did not conduct any analysis of how any other factors, such as hospitalizations, ICU occupancy and weekly cases, had impacted the delay.

Province Did Not Mandate Vaccinations for Hospital Staff Despite Support from Hospitals to Do So

Despite significant evidence to support enacting vaccine mandates in hospitals as well as support from hospitals, the Ministry of Health did not enact such a mandate. Instead, it required hospitals to have vaccination policies in place, which effectively required each hospital to make its own rules.

Hospital CEOs, the Ontario Hospital Association, the Registered Nurses' Association of Ontario and the Ontario COVID-19 Science Advisory Table publicly indicated that they believed that implementing a provincial requirement for employees in hospitals to be vaccinated would have minimal negative impact to staffing levels and would instead protect the workforce from absences due to sickness. We summarized their letters in **Appendix 19**.

After receiving the input, the Ministry announced on November 3, 2021 that it would not implement a vaccine mandate on hospital staff due to concerns about staff shortages. It did not attribute its decision to the feedback received from health leaders, nor did it publish the responses received from hospital CEOs. Ministry staff informed us that they did not enact a vaccine mandate on hospital workers because they wanted to allow for flexibility at individual hospitals. As well, they informed us that the Chief Medical Officer of Health had assessed the situation, and this assessment did not support enacting a mandate. However, the details of this assessment were not available for us to review to better understand the factors considered. The Ministry did not provide any further evidence to explain why it did not act in alignment with the majority of the feedback and advice it received. The Ontario Hospital Association ultimately expressed its disappointment with the province's decision.

As discussed in **Section 2.5**, long-term care homes were the only settings in which the Ministry implemented a vaccine mandate. The Ministry also required Ontarians to present proof of vaccination at businesses during the height of the pandemic. However, the Ministry did not implement a provincial vaccine mandate on hospital staff who worked with people at risk. When the Ministry makes decisions that are incongruent with input from people and organizations that are knowledgeable about the sector's needs, it creates the perception that their input is discounted.

RECOMMENDATION 10

To uniformly protect populations that are vulnerable to severe outcomes from disease outbreaks, and minimize transmission, death and hospitalization, we recommend that the Ministry of Health publicly explain its rationale in the future when it makes decisions on vaccine mandates and policies that are incongruent with science-based information and expert advice.

MINISTRY OF HEALTH RESPONSE

The Ministry of Health agrees with the recommendation of publicly explaining the rationale regarding decisions on mandates and policies in the future.

Ontario's approach to implementing COVID-19 vaccine mandates and policies in hospitals and other high-risk health settings was driven by real-world evidence and was guided by the advice of scientific and medical experts and several health stakeholders.

4.7 Leadership Communication and Public Education

A key element of any vaccination program involves informing and educating people about the benefits of vaccines, and then convincing them to take steps to get vaccinated—all of which involves communication, both direct and through intermediaries.

The COVID-19 pandemic introduced both urgency and complexity to planning for communication about vaccination programs. The development of new vaccines for the novel coronavirus was watched closely, and people wanted information about progress. Vaccines were developed with new and different technologies, and though built on past successes, some formed negative opinions about safety and efficacy, many of which proved resilient despite evidence to the contrary. Vaccine scarcity, especially in early 2021 as doses arrived, required governments to prioritize different groups for vaccination. Those who were unsure about the health benefits of vaccination required additional information. And finally, people needed information about when and where to go to get vaccinated.

The development of coherent communication on a province's vaccination program requires co-ordination and communication between federal, provincial and municipal governments, and other health organizations, both public and private, with expertise and involvement in vaccination programs. Accountability and decision-making are important for clarity in communication. When decisions are not clear, or not made at all, effective communication is at best unlikely—at worst, impossible.

Ontarians looked to their leaders to ensure they had the information they needed to make informed, educated and potentially life-and-death decisions in an uncertain environment. We examined the communications plans developed by the Ministry of Health (Ministry) to support provincial leaders over the course of the vaccination program's rollout. The Ministry drafted strategic communications plans on booster doses, vaccine certification and vaccines for children aged five to 11, for example. However, these plans were never finalized. Communication plans should detail the key goals or objectives of the program the plan is meant to support. In this case, one of the Ministry's key objectives was to ensure a high percentage of Ontarians got vaccinated, but the Ministry's draft plans did not include mention of this goal, nor did they detail specific, measurable, timebound targets to enable evaluation of their efforts.

The Ministry undertook an extensive marketing program leveraging paid advertising in both traditional and social media to promote, for example, first and second dose vaccination in June-July 2021, and booster vaccination in December 2021. However, more effective strategic communications were needed to provide clarity and details, and to answer questions about issues such as:

- the rationale for prioritizing 114 hotspot communities for vaccination over other areas in the province, discussed in **Section 4.1.1;**
- the timing and importance of getting a fourth dose; and
- the ages and additional risk factors of people sick in the hospital with COVID-19.

Many studies note the importance of strategic communications in improving vaccine uptake, and issues that can hinder high vaccination rates. A 2021 study from the Royal Society of Medicine in the United Kingdom, for example, noted that one of the biggest hurdles to vaccination is vaccine hesitancy. Not clearly and sufficiently communicating to the public to promote the benefits of vaccination, as well as address valid questions, issues and misinformation, could lead to lower vaccination rates, and missed opportunities to obtain the benefits of fully vaccinated populations.

The Ethical Framework for COVID-19 Vaccine Distribution stresses the importance of public trust as one of its core principles. However, a lack of transparency about important decisions at a critical time in the vaccination program rollout likely impacted public trust in the government to make ethical, science-based decisions to protect Ontario's most vulnerable populations from COVID-19.

We surveyed all 34 public health units about their perspectives on the provincial government's communications. Of the public health units that responded to our survey, 27% agreed that the strategy was effective, 13% had no views, and 60% disagreed that it was effective. Half of the medical experts responding to our survey also disagreed; 17% agreed and the rest had no view.

4.7.1 The Ministry of Health Did Not Clearly Explain the Rationale for Its Decision-Making on Vaccine Distribution

When vaccines first arrived in Ontario in late 2020, the public, but especially groups including healthcare workers, educators, paramedics and police, had concerns about which groups would be first to access the scarce vaccine supply. However, neither the Ministry of Health nor the COVID-19 Vaccine Distribution Task Force (Task Force), the government's established public-facing advisory body, effectively communicated their rationale for decisions on vaccine priority groups. In times of crisis, it is important to have a dedicated spokesperson available regularly to answer questions from the media about critical issues to ensure the public receives important information, which in the case of a pandemic was the availability and distribution of vaccines. According to Ministry records, the Task Force Chair was available to take questions from the media only about 20 times between December 1, 2020 and March 31, 2021, averaging five times per month. This is discussed in greater detail in **Appendix 20** along with other areas of poor communication on vaccine distribution and science.

4.7.2 Government Did Not Clearly Explain the Waning Effectiveness of Vaccines

The term "fully vaccinated" has formed the basis of vaccine mandates and policies developed by the Ministry of Health (Ministry) and other organizations. However, the Ministry did not revisit its 2021 definition—two doses of any combination of an approved vaccine in the majority of cases—until May 2022. The information added at that time, however, only introduced more confusion.

In May 2022, the Ministry issued a bulletin titled "Staying Up to Date with COVID-19 Vaccines: Recommended Doses." It notes that "up to date means a person has received all recommended COVID-19 vaccine doses, including any booster dose(s) when eligible." This implies that a person needs to have taken all vaccines when they were eligible to do so, but does not specifically redefine "fully vaccinated." Instead, it provided the following ambiguous messaging: that "'fully vaccinated' … may continue to be used in some settings, and relevant policies, legislation directives or orders must continue to be followed where applicable."

Continued use of the term "fully vaccinated" contradicts the Ministry's message to the public, since the term suggests that only two doses are needed; this is at odds with the Ministry's other message asking Ontarians to "stay up to date with COVID-19 vaccines". The Ministry confirmed to us that the latter concept is more critical than the number of doses administered. However, having the public messaging include both concepts creates confusion and may lead to the misconception that good protection is achieved with two doses. The Ministry informed us that it continues to use the term "fully vaccinated" since this is the term used by the federal government.

One public health unit that responded to our survey noted that guidance to the public on the number of vaccine doses required is confusing, but believed this was not entirely an Ontario problem. In June 2022, the government of Canada stated plans to update the definition

of "fully vaccinated" as based on the timing of a person's latest dose rather than a set number of doses, but had not updated the definition as of August 2022. Ontario's practice is consistent with the federal government's practice.

We found that other jurisdictions had clearly communicated that three doses provided better protection. Israel, Australia, France, Austria and Singapore changed their public messaging between October 2021 and June 2022 to define fully vaccinated as three doses. However, only Israel's change was made before the surge of Omicron cases in January 2022.

4.7.3 The Ministry of Health Did Not Provide Clear and Sufficient Information to Help Ontarians Make Informed Choices about Booster Doses

The rate of third dose vaccination has been much lower than the second dose—50% compared to 82% as of mid-August 2022—despite evidence that shows the benefits of the third dose in reducing hospitalization and death. While the Ministry of Health (Ministry) indicated that it anticipated high uptake in the booster doses, as evidenced by the quantities of vaccine that it ordered (discussed in **Section 4.5.1)**, clear communication, as well as other strategies such as vaccine mandates and the vaccine passport, was not in place to support achieving this goal. Public information supporting and expanding on the benefits of booster doses should have been easily available to Ontarians. Instead, website information was unclear, and leaders sometimes contradicted the key messages in vaccination advertising campaigns. This potentially diminished the effectiveness of the advertising and the value of dollars spent on them—the Ministry spent about a quarter of its total vaccination campaign advertising expenditures on booster doses. Medical experts we surveyed believed poor government communication contributed to the low rate for the third dose.

In July 2022, a fourth dose was made widely available to Ontarians, but the Ministry's related news release did not clearly describe its value. It stated "While most individuals aged 18 to 59 years old will continue to have strong protection more than six months after their first booster dose, expanding second booster dose eligibility will ensure that Ontarians can make an informed decision based on their personal circumstances." However, as of August 2022, the Ministry had not provided supplemental information to help Ontarians make an informed choice about a fourth dose.

One public health expert we spoke to noted that clear messages on matters of public health in Ontario have often been challenging due to conflicting information provided by different health organizations and their leaders. For example, we noted that while Ontario's Chief Medical Officer of Health recommended the general population hold off on a booster dose until new vaccines were available in the fall, one local medical officer of health advised widespread uptake.

We surveyed public health units on the provincial government's fourth-dose communications. Only about 20% of the public health units that responded to our survey agreed the government was clear in its communication, compared to 47% that indicated they disagreed. Their concerns include:

- public information recommending booster doses was not provided, though booster doses are available and being offered;
- communication providing individuals a choice of vaccines for the first time was confusing; and
- provincial risk information for healthy 18-to-59-year-olds was confusing and difficult for many to understand.

We also found that the Ministry of Health did not clearly communicate supporting medical information that would inform and encourage Ontarians to obtain an additional dose. In February 2022, the Ministry began collecting data on COVID-19 hospitalizations by immunization status, including third and fourth doses, and released this publicly. However, this data does not include other health conditions such as obesity or immunocompromised conditions. Such data could inform both the public as to the level of risk they would face if not vaccinated, as well as physicians so that they could make informed care decisions and recommend vaccination to their patients.

Furthermore, experts we spoke to described the data provided as misleading in some ways. One expert stated "the need to provide adjusted figures, not raw data for things like proportion of deaths among

(vaccinated vs unvaccinated). Raw numbers are easily misunderstood." For example, the hospitalization and death data posted does not adjust for factors such as the high number of people vaccinated, as opposed to unvaccinated. It also does not adjust for age and other factors such as obesity or immunocompromised conditions. (See also **Section 4.7.4.**)

4.7.4 The Ministry of Health Did Not Effectively Address Misinformation

Public health units and other medical experts have told us that public confidence in the safety and efficacy of vaccines has been negatively impacted by misinformation. World Health Organization representatives note misinformation as described in **Figure 25**.

Public health units and experts we surveyed told us the provincial government did not do enough to combat vaccine misinformation in Ontario. The Ministry of Health (Ministry) engaged three market research companies to survey the public between January 2021 and March 2022 about their views on COVID-19 vaccines, including any misconceptions. Several public health units we surveyed indicated that this information could have been leveraged to develop a strong communications campaign to combat misinformation, but no campaign was produced, and this information was not shared with public health or any other Ontario health organizations. The Ministry spent a total of $1.7 million on these surveys.

Some Ministry communication has allowed false beliefs to persist because misinformation has not been effectively challenged. For example, some Ontarians believe erroneously that vaccines are less effective because there are more vaccinated people in hospital than unvaccinated. One public health unit we surveyed informed us that the data on the Ministry's website made it appear that more vaccinated people were getting sick and dying than unvaccinated people. However, hospitals admit more COVID-19 patients with two doses than patients who are unvaccinated or with a single dose, because there are many times more people in Ontario with two doses. However, the information provided on the Ministry site does not directly address the potential misunderstanding, instead stating, "Trends in post-vaccination cases are a reflection of both trends in vaccine administration (increasing number of doses administered over time) and trends in COVID-19 incidence." Instead of improving the quality of public information provided, in July 2022,

Figure 25: Misinformation about COVID-19 as Explained by the World Health Organization

Prepared by the Office of the Auditor General of Ontario

Date Statement Made	Statement
April 2021	"In the early days of the pandemic, much of the misinformation focused on whether COVID-19 was in fact a serious disease." "Public trust in science and evidence is essential for overcoming COVID-19. Therefore, finding solutions to the infodemic is as vital for saving lives from COVID-19 as public health measures, like mask-wearing and hand hygiene, to equitable access to vaccines, treatments and diagnostics." • Infodemic is too much information including false or misleading information in digital and physical environments during a disease outbreak.
August 2021	"One of the biggest challenges that we still face is getting the public vaccinated. We've heard false claims that the COVID-19 vaccine causes infertility, contains microchips and causes COVID-19. And worse, we've heard false claims that thousands of people have died from the vaccine…these claims are simply not true." "Misinformation about COVID-19 and vaccine appear to have gotten worse and is keeping people from getting the shots, driving an increase in cases."

Figure 26: Suggestions on Ways to Combat Misinformation Offered by Selected Public Health Units

Prepared by the Office of the Auditor General of Ontario

- directly combat myths and amplify the data showing that vaccines protect against hospitalization and death
- provide information about how vaccines work, with consideration to audiences who believe that natural infection or immunity is superior to vaccine-derived immunity
- make strong statements supporting evidence-informed guidance and calling out sources of misinformation
- provide more consistent messages to combat vaccine hesitancy
- communicate more effectively with primary care practitioners
- provide more advance notice and information on vaccination campaign plans in consultation with public health units and health-care system stakeholders

the Ministry discontinued providing the information altogether because "continuous daily reporting of these numbers created a false impression that vaccination does not protect from severe COVID outcomes."

In December 2021, the National Advisory Committee on Immunization (NACI) stated that Moderna was a more effective vaccine and provided longer protection against infection and severe COVID-19 outcomes when compared to Pfizer. However, media reports in early 2022 indicated that Ontarians were averse to receiving a Moderna booster; some media reports at the time had linked it to serious side effects. The Ministry, however, did not take sufficient action to counteract related concerns about Moderna. While the Ministry provided an information package on Moderna hesitancy to public health units, it did not provide a strong public message to address the concerns. The Ministry informed us that it believed it could not express a preference for a particular vaccine brand.

Half of the public health units we surveyed disagreed that provincial communication on the benefits of Moderna was clear; only 24% agreed that it was well communicated. As well, 47% agreed that not adequately conveying information about Moderna's benefits contributed to a trend of individuals cancelling their Moderna appointments. We also surveyed medical experts and 50% disagreed that provincial communication was clear, with 33% agreeing and 17% having no opinion. One expert noted "the Moderna vaccine … was preferred for (immunocompromised and older people) but I am not sure that message got out to the public clearly enough."

This misconception about the Moderna vaccine likely contributed to vaccine wastage. A report commissioned by the Ministry on vaccine data quality, which considered vaccination data up to February 23, 2022, indicated that media reports linking Moderna to increased risk of serious side effects coincided with a precipitous drop in demand, which led to wastage. Over 67% of the public health units that responded to our survey agreed that they needed more provincial assistance in combatting misinformation, and only 3% disagreed; 30% did not have an opinion. Some of the concerns and suggestions offered by the public health units are described in **Figure 26**.

RECOMMENDATION 11

To support increases in immunization rates and minimize hospitalization and death from COVID-19, and to support informed public decision-making on COVID-19 vaccination, we recommend that the Ministry of Health:

- more clearly convey to the public the underlying scientific data and how that data support its decisions on vaccine distribution priority groups, co-ordinate communications with public health units, and incorporate this process in its future pandemic response plan;
- in conjunction with Public Health Ontario, improve the clarity of its communications on who should get vaccinated and when to actively promote COVID-19 vaccination to the hesitant, such as by conferring with an external stakeholder group to assess whether its messaging is clear to the average person in the public;
- provide the public with easy access to current information on available resources and COVID-19 trends, including the underlying health conditions of people with COVID-19 in hospital; and
- review and report on the effectiveness of its communication and awareness strategy on the safety and efficacy of the COVID-19 vaccine, including its effectiveness at combatting misinformation and incorporate lessons learned from this review in its future pandemic response plan.

MINISTRY OF HEALTH RESPONSE

The Ministry of Health agrees with this recommendation. The Ministry's communications approach, in collaboration with our partners including public health units and Public Health Ontario, has consistently provided the public with up-to-date information through a challenging and constantly evolving global pandemic. The province's communications strategy has included news releases, news conferences, extensive marketing campaigns, tailored communications for high-risk audiences, including First Nations, Inuit and Métis, and community ambassadors to provide information in a culturally sensitive way to the hardest-hit communities.

The Ministry is committed to continuously improving its communications approach to support the COVID-19 vaccine program and continue to convey critical COVID-19-related information clearly and concisely to the public. The Ministry continues to base its communications in scientific evidence and combat misinformation through media communications by the Chief Medical Officer of Health and comprehensive resources available on its website.

Appendix 1: Approved Vaccines in Canada

Sources of data: Government of Canada, Ministry of Health

Vaccine[1]	Description	Effectiveness[2]	Side Effects	Doses Administered[3]
Comirnaty (Pfizer)	• mRNA • Approved for ages 16 and older on December 9, 2020 • Approved for ages 12–15 on May 5, 2021 • Approved for ages 5–11 on November 19, 2021	Beginning one week after second dose: 95% effective for those 16 years and older; and 100% effective for those 12 to 15 years old	**Common:** redness, soreness and swelling of the injection site, chills, fatigue, joint pain, headache, mild fever, muscle aches **Rare:** myocarditis, pericarditis, Bell's Palsy, anaphylaxis	23.2 million (69%)
Spikevax (Moderna)	• mRNA • Approved for ages 18 and older on December 23, 2020 • Approved for ages 12–17 on August 27, 2021 • Approved for ages 6–11 on March 17, 2021 • Approved for ages 6 months–5 years on July 14, 2022	Beginning two weeks after second dose: 94.1% effective for those 18 years and older; and 100% effective for those 12–17 years old	**Common:** redness, soreness and swelling of the injection site, chills, fatigue, joint pain, headache, mild fever, muscle aches **Rare:** myocarditis, pericarditis, Bell's Palsy, anaphylaxis	9.5 million (28%)
Vaxzevria (AstraZeneca)	• Viral vector-based • Approved for ages 18 and older on February 26, 2021	Beginning two weeks after second dose: 62% effective for those 18 years and older	**Common:** redness, soreness and swelling of the injection site, chills, fatigue, joint pain, headache, mild fever, muscle aches **Rare:** anaphylaxis, blood clots with low levels of blood platelets, capillary leak syndrome, Guillain-Barré syndrome	1.1 million (3%)
Janssen (Johnson & Johnson)	• Viral vector-based • Approved for ages 18 and older on March 5, 2021 • Single dose	Beginning two weeks after single dose: 66% effective for those 18 years and older	**Common:** redness, soreness and swelling of the injection site, chills, fatigue, joint pain, headache, mild fever, muscle aches **Rare:** anaphylaxis, blood clots with low levels of blood platelets, capillary leak syndrome, Guillain-Barré syndrome	3,844 (0.01%)

1. In February 2022, Health Canada approved two other vaccines: Novavax's Nuvaxovid for adults aged 18 and older and Medicago's Covifenz for adults aged 18 to 64. As of August 14, 2022, Ontario had administered 9,980 doses of Novavax and no doses of Medicago as its manufacturer had not yet released the product to Ontario.
2. Effectiveness of vaccines was measured against the original strain of COVID-19. Since then, other more infectious variants have emerged, such as the Delta and Omicron strains. Current vaccines are still expected to protect against severe illness, hospitalization and death due to these variants, despite higher rates of breakthrough cases.
3. Data as of August 14, 2022.

Appendix 2: Roles of Key Parties Involved in COVID-19 Vaccine Rollout in Ontario

Prepared by the Office of the Auditor General of Ontario

Entity	Key Roles	Report(s)/ Accountable to
Federal		
Public Services and Procurement Canada	• Procures and obtains vaccine supply for all of Canada • Negotiates and finalizes agreements with private-sector vaccine manufacturers • Allocates and distributes vaccines to provinces and territories	n/a
Health Canada	• Approves and licenses vaccines developed and produced by private-sector vaccine manufacturers	n/a
Public Health Agency of Canada	• Principal federal government agency responsible for immunization • Provides leadership, advice and support for timely vaccine recommendations and sustainable immunization programs • Sets technical standards to support the vaccine certificate, promoting inter-operability of these certificates for federally regulated travel • Oversees the National Advisory Committee on Immunization	Health Canada
National Advisory Committee on Immunization (NACI)	• Makes recommendations on use and administration of vaccines authorized by Health Canada, including for whom vaccination should be prioritized	Public Health Agency of Canada
Provincial		
Ministry of Health	• Establishes provincial COVID-19 vaccination plan • Allocates and distributes vaccines, vaccine ancillary supplies and cold storage requirements • Develops storage and handling guidance • Monitors vaccine rollout amongst delivery partners, ensuring they have the capacity to administer vaccine and providing standard technology and technical support to vaccination sites • Develops and maintains vaccine data repository and provincial booking tool • Produces and monitors vaccine coverage data • Provides funding and clinical guidance to health system partners • Establishes rules around eligibility based on NACI guidance (the Office of the Chief Medical Officer of Health within the Ministry reviews vaccine recommendations and develops and shares provincial guidance) • Ensures ongoing clinical surveillance, quality monitoring and vaccine safety • Acts as program lead on the development of the vaccine certificate • Sets regulations defining who can administer COVID-19 vaccine and other health human resource considerations	Minister of Health

Entity	Key Roles	Report(s)/ Accountable to
Ministry of the Solicitor General	• Responsible for vaccination logistics-related activities, including the procurement of some vaccine clinic and vaccinators contracts • Supports employer-led clinics, third-party-led clinics and additional provincial supports such as the GOVAXX bus • In partnership with the Ministry of Health, delivers mobile community vaccine clinics • In June 2022, responsibility for emergency management transferred from the Ministry of the Solicitor General to Treasury Board Secretariat under the leadership of the President of the Treasury Board, and the Deputy Minister/Commissioner of Emergency Management. The vaccine program continues to be led by the Ministry of Health with support from the Ministry of the Solicitor General and other partner ministries. Treasury Board's Deputy Minister/Commissioner of Emergency Management has an advisory role with the vaccine program.	Minister of the Solicitor General
Ministry of Public and Business Service Delivery	• Operates phone-based Provincial Vaccine Contact Centre, which is responsible for answering public inquiries related to vaccinations, including vaccination appointment bookings and vaccination records • In partnership with the Ministry of Health, provides delivery, technical support and installation at vaccination sites	Minister of Public and Business Service Delivery
Other ministries	Several Ontario ministries provide oversight and monitoring, develop policies and support vaccine rollout for population groups that they are responsible for: • Ministry of Children, Community and Social Services: those in congregate care settings and those receiving social assistance • Ministry of Colleges and Universities: post-secondary institutions and private career colleges • Ministry of Education: children and youth in school/child care settings, and education and child care workforce • Ministry of Long-Term Care: long-term care residents • Ministry of Municipal Affairs and Housing: people experiencing homelessness • Ministry for Seniors and Accessibility: retirement home residents and seniors • Ministry of Agriculture, Food and Rural Affairs • Anti-Racism Directorate • Ministry of Indigenous Affairs • Ministry of Labour, Immigration, Training and Skills Development	Respective Ministers
Public Health Ontario	• Responsible for vaccine safety and coverage surveillance—supports public health units, receives reports on adverse events following immunization, compiles surveillance data and submits to Health Canada • Provides scientific input on Ministry of Health guidance documents for vaccine implementation and administration that are then disseminated to vaccinators and the public • Operates what was formerly an independently operated Ontario COVID-19 Science Advisory Table (created in July 2020 and operated independently until April 4, 2022), which consisted of a group of voluntary scientific experts and health system leaders who evaluated and reported on emerging evidence relevant to the COVID-19 pandemic, to inform Ontario's response	Ministry of Health

Entity	Key Roles	Report(s)/ Accountable to
Ontario Health	• Provides funding to Ontario Health Teams and Community Health Centres for COVID-19 vaccine administration • Supported regional capacity in collaboration with public health units, and co-chaired COVID-19 vaccine implementation planning tables in some Ontario Health regions	Ministry of Health
Ministers' COVID-19 Vaccine Distribution Task Force	• Created in November 2020 via an Order-in-Council; ended on August 31, 2021 • Reported to the Minister of Health and the Solicitor General • Provided advice on logistics and operational planning for COVID-19 vaccines, including ethical, timely and effective distribution in the early stages of the COVID-19 vaccine rollout • Consisted of a chair, a vice-chair and nine members • Chaired by General (retired) Rick Hillier until March 2021 and then by Dr. Homer Tien, President and CEO of Ornge, until the end of August 2021	Ministry of Health Ministry of the Solicitor General
Children's Vaccine Table	• Created in April 2021 • Provides strategic advice and recommendations to the government to inform planning, process and readiness of the vaccine rollout with a focus on children	Initially to Dr. Dirk Huyer, Co-ordinator of the Provincial Outbreak Response and Ontario's Chief Coroner and subsequently to Dr. Daniel Warshafsky, Associate Medical Officer of Health
Ontario Immunization Advisory Committee	• Created in September 2021 • Provides evidence-based advice to Public Health Ontario on vaccines and immunization program implementation in Ontario, priority populations and clinical guidance	Public Health Ontario
Regional/Local		
Public health units	• Oversee and co-ordinate vaccine administration efforts within their jurisdiction (excluding pharmacies), particularly mass vaccination clinics and primary care • Administer vaccines • Distribute vaccine and vaccine ancillary supplies to local clinics and partners • Maintain cold chain requirements and report and remediate cold storage excursions • Facilitate local and regional planning to maximize vaccine access and coverage within region • Inspect cold-chain processes to maintain the integrity of the vaccine, as well as storage and handling of vaccines • Report adverse events following immunization to Public Health Ontario • Assess medical exemptions for COVID-19 vaccination • Approve out-of-country and out-of-province COVID-19 vaccine records	Ministry of Health and municipalities
Ontario Health Teams	• Support public health units, primary-care providers and hospitals in COVID-19 vaccine administration	Ontario Health

Entity	Key Roles	Report(s)/ Accountable to
Pharmacies*	• Receive vaccines independently from distribution centres (not through the public health units) • Administer COVID-19 vaccines • Report adverse events following immunization to public health units	Ministry of Health
Pharmacy distributors*	• Store, handle and distribute vaccines, diluent and vaccine ancillary supplies (such as needles and syringes) to pharmacies	Ministry of Health
Primary care providers (includes family health teams, community health centres and primary-care practices)	• Administer COVID-19 vaccines • Report adverse events following immunization to public health units	Ministry of Health
Employers* and other third-parties*	• Administer COVID-19 vaccines at employer-led clinics and third-party led clinics • Report adverse events following immunization to public health units	Ministry of Health on the use of vaccination information systems
Third-party logistics and warehousing providers*	• Store, handle and distribute vaccines, diluent and vaccine ancillary supplies (such as needles and syringes) to public health units, mobile clinics, mass vaccination clinics, hospitals and primary care	Ministry of Health
Calian*	• Provides additional vaccinators and support staff to clinics across the province, including the Greater Toronto Area, remote indigenous communities, northern public health units, and public health units experiencing outbreaks.	Ministry of the Solicitor General
Canadian Red Cross*, Medavie*	• Operates mobile and pop-up vaccination clinics	Ministry of the Solicitor General
FH Health*	• Operated vaccine clinics in nine clinic locations and in the Toronto Zoo	Ministry of the Solicitor General
Switch Health*	• Operated a mass vaccination clinic at the International Centre for the general public • Operates a clinic at the Toronto Pearson International Airport (Airport) to administer vaccines to international agricultural workers arriving at the Airport	Ministry of Health

* Private-sector/non-government sector

Appendix 3: Expenditures Incurred by Ontario Government to Deliver COVID-19 Vaccines to Ontarians, 2020/21–2022/23[1] ($ million)

Sources of data: Ministry of Health and Ministry of the Solicitor General

Funding recipient(s)	Description of goods/services	2020/21	2021/22	2022/23[1]	Total
Public health units (34)	Mass vaccination clinics; vaccination clinics in or near schools; extraordinary costs such as reporting tools and financial reports to support the COVID-19 vaccination program	0	519.6	236.2	**755.8**
Hospitals (~80)	Operation of hospital vaccination sites and recruitment and/or training of health human resources and other clinical staff who establish and support these sites	33.0	178.1	0	**211.1**
Provincial Vaccine Contact Centre[2]	Call centre staffing to answer calls to book, reschedule and cancel vaccination appointments and answer questions about the vaccine rollout; preparation of vaccine certificates; and translation/interpretation services	0	103.4	5.3	**108.7**
Various IT vendors[2]	COVID-19 vaccination database (COVaxON), vaccine passports, provincial vaccination booking system and related information and information technology (I&IT) staffing	6.4	102.5	45.3	**154.2**
Pharmacies (>2,900)	Reimbursement of vaccines administered at $13 per dose	2.1	95.6	8.3	**106.1**
Municipal paramedic services (>30) and Ornge	Land and air ambulance paramedic support for vaccine clinics, including all three phases of Operation Remote Immunity	13.3	13.4	0	**26.7**
Internal costs[3]	Vaccine credentials: proof of COVID-19 vaccination such as the vaccine passport, QR code, and Verify Ontario app	0	17.4	0	**17.4**
Canadian Red Cross, Medavie	Operated >3,000 vaccination events at mobile and pop-up vaccination clinics	0	17.5	0	**17.5**
Switch Health	Operated a mass vaccination clinic at the International Centre for the general public and is still operating another clinic at the Toronto Pearson International Airport (Airport) to administer vaccines to international agricultural workers arriving at the Airport	0	16.4	0.9	**17.3**
Shoppers Drug Mart, McKesson and Andlauer Healthcare Group	Storing, handling and distributing COVID-19 vaccines	0.7	11.9	0.4	**12.9**
Calian Group Ltd.	Provides vaccinators and support staff to clinics in the Greater Toronto Area and remote Indigenous communities	0.7	11.7	0.05	**12.5**
Primary care providers and OntarioMD	Reimbursement of vaccines administered at $13 per dose (primary-care providers); training and support fee (OntarioMD)	0.3	9.2	0.3	**9.8**

Funding recipient(s)	Description of goods/services	2020/21	2021/22	2022/23[1]	Total
Deloitte Inc.	Consulting services in business process assessment and design, data analysis, implementation planning and project management	2.4	6.7	0.7	**9.8**
The Hospital for Sick Children	A virtual clinic/phone line and parent education campaign designed to build confidence in providing vaccines to children	0	1.4	0.7	**2.1**
The Strategic Counsel, Ipsos, Leger	Health behaviours surveillance study using online surveys to gather public opinions, campaign recall and vaccine intent related to the COVID-19 vaccine	0.7	1.0	0	**1.7**
Xpera Risk Mitigation and Investigation	Provided logistical support for mobile vaccine clinics	0	1.7	0	**1.7**
FH Health	Operated vaccine clinics in 10 locations	0	0.7	0	**0.7**
Total		**59.7**	**1,108.1**	**298.2**	**1,465.9**

1. Data up to May 31, 2022.
2. Includes costs related to proof of COVID-19 vaccination such as the vaccine passport, QR code, and Verify Ontario app that are not broken out separately.
3. Borne by the Ministry of Health, the Ministry of Public and Business Service Delivery and Ontario Digital Service.

Appendix 4: Members of the Ministers' COVID-19 Vaccine Distribution Task Force

Prepared by the Office of the Auditor General of Ontario

Appointee	Position	Start Date	End Date	Additional Information
Rick Hillier* (Chair until Mar 31, 2021)	Canadian Forces General (Retd)	Dec 4, 2020	Mar 31, 2021	Also appointed Special Advisor to the Premier
Dr. Homer Tien (Chair from Apr 1, 2021)	President and CEO, Ornge	Dec 4, 2020	Aug 31, 2021	Replaced General Hillier as Chair on April 1, 2021
Mario Di Tommaso* (Vice-Chair)	Deputy Minister of Community Safety	Nov 23, 2020	Aug 31, 2021	
Helen Angus*	Deputy Minister of Health	Nov 23, 2020	Aug 31, 2021	
Dr. Dirk Huyer	Chief Coroner	Dec 4, 2020	Aug 31, 2021	Also appointed Co-ordinator of Provincial Outbreak Response
Dr. Isaac Bogoch	Infectious Diseases Consultant, Toronto General Hospital	Dec 4, 2020	Aug 31, 2021	
Mark Saunders	Former Toronto Police Chief	Dec 4, 2020	Aug 31, 2021	
Dr. Maxwell Smith	Bioethicist and Assistant Professor, Western University	Dec 4, 2020	Aug 31, 2021	
Dr. Regis Vaillancourt	Director of Pharmacy, Children's Hospital of Eastern Ontario	Dec 4, 2020	Aug 31, 2021	
Linda Hasenfratz	CEO, Linamar Corporation	Dec 4, 2020	Jan 18, 2021	Resigned
Angela Mondou	President and CEO, TECHNATION	Dec 4, 2020	May 3, 2021	Resigned
RoseAnne Archibald	Ontario Regional Chief, Taykwa Tagamou Nation	Dec 4, 2020	Jun 17, 2021	Resigned
Dr. Kieran Moore	Medical Officer of Health, Kingston, Frontenac and Lennox & Addington	Jan 8, 2021	Jun 26, 2021	Membership revoked due to new role as Ontario's Chief Medical Officer of Health
Dr. Syed Wajid Ahmed	Medical Officer of Health, Windsor-Essex Public Health Unit	Jun 26, 2021	Aug 31, 2021	

Note: The Task Force ended on August 31, 2021.

* Members that were appointed by the establishing Order in Council for the Vaccine Distribution Task Force (OIC 1546/2020). Remaining members were appointed by Ministers' Letter.

Appendix 5: Members of the COVID-19 Science Advisory Table, as of August 2022

Prepared by the Office of the Auditor General of Ontario

Member	Position as Noted on the Science Table Website
Dr. Upton Allen[1] (Co-Chair)	• Professor of Paediatrics, University of Toronto
Dr. Brian Schwartz (Co-Chair)	• Vice-President, Public Health Ontario • Professor, Department of Family and Community Medicine and Dalla Lana School of Public Health, University of Toronto
Dr. Fahad Razak[2] (Scientific Director)	• Internist and Assistant Professor, St. Michael's Hospital, University of Toronto • Assistant Professor, Institute of Health Policy, Management and Evaluation, University of Toronto • Research Scientist, Li Ka Shing Knowledge Institute • Provincial Lead, Quality Improvement in General Medicine, Ontario Health
Dr. David Earn	• Professor of Mathematics, Department of Mathematics and Statistics, McMaster University
Dr. Gerald Evans	• Professor of Medicine, Biomedical and Molecular Sciences and Pathology and Molecular Medicine, Queen's University • Medical Director, Infection Prevention and Control
Dr. Jennifer Gibson	• Assistant Professor, Institute of Health Policy, Management and Evaluation, University of Toronto; • Director, Joint Centre for Bioethics, University of Toronto • Sun Life Financial Chair in Bioethics
Dr. Michael Hillmer	• Assistant Deputy Minister, Capacity Planning and Analytics Division, Ministries of Health and Long-Term Care • Assistant Professor, Institute for Health Policy, Management and Evaluation, University of Toronto
Dr. Jessica Hopkins	• Deputy Chief, Health Protection, Public Health Ontario • Assistant Professor, Department of Health Research Methods, Evidence, and Impact, McMaster University • Adjunct Lecturer, Dalla Lana School of Public Health, University of Toronto
Dr. Peter Jüni[3]	• Professor of Medicine and Epidemiology, Department of Medicine and Institute of Health Policy, Management and Evaluation, University of Toronto • Director, Applied Health Research Centre, Li Ka Shing Knowledge Institute, St. Michael's Hospital
Dr. Fiona Kouyoumdjian	• Associate Chief Medical Officer of Health, Ontario Ministry of Health • Adjunct Scientist, ICES Central Populations and Public Health Research Program
Dr. Audrey Laporte	• Professor and Director, Institute of Health Policy, Management and Evaluation, University of Toronto • Director, Canadian Centre for Health Economics
Dr. Linda Mah	• Associate Professor of Psychiatry, Division of Geriatric Psychiatry, Faculty of Medicine, University of Toronto • Associate Member, Institute of Medical Science, Faculty of Medicine, University of Toronto • Senior Scientist, Rotman Research Institute, Baycrest Health Sciences • Staff Psychiatrist, Baycrest Health Sciences
Dr. Doug Manuel	• Professor, Department of Family Medicine, School of Epidemiology and Public Health, Faculty of Medicine, University of Ottawa • Senior Scientist, Ottawa Hospital Research Institute

Member	Position as Noted on the Science Table Website
Dr. Allison McGeer	• Microbiologist and Infectious Disease Consultant, Mount Sinai Hospital • Professor, Department of Laboratory Medicine and Pathobiology, Dalla Lana School of Public Health, University of Toronto
Dr. Andrew Morris	• Professor, Infectious Diseases, University of Toronto • Director, Antimicrobial Stewardship Program, Sinai Health and University Health Network
Dr. Samira Mubareka	• Clinician-Scientist, Sunnybrook Research Institute and Department of Laboratory Medicine and Pathobiology
Dr. Michelle Murti	• Associate Chief Medical Officer of Health, Ministry of Health • Assistant Professor, Dalla Lana School of Public Health, University of Toronto
Dr. Christopher Mushquash	• Professor, Department of Psychology, Lakehead University, and the Northern Ontario School of Medicine • Psychologist, Dilico Anishinabek Family Care • Director, Centre for Rural and Northern Health Research, Lakehead University • Interim Executive Vice President Research, Thunder Bay Regional Health Sciences Centre • Chief Scientist, Thunder Bay Regional Health Research Institute
Dr. Menaka Pai	• Associate Professor of Medicine, McMaster University • Head of Service, Benign Hematology, Hamilton Health Sciences • Transfusion Medicine Quality Lead, Hamilton Regional Laboratory Medicine Program
Dr. Samir Patel	• Deputy Chief, Microbiology, Public Health Ontario • Clinical Microbiologist, Public Health Ontario • Associate Professor, Department of Laboratory Medicine and Pathobiology, University of Toronto
Dr. Justin Presseau	• Associate Professor, School of Epidemiology and Public Health, University of Ottawa • Scientist, Ottawa Hospital Research Institute
Dr. Paula Rochon	• Senior Scientist and Geriatrician, Women's College Hospital • Professor, Division of Geriatric Medicine, Faculty of Medicine and Dalla Lana School of Public Health, University of Toronto • RTOERO Chair in Geriatric Medicine, University of Toronto
Dr. Beate Sander	• Canada Research Chair in Economics of Infectious Diseases • Scientist and Director, Population Health Economics Research, University Health Network • Director, Health Modeling and Health Economics, Toronto Health Economics and Technology Assessment Collaborative • Associate Professor and Faculty Co-Lead Health Technology Assessment program, Institute of Health Policy, Management and Evaluation, University of Toronto • Adjunct Scientist, Public Health Ontario • Adjunct Scientist, ICES
Dr. Michael Schull	• CEO and Senior Core Scientist, ICES • Professor and Clinician-Scientist, Department of Medicine, University of Toronto • Senior Scientist, Evaluative Clinical Sciences, Sunnybrook Research Institute • Professor, Institute of Health Policy, Management and Evaluation, University of Toronto • Staff emergency physician, Sunnybrook Health Sciences Centre
Dr. Arjumand Siddiqi	• Associate Professor and Division Head of Epidemiology, University of Toronto • Canada Research Chair in Population Health Equity

Member	Position as Noted on the Science Table Website
Dr. Chris Simpson	• Professor of Medicine, Division of Cardiology, Queen's University
Dr. Arthur Slutsky	• Scientist, St. Michael's Hospital, Unity Health Toronto • Professor of Medicine, Surgery and Biomedical Engineering, University of Toronto
Dr. Janet Smylie	• Professor, Dalla Lana School of Public Health and Department of Family and Community Medicine, Faculty of Medicine, University of Toronto • Research Scientist and Staff Physician, St. Michael's Hospital
Dr. Tania Watts	• Professor and Associate Chair, Post-doctoral program, Department of Immunology, Temerty Faculty of Medicine, University of Toronto
Dr. Scott Weese	• Professor, Ontario Veterinary College and Director, Centre for Public Health and Zoonoses, University of Guelph

Note: The Science Table was dissolved effective September 6, 2022.

1. Dr. Upton Allen took over from Dr. Adalsteinn Brown as co-chair in August 2022.
2. Dr. Fahad Razak took over as Scientific Director in May 2022.
3. Dr. Peter Jüni stepped down as Scientific Director in May 2022.

Appendix 6: Operation Remote Immunity

Prepared by the Office of the Auditor General of Ontario with information from the Ministry of the Solicitor General

	ORI	ORI 2.0	ORI 3.0
Time Period	Feb 1–Apr 28, 2021	May 31–Jul 23, 2021	Nov 15, 2021–Feb 28, 2022
Targeted Communities	• First and second doses for adults in 31 remote fly-in Indigenous communities and Moosonee	• First and second doses for youths aged 12 to 17 in 31 remote fly-in Indigenous communities and Moosonee • Second and third doses for adults in those same communities	• First and second doses for children aged 5 to 11 in 29 remote fly-in Indigenous communities and Moosonee • First and second doses for those aged 12 and over • Third doses for all eligible individuals
Doses Administered	25,614	5,743	11,052

Appendix 7: Hotspot Communities and Their Public Health Units

Source of data: Ministry of the Solicitor General

Public Health Unit	Postal Code Region
Durham	L1S, L1T, L1V, L1X, L1Z
Halton	L9E
Hamilton	L8W, L9C
Niagara	L2G
Ottawa	K1T, K1V, K2V
Peel	L4T, L4W, L4X, L4Z, L5A, L5B, L5C, L5K, L5L, L5M, L5N, L5R, L5V, L5W, L6P, L6R, L6S, L6T, L6V, L6W, L6X, L6Y, L6Z, L7A, L7C
Simcoe-Muskoka	L3Z
Southwestern	N5H
Toronto	M1B, M1C, M1E, M1G, M1H, M1J, M1K, M1L, M1M, M1P, M1R, M1S, M1T, M1V, M1W, M1X, M2J, M2M, M2R, M3A, M3C, M3H, M3J, M3K, M3L, M3M, M3N, M4A, M4H, M4X, M5A, M5B, M5N, M5V, M6A, M6B, M6E, M6H, M6K, M6L, M6M, M6N, M8V, M9A, M9B, M9C, M9L, M9M, M9N, M9P, M9R, M9V, M9W
Waterloo	N2C
Wellington-Dufferin-Guelph	N1K
Windsor-Essex	N8H, N8X, N8Y, N9A, N9B, N9C, N9Y
York Region	L0J, L3S, L3T, L4B, L4E, L4H, L4J, L4K, L4L, L6A, L6B, L6C, L6E

Appendix 8: Timeline of Government Announcements and Other Key Events Related to Proof-of-Vaccination Requirements, September 1, 2021 to March 17, 2022

Prepared by the Office of the Auditor General of Ontario

Date	Announcement
Sep 1, 2021	• Ontarians will need to provide proof of vaccination (vaccine passport) (two doses plus 14 days) along with photo ID at selected settings starting September 22, 2021.
Sep 14, 2021	• Regulations released under the *Reopening Ontario (A Flexible Response to COVID-19) Act, 2020* and guidance for businesses and organizations on proof-of-vaccination requirements.
Oct 15, 2021	• Ontarians told they can download the "enhanced vaccine certificate", which includes an electronic QR code for scanners. The Verify Ontario app is released to allow businesses and organizations to electronically verify the authenticity of enhanced vaccine certificates and confirm a patron's vaccination status. The app was intended for use by business and organizations. The enhanced vaccine certificate was to be used by people, and was encouraged but not required.
Oct 22, 2021	• Plan released to gradually lift the vaccine passport requirements starting January 17, 2022, capacity limits starting November 15, 2021, in the absence of any concerning trends.
Nov 10, 2021	• Pause of at least 28 days announced for the lifting of capacity limits where the vaccine passport is required.
Dec 7, 2021	• Pause announced on November 10 extended.
Dec 10, 2021	• Announces pause on lifting proof of vaccination requirements beyond January 17, 2022. Starting January 4, 2022, enhanced vaccine certificate with QR code and the Verify Ontario app will be mandatory in settings where proof of vaccination is required.
Jan 3, 2022	• Lockdowns starting January 5, 2022 which include reducing the size of indoor and outdoor gatherings and closing indoor dining, which in effect eliminates the need of the vaccine passport in these settings.
Jan 20, 2022	• Lifting of lockdowns will begin January 31, 2022.
Feb 14, 2022	• Lifting of proof-of-vaccination requirements will occur on March 1, 2022 for all indoor settings.
Mar 17, 2022	• Science Table notes: "Be prepared to renew vaccine certificates (broad term that generally means the vaccine passport) requiring a recent booster dose for high-risk settings if needed."

Appendix 9: Summary of Ontario Legislation and Regulations Related to COVID-19 Vaccinations

Prepared by the Office of the Auditor General of Ontario

Legislation	Summary
Health Protection and Promotion Act, 1990	• Establishes the Chief Medical Officer of Health as responsible for dealing with situations that constitute or may constitute a risk to the health of any persons in Ontario including vaccination issues. • Establishes the 34 Boards of Health (public health units); they are responsible for control of infectious diseases and provision of vaccination services to children and adults. • Allows any Medical Officer of Health (i.e., both the provincial Chief and local/municipal) to place restrictions on the public (persons or businesses) due to the potential risk of a communicable disease. • Allows the Chief Medical Officer of Health to issue directives to any health-care provider or entity, detailing procedures to be followed to protect the health of Ontarians (e.g., Directive #3 for Long-Term Care Homes). • A regulation under this Act that came into effect in June 2020 allows for the collection of data specific to diseases caused by a novel coronavirus including Severe Acute Respiratory Syndrome (SARS), Middle East Respiratory Syndrome (MERS) and coronavirus disease (COVID-19) vaccine history and sociodemographic data, including race, income level, household size and language.

Covid-19 Vaccination Reporting Act, 2021	• Requires persons or entities who administer COVID-19 vaccines to report information to the Ministry of Health which includes:
	  ◦ the individual's name, telephone number, date of birth;
	  ◦ the vaccinator's name, contact information, professional designation; and
	  ◦ the vaccine product name, date of administration, lot number.

Regulations under the *Reopening Ontario (A Flexible Response to COVID-19) Act, 2020*	• Required certain businesses or organizations that are permitted to open to comply with public health and workplace safety measures. Additionally, certain businesses or organizations that were permitted to open were required to ensure patrons were fully vaccinated against COVID-19 before permitting entry into the establishment.
A regulation under the *Regulated Health Professions Act, 1991*	• Amendments made to the regulation to support the rapid delivery of COVID-19 vaccine doses to all eligible individuals. • In January 2021, several regulated health professionals were authorized to administer the COVID-19 vaccine. These professionals include pharmacists and pharmacy interns, registered pharmacy students and pharmacy technicians; and registered nurses in the general class, registered practical nurses in the general class, and nurse practitioners. • In December 2021, exemptions were made for any person, including a member of the public or other professional not listed above, from the prohibition on administering the COVID-19 vaccine by injection providing that at least one member of a specified health profession is present at the premises where the vaccine is administered and that professional is accessible to the person administering the vaccine to discuss questions relating to, or give directions with respect to, the administration of the vaccine.

Appendix 10: Areas Not Examined in This Audit

Prepared by the Office of the Auditor General of Ontario

- vaccination coverage for children under six—the approval and subsequent administration of this vaccine occurred toward the end of our audit;
- vaccine inventory control;
- completeness of the province's tracking of adverse events following immunization;
- efficiency of workplace vaccine clinics and vaccinating inmates in provincial correctional facilities;
- efficiency of Operation Remote Immunity (described in **Section 2**.2.2);
- effectiveness of vaccine mandates and policies in relation to other public health measures, such as masking requirements;
- security management of vaccine storage, for example, by law enforcement; and
- management of medical and non-medical waste related to vaccination.

Appendix 11: Audit Criteria

Prepared by the Office of the Auditor General of Ontario

1.	The government has established a strategy to efficiently and cost-effectively deliver the COVID-19 vaccines that clearly outlines roles and responsibilities of all relevant parties and is executed in a timely manner.
2.	Vaccines are distributed based on eligibility criteria that are informed by scientific evidence and appropriate ethical principles, especially in periods where demand for vaccines exceeds supply.
3.	Provincial vaccine coverage data is assessed periodically to identify obstacles for clients and areas where vaccine clinic offerings or vaccination rates are lower, and strategies are developed and implemented to increase access. This includes identifying higher-risk groups who are less likely to get vaccinated, due to systematic issues.
4.	Vaccination clinics are established to improve access to vaccines and their operations are guided by agreements that clearly define standards and policies on vaccine clinic staff training, storage and handling of vaccines; processes are established to monitor clinic operation and reimburse clinic operators based on valid billings.
5.	Effective and flexible data systems are developed in a timely manner to book vaccine appointments and store vaccination and vaccine inventory data with appropriate safeguards for validity and accuracy.
6.	The government's decisions on the timing and content of vaccine policies and mandates are informed by the best available scientific evidence and advice.
7.	Clear, consistent and transparent messages are communicated to the public about vaccine policies, mandates, availability and effectiveness to establish public trust and opportunities for improvements and effectively address vaccine hesitancy.
8.	Performance measures are established and measured to guide actions and establish priorities, including improving immunization rates and minimizing vaccine wastage, and these are modified as appropriate.

Appendix 12: Stakeholders Interviewed for the COVID-19 Vaccination Program Audit

Prepared by the Office of the Auditor General of Ontario

- The Ministry of Public and Business Service Delivery regarding the operation of the Provincial Vaccine Contact Centre
- The Ministry of Labour, Immigration, Training and Skills Development regarding its actions to monitor businesses' compliance with and enforce the *Reopening Ontario (A Flexible Response to COVID-19) Act, 2020* in relation to the requirements for vaccine passports in certain higher risk settings
- The Ministry of Long-Term Care regarding vaccination mandates at long-term care homes
- Public Health Ontario to identify the most current science regarding COVID-19 vaccines and to better understand its role in the vaccination distribution decision-making process
- Ontario Health regarding its role in co-ordinating certain regional vaccine-related operations
- The National Advisory Committee on Immunization regarding the advice it had provided on vaccine use
- The COVID-19 Vaccine Distribution Task Force to understand its activities in the early stages of the vaccination rollout; and
- The Children's Vaccine Table, the Ontario Medical Association, the Ontario Pharmacists Association, the Ontario Public Health Association, the Registered Nurses' Association of Ontario, the Association of Local Public Health Agencies and Vaccine Hunters Canada to obtain their perspective on the vaccine strategy and rollout.

Appendix 13: Summary of Inquiries Received by the Office of the Auditor General Regarding COVID-19 Vaccines, April 2021–January 2022, and Related Sections in This Report Where Topic Is Discussed

Prepared by the Office of the Auditor General of Ontario

Note: Summaries are based on comments from multiple individuals and organizations and may include non-factual information. Refer to **Section 4** of this report for the Office of the Auditor General of Ontario's assessment.

Topic	Concerns Identified	Section

Selection of Hotspot Postal Codes	• Many individuals expressed interest in how hotspots were chosen and wanted to make sure that hotspots were determined based on science and free of political influence.
	• Individuals were concerned that the government has favoured its own electoral ridings when it came to distribution of vaccines.
	• Specific examples include:
	  ◦ Vaccines were distributed to lower-risk areas instead of to essential workers and higher priority neighbourhoods in Peel and Toronto.
	  ◦ Kanata was included as a hotspot despite having a relatively low positivity rate, whereas London, where positivity rates were soaring, was not considered a hotspot.
	  ◦ York Region has consistently experienced unfair shortages of vaccines.
		4.1

Stockpiling and Wastage	• Citizens wondered why some vaccine supplies were being held in freezers instead of being administered. • Our Office was requested to audit the government's use of private clinics and businesses to distribute and administer vaccines. The individual questioned whether the "haphazard" vaccine distribution in Ontario resulted in private clinics and businesses being "improperly incentivized to acquire doses of vaccine that they were not able to fully distribute". • Some primary care physicians were concerned that the two hospitals responsible for initial vaccine rollout in December 2020 were hoarding vaccines to give to their own staff who did not meet eligibility criteria because they did not have direct patient contact.	4.5
Use of External Consultants and Private Contractors	• Ontario's official opposition asked the Auditor General to review the sole-source contract between the government and FH Health, a private company, to operate vaccination clinics in the Greater Toronto and Hamilton Area, following reports that some FH Health corporate directors and their family members made donations to the Ontario PC Party totaling about $42,000. The opposition expressed concern that there may be some quid pro quo between the government and FH Health and that the political donations may contravene the *Election Finances Act, 1990*. • There was concern about the government's sole-source contracting of Deloitte consultants for the COVID-19 vaccine distribution program and the use of exceptional provisions to sole-source this contract. It is unclear how much money the Province has spent on this contract. • A component of the provincial vaccination database responsible for tracking adverse events after immunization was built by Smile CDR (Clinical Data Repository). A citizen would like to know how this company was chosen and what it was paid.	4.3 See also COVID-19 Contracts and Procurement audit, *2022 Annual Report*

Topic	Concerns Identified	Section
Vaccination Appointment Booking Portal	• There were reports that appointments for vaccinations were going unfilled due to citizens booking multiple appointments. • Many citizens reported feeling confused and frustrated with the lack of a central booking platform for all locations administering vaccines in their regions. • The provincial vaccine portal provided overly generic error messages when denying people from booking vaccination appointments, prompting citizens to call their public health units in confusion. • A group of primary care physicians expressed concerns about the booking system, in particular with high-risk individuals experiencing booking issues due to barriers to access (e.g., language barriers or no access to a computer/Internet). The booking of appointments in Ontario favoured those who were tech-savvy and fluent in English.	4.2
Vaccine Priority	• Many individuals questioned the four-month delay between the first and second dose recommended by the National Advisory Committee on Immunization, wondering whether this prolonged interval had any health consequences, especially for the elderly. • Some citizens worried that homebound seniors and other vulnerable populations were not able to access vaccines. • An individual was concerned that the government is putting the lives of people receiving home care and personal support services at risk. Personal support workers (PSWs) are more vulnerable as they visit multiple clients a day, but they have not received priority for second and third doses, nor are they protected by a vaccine mandate. Also, the individual notes that PSWs do not have access to N95 masks and test kits, despite the heightened risk. • A transit operator expressed concern with the Province's prioritization of certain workers for vaccines. He asked why education workers were prioritized over workers like himself, who cannot work from home. • Some primary care physicians expressed concerns regarding inconsistency when it came to the vaccination of health-care workers. When supplies were scarce, some physicians knew of non-patient-facing health-care workers who received their dose before those who were patient-facing or working in emergency.	4.1 4.6

Compensation and Organization of the Vaccinator Workforce	• The Registered Nurses' Association of Ontario and many nurses expressed frustration and concern about the vaccination workforce regarding:
	  ◦ The pay gap between physicians and nurses who administer the vaccine: physicians receive $170 per hour ($220 for overtime) from the Province while nurses receive $40–50 per hour from the public health unit that employs them.
	  ◦ Feeling underutilized, as many nurses had not been called upon to vaccinate in the early stages of the rollout; the Province and public health units appeared to favour physicians, whose rates were much higher, to administer the vaccine.
	  ◦ The preference of physicians over nurses to administer COVID-19 vaccines, which seemed illogical given that nurses routinely administer other injections in primary care settings.
	• Primary care physicians also expressed concerns regarding the apparent disorganization of the vaccinator workforce. The list of vaccinators was unclear and should have been established through a centralized portal that tracked their identities and qualifications to help public health units plan clinics. Many vaccinators received little to no notice when being called onto shifts or when having their shifts canceled.
		4.3

Topic	Concerns Identified	Section

Vaccine Planning Process and Information Systems	• Some primary care physicians expressed the following concerns regarding the planning of Ontario's vaccine rollout:
	  • Initial planning did not include primary care and public health units, the two sectors with most experience in mass vaccination campaigns (i.e., annual flu shots).
	  • From December 2020–April 2021, during the crucial phase of initial planning, retired General Hillier was head of the Vaccine Distribution Task Force. Although he provided logistics expertise, the General did not appear to have prior knowledge of public health systems in Ontario. This lack of public health knowledge may have been to the detriment of the vaccine rollout as the General prioritized getting vaccines into arms as quickly as possible over public health concerns such as equity.
	  • The COVaxON system created to track vaccination data did not integrate with existing systems such as the electronic medical records maintained by primary care physicians, which created duplication of effort and risks of data loss or inaccuracy.
	  • The Province's system of governance and accountability was complex "with multiple layers and holes in accountability" and "failures of leadership at multiple levels".
		4.4
		4.1

Appendix 14: Major Events Related to the Rollout of the COVID-19 Vaccine in Long-Term Care Homes and Among Health-Care Workers, December 2020 to February 2021

Prepared by the Office of the Auditor General of Ontario

Date	Major Events
Dec 4, 2020	The COVID-19 Vaccine Distribution Task Force (Task Force) analyzes National Advisory Committee on Immunization (NACI)'s guidance on prioritization. NACI guidance puts "residents and staff of congregated living settings that provide care for seniors" at the top of the prioritization list. 431,013 or 0.8% of Ontario's population fell under this group.
Dec 13, 2020	Ontario receives first shipment of Pfizer vaccine doses.
Dec 14, 2020	First vaccine dose of Pfizer administered in Ontario.
Dec 23, 2020	Over 9,300 doses administered thus far; recipients include long-term care home staff and residents, and hospital staff.
Dec 30, 2020	Ontario receives first shipment of 52,800 Moderna vaccine doses.
Jan 5, 2021	The Ontario government announces an accelerated plan to vaccinate at 163 long-term care homes in four priority regions (Toronto, York, Peel and Windsor-Essex) by January 21, 2021 leveraging the first shipment of Moderna vaccine doses; the Pfizer vaccine doses required ultra-cold freezing and were not approved for transportation out of hospitals or centralized vaccination sites and therefore were made available to health-care workers and long-term care home staff who could travel to these sites; the Task Force developed its plan to respond.
Jan 6, 2021	The Ministry of Health issues guidance allowing transportation of Pfizer vaccines beyond the initial point of delivery, following related guidance issued by the manufacturer on December 31, 2020.
Jan 17, 2021	Thus far, a total of 333,550 doses of vaccines have been received, with 207,788 doses administered: • 97,865 to health-care workers; • 48,436 to health-care workers at long-term care homes; • 12,989 to health-care workers at retirement homes; • 27,311 to long-term care home residents; • 9,061 to retirement home residents; • 346 to advanced age group residents in community dwellings; • 9,837 to other employees in acute care, long-term care and retirement homes; • 83 to members of Indigenous communities; • 1,637 to adults receiving chronic home care; • 1,221 to essential caregivers at long-term care homes; • 103 to other non-employees at long-term care homes; • 511 to essential caregivers at retirement homes; • 60 to other non-employees at retirement homes; • 242 to other priority populations Estimated total coverage of long-term care homes is around 33.5%.
Jan 19, 2021	The government announces that it has completed the accelerated plan to vaccinate 163 long-term care homes in four regions (Toronto, York, Peel and Windsor-Essex) ahead of schedule, and will continue to roll out to other long-term care homes and high-risk retirement homes across Ontario with a targeted completion date of February 15th.
Jan 21, 2021	50%* of residents and staff of long-term care homes and high-risk retirement homes have been offered the first dose of the COVID-19 vaccine. Due to supply constraints, the government pivots to vaccinating long-term care homes and high-risk retirement home residents only.

Date	Major Events
Feb 14, 2021	The Task Force, the Ministry of Health and the Ministry of the Solicitor General announce that the government has completed offering first doses to all residents in long-term care homes and high-risk retirement homes and begun to vaccinate those in retirement homes (approximately 60% of those in retirement homes have already received the first dose).
Feb 25, 2021	The Task Force continues to roll out the second dose to long-term care homes, high-risk retirement homes and other elder care homes, and resumes vaccinating patient-facing health-care workers, which was put on hold when the government prioritized vaccinating long-term care residents.

* The COVID-19 Science Advisory Table publishes a Science Brief that notes: "accelerating the rollout of Ontario's COVID-19 vaccine such that all long-term care residents receive the first dose of a COVID-19 vaccine by January 31, 2021, would prevent a projected 600 COVID-19 cases and 115 deaths by March 31, 2021 when compared with the province's current plan to vaccinate all long-term care residents by February 15, 2021. Projections indicate that further acceleration of the rollout would prevent even more COVID-19 cases and deaths."

Appendix 15: Ontario's Roadmap to Reopen and Vaccination Rate for Each Step, Target versus Actual

Prepared by the Office of the Auditor General of Ontario

Steps	Examples of Permitted Activities	Target		Actual	
		Vaccination Rate	Date[1]	Vaccination Rate	Date[2]

One	• Social gathering and organized public events limits
	  • Outdoor—10
	  • Indoor—nil
	• Retail capacity
	  • Essential—25%
	  • Non-essential—15%
	• Certain outdoor activities with capacity limits
		60% of 18+ with at least one dose	Week of June 14, 2021	74.1% of 18+ with at least one dose	June 11, 2021[3]

Two	• Social gathering and organized public events limits
	  • Outdoor—25
	  • Indoor—5
	• Retail capacity
	  • Essential—50%
	  • Non-essential—25%
	• Personal care services, public libraries with restrictions
		70% of 18+ with at least one dose
		20% of 18+ with two doses
			21+ days after step one	77.7% of 18+ with at least one dose
				39.3% of 18+ with two doses
					June 30, 2021 (19 days after step one)

Three	• Social gathering and organized public events limits
	  • Outdoor—100
	  • Indoor—25
	• All retail capacity limited to permit physical distancing
	• Indoor dining permitted with no limits on the number of patrons per table with physical distancing and other restrictions
	• Sports and recreational fitness with capacity limits
	• Concert venues, cinemas and theatres permitted to operate with capacity limits
		70-80% of 18+ at least one dose
		25% of 18+ with two doses
			21+ days after step two	78.5% of 12+ at least one dose
				58.1% of 12+ with two doses
					July 16, 2021 (16 days after step two)

1. Anticipated date when the Province would enter the next step in its reopening plan.
2. This is the date when the province elected to move to the step.
3. The province actually met the criteria in step 1 on May 22, 2021.

Appendix 16: Third and Fourth Dose Time Frames and Groups Recommended by National Advisory Committee on Immunization (NACI)

Source of data: National Advisory Committee on Immunization

Month Recommendation Made	Groups
Jan 2022	The following groups are to obtain the third dose six months after they have had their first and second doses: • children five to 11 who are moderately to severely immunocompromised • adults 18 years of age and older The following groups are to obtain the third dose six months after the completion of a primary vaccine series (which in Ontario is usually two doses of either Pfizer or Moderna or one dose of Janssen): • adolescents 12 to 17 years of age with underlying medical conditions at high risk of severe illness due to COVID-19 (including those who are moderately to severely immunocompromised and who received a three-dose primary series) • residents of congregate living settings • those who belong to racialized and/or marginalized communities disproportionately affected by COVID-19
Apr 2022	The following groups are to obtain their fourth doses: • adults 80 years of age • adults living in long-term care or other congregate living settings for seniors • adults 70 to 79 years of age and over living in the community • adults younger than 70 years in or from First Nation, Métis, or Inuit communities

Appendix 17: Recommendations from "Shining a Light at the End of the Tunnel—Guiding Considerations for a Safe, Accessible and Equitable COVID-19 Vaccination Framework in Ontario", Ontario Medical Association, December 15, 2020

Source of data: Ontario Medical Association

Area of Interest	Recommendation
Defining Populations	• The government must identify clear criteria for, as well as within, priority populations who will receive a COVID-19 vaccination first. Physicians and others with expertise should inform the clinical and risk criteria to help prioritize within groups. • Health-care workers including doctors, nurses etc., should be in the first group of identified priority populations to receive the COVID-19 vaccine. • Real-time data should be used to help identify geographic areas of high spread and target those areas as a priority for vaccine distribution and allocation efforts, particularly where the demand for the vaccine exceeds the supply. • The government should begin planning now in anticipation of an approved vaccine for children (under the age of 16). • As part of the Ministers' COVID-19 Vaccine Distribution Task Force, the government must develop and deploy educational material to provide physicians with the information they will need to talk with their patients and provide them with the confidence that the COVID-19 vaccination is safe and effective. • The government must develop and implement a public awareness campaign to educate providers and the public regarding which populations will be prioritized during the vaccine distribution and administration process.
Vaccine Distribution and Administration	**Roles of Key Actors** • A key consideration is avoiding overlap in responsibilities and gaps in any plan. Clarify roles of all parties involved, including the federal government, provincial government, Public Health Ontario, public health units, health-care workers including physicians, hospitals, community clinics, long-term care and other congregate settings, and community leaders in developing and implementing the strategy for co-ordinated and safe vaccine delivery in consideration of local needs and contexts. The government should work with public health units to support capacity for these recommendations on distribution and administration. These roles will change throughout the campaign as vaccines with different distribution characteristics are approved for use in Canada. • Physicians, public health units (including medical officers of health), and other primary-care providers impart public health knowledge and have experience in patient care. They must be represented at provincial tables when immunization strategy decisions are being made. **Administration for Priority Populations** • Bring vaccination to priority populations in settings relevant and accessible to them (e.g., in hospitals for health-care workers, in schools for school staff and students, mobile vans for individuals unable to leave home). Government and local public health units should work with providers to investigate the desirability of various options for the vaccination of key priority groups such as community-based physicians, nurses and other workers in community health-care settings. • Plans must be made for how and where community-based health-care workers will be vaccinated. Hospitals and other public health-led clinics in local communities should maintain capacity and co-develop plans to ensure access to the vaccine for all health-care providers, which will allow them to stay healthy to continue to care for Ontarians including those with COVID-19. Hospitals and public health units seem an appropriate location for these individuals to get vaccinated. • Clear and consistent guidance for vaccine administrators on administering the COVID-19 vaccines and the specifics of each product, including follow-up dose requirements, should be developed with leadership by Public Health Ontario and the Ministers' COVID-19 Vaccine Distribution Task Force in consultation and collaboration with end users. The Ontario Medical Association can support with knowledge translation support of guidance and dissemination to physicians.

Area of Interest	Recommendation
Vaccine Distribution and Administration (continued)	**Administration for the General Population** • Once fridge-stable vaccines become available and widespread, and wider population vaccination is required, public health units should work with local physician leaders and primary-care providers to design innovative collaborations to enhance access to the vaccine at places that are easily accessible to patients. • Traditional settings for vaccine administration (physician clinics, public health unit vaccination clinics, etc.) should be considered for COVID-19 vaccine administration for the general population as vaccine availability and characteristics allow. • Distribution channels for delivering vaccine doses to physicians need to be determined (i.e., if utilizing influenza vaccine distribution channels through public health units). These distribution channels must entail clear and timely communication to physicians with transparency around supply and a commitment to delivery timing and quantity of doses. Physicians should identify the number of doses required for their practices. • Clear and consistent guidance for vaccine administrators on administering the COVID-19 vaccine in traditional settings and the specifics of each product that will be available, including follow up dose requirements, should be developed with leadership by Public Health Ontario and the Ministers' COVID-19 Vaccine Distribution Task Force in consultation and collaboration with end users. The OMA can support with knowledge translation support of guidance and dissemination to physicians. • When utilizing innovative strategies, spaces (e.g., arenas, convention centres) should be secured for large-scale and/or innovative vaccination clinics, and needed health human resources, supplies, and equipment should be determined and sourced. • Public health units should develop a roster of vaccine providers who are willing and able to administer the COVID-19 vaccine in clinics outside of primary care. Public health units should recruit vaccine providers within their regions, with the government helping where recruitment from other areas of the province may be necessary. • Local physician leaders and other primary-care providers can set an example for peers by supporting their local vaccination delivery process through contribution of time to the efforts of vaccinating clients at various venues. • The government should engage with industry leaders on scheduling appointments for large-scale vaccination clinics to leverage existing available technologies and expertise for planning attendance for large-scale events.
Integrated Information Systems, Surveillance and Monitoring	**Integrated Information Systems for Patients & Providers** • The government should make available an electronic appointment, registration and record management and patient notification system for multi-dose vaccination. This should be mobile phone-enabled and aligned with each type of COVID-19 vaccine along with non-smart phone notification mechanisms to attempt to reach all patients. This system should be patient-facing and provider-facing. • The government should use this system to allow patients to book their vaccination appointment(s) online and provide them with needed information. Additionally, it should account for patient differences in access to technology and digital literacy, ensuring that use of this system does not exclude some patients, particularly those who may be most vulnerable. • This system must meet providers' needs, facilitating appointment booking on their end, the provision of information and needed forms, facilitating appointment reminders, notifying providers if their patients have received each dose of the vaccine outside of a patient's family physician's office, and tracking which vaccine a patient received and the specific follow up timeline. The system must be co-developed with end users to ensure that it can be seamlessly integrated into workflow. Where possible, notifications should be sent directly to the primary care provider's electronic medical record system. • In light of the need for multi-dose vaccination, this system must record and track which vaccine a patient has been administered for their first dose, record and ensure that a patient's follow up appointment is booked for the same vaccine, ensure that it prompts patients for follow-up in the right timeline for each specific vaccine, and that it allows patients to book appointments where the vaccine they need is available. This is especially necessary for patients who receive the first and second doses from different providers.

Area of Interest	Recommendation
Integrated Information Systems, Surveillance and Monitoring (continued)	**Information Systems for Surveillance Monitoring** • Establish and proactively utilize vaccination surveillance and program monitoring to identify potential gaps in administration strategies. A comprehensive, centralized and accessible digital vaccine registry for data collection that aims to document each COVID-19 vaccine administered should be established at the national level. Such a system would allow vaccination rates and coverage to be easily tracked, enable the distribution of potentially scarce vaccines to be optimized, facilitate a comparison of vaccine coverage with disease rates across the provinces, and enable monitoring for effectiveness particularly in the longer term with a single database to easily know if individuals experiencing COVID-19 might already have been vaccinated. • Collect demographic data on vaccine distribution to identify gaps in population reach and access, and monitor effectiveness and safety amongst different populations, particularly marginalized populations that have experienced a disproportionate rate of COVID-19 infection. • Ensure that the existing adverse effects following immunization (AEFI) reporting structure has sufficient capacity to monitor reports related to COVID-19 vaccines, and that there is a federal-provincial-territorial strategy to monitor and act quickly on potential trends. Ensure vaccine providers including physicians have clear and efficient means to report AEFIs to their local public health units and are resources to counsel patients around AEFIs.
Public Education and Vaccine Hesitancy	• Clear and consistent communication/education campaigns must be developed and implemented by government with the support of stakeholders to assist in building public trust in the vaccine. • Leaders and health-care workers should be early and visible recipients of vaccines to reassure the public of vaccine safety. • Continuous updates/guidance on vaccine-related developments must be provided to health-care workers. • Health professional associations and respected community-based and non-governmental groups/ organizations should be used to disseminate COVID-19-related information because this will help to build public trust in the vaccine. Targeted interventions must be developed for populations more at risk for contracting COVID-19 and groups who are more prone to vaccine hesitancy. • Regular monitoring of vaccine confidence levels (and dissemination of data to vaccine administrators) is necessary. • The vaccination experience should be as comfortable and convenient as possible. • Public education for protective measures including masking, physical distancing and hand and respiratory hygiene must continue. It must encourage people who have been vaccinated to continue these other measures so they can continue protecting those not yet vaccinated.

Appendix 18: Number of Vaccine Doses Received and Wasted by Public Health Units and Private-Sector Companies

Prepared by the Office of the Auditor General of Ontario

	Doses Received	Doses Wasted			
		Closed-Vial	Open-Vial	Total	Wastage (%)
Public Health Unit[1]					
Grey Bruce	320,769	49,534	4,588	**54,122**	17
Windsor-Essex	356,896	34,338	13,653	**47,991**	13
Huron Perth	251,787	15,595	4,970	**20,565**	8
Region of Waterloo	690,217	37,685	10,559	**48,244**	7
Eastern Ontario	338,016	19,627	3,988	**23,615**	7
Haliburton, Kawartha, Pine Ridge	247,204	8,008	7,184	**15,192**	6
Algoma	202,720	7,142	5,150	**12,292**	6
Porcupine	161,999	2,149	7,465	**9,614**	6
Kingston, Frontenac and Lennox & Addington	309,931	6,479	9,189	**15,668**	5
Durham Region	903,290	32,843	12,810	**45,653**	5
Timiskaming	67,731	1,485	1,854	**3,339**	5
Toronto	2,279,318	38,013	71,347	**109,360**	5
Niagara Region	462,622	12,808	9,253	**22,061**	5
City of Hamilton	811,593	14,855	22,941	**37,796**	5
Chatham-Kent	193,647	7,466	1,437	**8,903**	5
Renfrew County	177,684	3,206	4,190	**7,396**	4
Middlesex-London	587,204	5,022	18,647	**23,669**	4
Halton Region	776,349	17,276	13,904	**31,180**	4
Thunder Bay	233,121	4,062	4,885	**8,947**	4
Lambton	225,530	3,266	4,655	**7,921**	4
Leeds, Grenville & Lanark	300,777	3,816	5,990	**9,806**	3
Haldimand-Norfolk	117,016	1,606	2,196	**3,802**	3
Northwestern	171,384	808	4,491	**5,299**	3
Peterborough	233,635	5,271	1,421	**6,692**	3
Wellington-Dufferin-Guelph	524,272	4,779	9,422	**14,201**	3
Ottawa	1,742,329	5,970	40,641	**46,611**	3
Hastings Prince Edward	293,557	4,336	3,509	**7,845**	3
Southwestern	339,793	4,546	4,494	**9,040**	3
North Bay Parry Sound	227,509	1,089	4,924	**6,013**	3
Peel	1,877,241	21,134	27,710	**48,844**	3
Brant County	292,463	2,447	4,721	**7,168**	2
York Region	1,304,552	5,111	19,799	**24,910**	2
Simcoe Muskoka	1,034,233	8,739	10,351	**19,090**	2
Sudbury & Districts	404,802	954	5,439	**6,393**	2
Total	**18,461,191**	**391,465**	**377,777**	**769,242**	**4**

	Doses Received	Doses Wasted			Wastage (%)
		Closed-Vial	Open-Vial	Total	
Private-Sector Organizations					
Switch Health[2]	103,523	56,150	2,709	**58,859**	57
FH Health[3]	15,949	0	3,223	**3,223**	20
Canadian Red Cross[2]	55,077	119	3,622	**3,741**	7
Medavie[2]	136,823	464	8,018	**8,482**	6
Total	**311,372**	**56,733**	**17,572**	**74,305**	**24**

1. Data from December 2020–June 2022.
2. Data from May 2021–June 2022.
3. Data from January–March 2022.

Appendix 19: Summary of Letters Submitted by the Ontario COVID-19 Science Advisory Table, the Ontario Hospital Association and the Registered Nurses' Association of Ontario on Vaccination Mandate in Hospitals, October 2021

Prepared by the Office of the Auditor General of Ontario

Ontario COVID-19 Science Advisory Table

In October 2021, the Science Table responded publicly in support of mandating COVID-19 vaccinations for hospital workers, including front-line health-care workers and all other hospital staff to protect both workers and patients. The Science Table cited the following reasons:

- conclusive evidence that COVID-19 vaccines are safe and effective based on data collected worldwide;
- hospitals are a substantial source of COVID-19 outbreaks;
- a vaccinated workforce would reduce transmission to both unvaccinated and vulnerable fully vaccinated patients;
- unvaccinated hospital workers are at far greater risk of infection, which could lead to potentially significant time away from work, and further strain from increased workload on their vaccinated colleagues; and
- in comparison, the number of unvaccinated hospital workers who leave the workforce due to mandates has been low based on evidence from other jurisdictions and early reports from within Ontario:
  - Italy implemented a vaccination mandate for health-care workers in April 2021. At that time, only one in 10,000 health-care workers in Italy was resistant to the mandate, according the Order of Doctors, Surgeons and Orthodontists. According to senior leadership at the National Bioethics Committee, "vaccines are an ethical obligation for health professionals: their professional duty to treat the sick obliges them to avoid transmitting the infection."
  - In the United States, hospitals that implemented vaccination mandates for employees effective September 2021 saw compliance rates of more than 90% as of October 2021. In one Texas hospital that employs more than 26,000 people, the vaccination rate was as high as 98%, with very few employees requesting exemptions (2%) or leaving their jobs (0.6%).
  - In Ontario, as of October 2021, several hospitals had chosen to implement vaccination mandates for employees because the Province was contemplating making this a province-wide requirement. They reported that relatively small numbers of employees were terminated or placed on unpaid leave due to refusal to vaccinate or disclose vaccination status, and that patient care would not be negatively impacted.

Ontario Hospital Association

The Ontario Hospital Association issued a letter in October 2021 to the government supporting the mandate, citing many of the same reasons as the Science Table. The Association also pointed out that:

- One in three Ontario hospitals own, operate or license a long-term care home, where vaccines are mandatory for workers. Many of these hospitals' employees work in both settings, and the "lack of a clear and consistent provincial approach can breed confusion and further vaccine hesitancy".
- In contrast to the unpredictable absences that could occur during a COVID-19 outbreak, any staff departures due to a vaccination mandate would be planned, so that hospitals could better adapt and respond.

- The *Public Hospitals Act* already requires hospitals to ask health-care workers for proof of vaccination or proof of immunity for 17 communicable diseases including measles, rubella, varicella and tuberculosis, and COVID-19 should not be treated differently.

Registered Nurses' Association of Ontario

The Registered Nurses' Association of Ontario supported the mandate in hospitals as stated in the Association's public letter in October 2021. Based on a survey of its members, the Association found that "mandatory vaccination is considered by virtually all nurses as a matter of respect and necessary for the protection of their health and safety and those they go home to every day." The Association also echoed the sentiments of the Science Table and the Ontario Hospital Association in saying that vaccination mandates would not result in hospitals being short-staffed. Further recommendations on implementation include:

- a clear, comprehensive, consistent, firm mandate with a six-week time frame for implementation;
- nursing-led education in the workplace for health-care workers;
- workplace access to vaccination; and
- engagement of relevant stakeholders like regulatory and professional bodies providing education, portals for education, and other profession-specific supports.

Appendix 20: Examples of Poor Communication on Vaccine Distribution and Science

Prepared by the Office of the Auditor General of Ontario

Three-phase Vaccination Plan	The province provides COVID-19 information on its website, Ontario.ca. One of the COVID-19 web pages on Ontario.ca describes the three-phase vaccine distribution plan (explained in **Section 2.2.2**), the province's plan for vaccinating Ontarians generally based on the quantity of vaccines available, increasing over time. The information provides an outline of the plan, but does not provide details, for example, the relative priority of the groups in the first phase. Additional information (or links to additional information) is necessary for a comprehensive understanding of, for example, what would trigger a move from one phase to the next, order of eligibility within the priority groups listed in each phase, and how Ontarians would be able to access vaccination once they become eligible. The information available does not clearly describe how the vaccination plan follows the principles of the Ethical Framework for COVID-19 Vaccination (**Figure 4**); for example, how the plan would minimize harm and maximize benefits, or how the plan considered equity in prioritizing groups, and fairness for individuals within groups. The communication, therefore, does not align with another framework principle—transparency. Concerns about lack of clarity on the vaccination plan appeared regularly in the media, especially in the early phases of the plan when vaccine supply was severely limited, suggesting that another framework principle—public trust—was negatively affected.
Vaccination Priority Groups Planned Compared to Actual	The Ministry of Health did not adequately convey how its actual order of vaccination compared to its plan, or reasons for any deviations. For example, by summer 2022, the government website did not contain updated information on what had occurred. It is unclear whether lack of clarity is the result of poor communication, or a lack of clarity about the goals of the vaccination program. Poor communication often results from a lack of clarity in policy goals and objectives. We surveyed medical experts about whether the Ontario government should have established the order in which different priority groups would receive the COVID-19 vaccine prior to receiving them; 67% agreed or strongly agreed. Also, 50% disagreed that the Vaccine Distribution Task Force was effective in clearly communicating the rationale for prioritizing certain groups for the limited vaccines available at that time. One expert noted that the "distribution strategy depends upon underlying primary goals. Primary goal could be limiting deaths. Or limiting transmission. Or limiting hospitalizations. Each of these would entail a different strategy. The underlying goal was never clear, and so the utility of the strategy was also not clear."
"Hotspot" Strategy	As noted in **Section 4.1.1**, despite the concerns of public health units and media attention, neither the Vaccine Distribution Task Force nor the Ministry of the Solicitor General clearly communicated to the public the underlying scientific data or how this data supported their decisions to select certain communities and not others.
Racialized and Indigenous Communities	The Children's Vaccine Table recommended in May 2021 that communications and resources be directed to develop anti-stigmatizing messages to explain "the reasoning for prioritizing youth living in hotspots, acknowledging that youth living in these areas including Black and other racialized youth have been disproportionally impacted by COVID-19." This Table also raised similar concerns regarding whether prioritizing Indigenous people was adequately explained. However, the Ministry of Health did not develop communication to address these concerns. The Ministry informed us that in its view, drawing attention to racialized and Indigenous groups could have caused stigmatization.
Vaccine Science	The Ministry did not date information provided about vaccine science, or about key vaccination milestones as information was added to its website. Given the number of scientific studies underway and as a result, the evolving science on the COVID-19 virus and new variants, clearly dated information is key to helping the public interpret how current the information is.

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