

ENVIRONMENTAL SCAN

(ARCHIVED) COVID-19 Immunity Status and Considerations for Public Health Measures

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Key Points

- At this time, two jurisdictions were identified, the United States (US) and Israel, that report exceptions or changes to public health measures specific to individuals who are regarded as having acquired Coronavirus Disease 2019 (COVID-19) immunity either through vaccination or previous infection (E.g., allowing vaccinated people to gather indoors with other fully vaccinated people without masks or social distancing, or allowing entrance to certain locations).
- Both jurisdictions still require vaccinated or previously infected individuals to follow general public health measures when in public, such as wearing masks and physical distancing.
- Scientific considerations for policies relating to immunity status or the use of ‘immunity passports’ include: 1) COVID-19 vaccines are not 100% effective and the protection offered from vaccination or previous SARS-CoV-2 infection is not yet well-understood; 2) the duration of immunity conferred from infection/vaccination is not known at this time; and 3) there is still a paucity of data regarding an individual’s ability to transmit the virus despite being protected themselves.
- Ontario’s vaccination program is using a longer interval to second dose approach which further renders it challenging to translate the experience of the US and Israel to the Ontario context, in which fully vaccinated individuals are defined as having completed the 2 dose vaccination series.
- Ethical considerations for adjusting measures based on immunity status and/or the use of ‘immunity passports’ include the potential to increase social stigmatization and exacerbate existing inequalities, particularly among marginalized groups, including racialized populations who have been disproportionately impacted by the COVID-19 pandemic.

- When implementing public health measures specific to an individual's immunity or vaccination status, it is important to consider the epidemiological context in which these measures are taking place. This includes taking into account the incidence and burden of disease, pathogen transmissibility and the proportion of the population that has been vaccinated, especially given the variants of concern (VOC).
- A risk-decision framework in the context of equity needs to be considered when considering individual versus population-level public health measures in the context of immune status, whether through vaccination or infection.

Purpose and Scope

As jurisdictions in many countries ramp up their COVID-19 vaccination programs, decision-makers and their communities ponder how the progress of vaccination programs may impact the need for, and use of, community-based public health measures in the short and medium term,¹ given the individual and societal disruptions experienced related to the pandemic. While many enacted public health measures are at the community-level, individual-level measures for fully vaccinated individuals such as masking and small social gatherings are of interest, as well as the use of immunity status in relation to entering certain types of community settings such as places of worship. Thus, it was of interest to examine which countries globally have described approaches to adjustments of public health measures for the public based on immunity status. In addition, an overview of potential ethical considerations for the Ontario context was deemed to be relevant, recognizing that guidance on this topic is less likely to be reflected in the current evidence base on real-world vaccine effectiveness, and more likely to reflect policy decisions influenced by societal values and pandemic context.

The purpose of this scan is to describe: 1) jurisdictions identified at this time that have implemented adjustments to public health measures specific for individuals who have received their full COVID-19 vaccine; and 2) ethical considerations related to documentation of immunity (E.g., immunity passports).

Immunity status and references to an 'immunity passport' are defined in this document as immunity conferred through a definition of being vaccinated with COVID-19 vaccine or immunity conferred through infection with SARS-CoV-2, as it was not possible to separate based on policies for one of the jurisdictions examined (Israel). While several countries are discussing COVID-19 vaccination in the context of international travel, this was deemed out of scope for the current scan which focuses on community-based public health measures relevant to the provincial Ontario context. Literature related to specific health-care settings, including long-term care facilities, and COVID-19 case and contact management was also deemed out of scope.

Background

Over the course of the first quarter of 2021, people globally in many countries have started to receive the COVID-19 vaccines. It is expected, however, to take time for the vaccine to demonstrate an effect while the pandemic persists, particularly in the context of VOC which have higher transmissibility.² Ontario has a three-stage plan for administering vaccines over the course of 2021.³ In the first phase, high-risk populations (E.g., seniors, health care workers, Indigenous populations) will be vaccinated, followed by phase 2 (E.g., adults aged 60 to 79, in 5-year increments, as well as those in high-risk settings, individuals with high-risk chronic conditions and those who cannot work from home), and phase 3 (adults 59 years and younger). As of March 14, 2021 in Ontario, there were 319,374 confirmed

COVID-19 cases including 1,268 new cases.⁴ As of March 15, 2021 a total of 1,191,553 vaccines had been administered and 287,283 people had been fully vaccinated.⁵ 6.1% of people in Ontario have received at least one dose.⁶

To date, few jurisdictions have implemented plans for public health measures that are specific to vaccine-related immunity status, despite many of these jurisdictions having progressed further than Ontario in terms of the proportion of their population vaccinated. A recent Public Health Ontario (PHO) environmental scan examining the current status of public health measures including vaccination program progress in seven European countries noted that none of these countries have, at the time of writing, described any adjustments to public health measures at the individual-level and appear to be continuing to use public health measures and related strategy at the population level.⁷

There appears to be many ongoing discussions about the use of vaccination certificates or immunity passports for COVID-19, including in relation to community-based public health measures. In the US, where there has been marked variation in COVID-19 public health measures across states, some jurisdictions have reported plans to ease COVID-19 restrictions as larger percentages of their population are fully vaccinated (E.g., Tennessee Department of Health, US Centers for Disease Control and Prevention [CDC]).⁸ Others have discussed the advantages and disadvantages of vaccine certification and indicate they are not making a determination about easing measures until more is learned about immunization from infection or vaccine-related immunity (E.g., United Kingdom (UK), Australia).⁹ As the vaccination program is implemented over the coming year in Ontario, the general population should expect many community-level measures to remain in place (E.g., physical distancing, wearing masks) to protect public health.

This scan summarizes two identified jurisdictions that have reported adjustments to public health measures specific to groups that are fully vaccinated and/or have immunity related to prior infection. This scan also presents some key articles that describe the scientific feasibility of immunity passports and an overview of described ethical issues related to documentation of immunity.

Methods

This scan was informed by articles and data from subject matter experts, PHO reports and keyword searches for literature related to COVID-19 immunity and its impact for individuals and the population on public health measures. A formal database search was not conducted due to time constraints; thus, some relevant articles may have been missed.

Findings

Public Health Measures Specific to Vaccination Status

This section describes jurisdictions that have reported adjustments to public health measures specific to those who have been fully vaccinated. Examples of jurisdictions that do not have adjustments to measures for vaccinated individuals have been documented elsewhere.⁷ At this time, only two countries, the US and Israel, have been identified to have made adjustments or exceptions to public health measures for vaccinated or immune individuals (excluding measures specific to travel and health care settings). This section provides an overview of their epidemiologic and vaccine context, and changes to their public health measures.

UNITED STATES

EPIDEMIOLOGICAL CONTEXT

- As of March 10, 2021, the 7-day rolling average number of daily new COVID-19 cases per 100 000 people was 16.9.¹⁰
- As of March 10, 2021 the cumulative number of cases in the US was 29.15 million (equivalent to 8828.8 cases per 100 000 people).¹¹ The US currently has the greatest number of cumulative COVID-19 cases worldwide.¹² The current population of the US is approximately 332 million people.¹³
- As of March 17, 2021 the US had 161.8 deaths per 100 000 people.¹⁴

VACCINATION CONTEXT

- The US vaccination campaign started on December 14, 2021.¹⁵ Currently there are three vaccines being administered (i.e., Pfizer-BioNTech, Moderna and J&J/Janssen).¹⁶ The first group prioritized for vaccinations included healthcare personnel and residents of long-term care facilities (group 1a), followed by frontline essential workers (E.g., police officers, grocery store workers, public transit workers), and individuals aged 75 years and older (1b). The next group includes individuals aged 65—74 years, individuals 16—64 years with underlying medical conditions, and other essential workers (E.g., housing construction, law, media) (1c).¹⁷
- As of March 10, 2021, 95.72 million doses (28.9 doses per 100,000 people) of the COVID-19 vaccine had been administered.¹⁸
- As of March 11, 2021, 19.3% of the population had received at least one dose of the COVID-19 vaccine and 10.2% were fully vaccinated.¹⁶ The majority (>95%) of fully vaccinated individuals received their second dose within the time period recommended by manufacturers.¹⁹
- The percentage of the population over 65 years of age that was fully vaccinated as of March 10, 2021 was 32.2% (and 13.3% of the population of those aged 18 years and older).¹⁶
- It is important to note that vaccine hesitancy may be an impediment to achieving high vaccine coverage in the US, as a recent poll indicated that about 1 in 4 Americans are not willing to be vaccinated.²⁰

PUBLIC HEALTH MEASURES

The US CDC defines an individual as ‘fully vaccinated’ for COVID-19 from two or more weeks after their second dose in a two-dose series, or two or more weeks after a single-dose vaccine of a Food and Drug Administration (FDA)-authorized vaccine for SARS-CoV-2.²¹⁻²³ For the three vaccines currently available and authorized for emergency use, two are two-dose mRNA vaccines (Pfizer-BioNTech and Moderna), and one is a single-dose viral vector vaccine (Johnson and Johnson [J&J]/Janssen). Other vaccines may be considered for fully vaccinated status by the CDC depending on whether the World Health Organization (WHO) or a national regulatory agency has authorized other vaccine products.

The CDC describes that fully vaccinated people should continue to follow public health measures when in the broader community (E.g., physical distancing, wear masks, etc);²¹ however, new interim guidance

from the CDC for non-healthcare settings describes how fully vaccinated individuals may begin the following activities:^{21,22}

- Gather indoors with other fully vaccinated people without wearing a mask or physical distancing.
 - Exception: Medium- or large-sized gatherings, regardless of vaccination status, should still adhere to current CDC guidance which includes avoiding such in-person gatherings and if they choose to participate, wearing a well-fitted mask, maintaining physical distance from others, and washing hands frequently.
- Gather indoors with unvaccinated people from one other single household without wearing a mask or physical distancing, unless any of the other unvaccinated household members has an increased risk for severe illness from COVID-19.²⁴
- Be exempted from requirements to quarantine or get tested after being exposed to someone who has suspected or confirmed COVID-19; instead are recommended to self-monitor for 14 days. If symptoms develop, the individual should self-isolate and get tested.
 - Exception: Residents in non-healthcare congregate settings (E.g., a correctional facility or group home) should still isolate for 14 days and get tested regardless of symptoms.
 - Employees of non-healthcare congregate settings and other high-density workplaces are not required to quarantine, but are recommended to be tested following an exposure and through routine workplace screening programs (if in place).

ISRAEL

EPIDEMIOLOGICAL CONTEXT

- As of March 10, 2021 the 7-day rolling average number of daily new COVID-19 cases per 100 000 people was 36.3.¹⁰
- As of March 10, 2021 the cumulative number of cases in Israel was 811,942 (equivalent to 9375.4 cases per million people).¹¹ Israel is ranked in the top 30 (26th) in the world in terms of cumulative COVID-19 cases.¹² The current population of Israel is approximately 9 million people.²⁵
- As of March 17, 2021 Israel had 70.0 deaths per 100 000 people.¹⁴

VACCINATION CONTEXT

- On December 20, 2020, Israel launched its COVID-19 vaccination campaign using the Pfizer-BioNTech COVID-19 vaccine.²⁶ The initial target groups for vaccination included individuals aged 60 years and over, nursing home residents, other people at high risk due to serious medical conditions, and front-line health care workers.²⁶
- As of March 10, 2021, 9.07 million doses (104.8 doses per 100,000 people) of the COVID-19 vaccine had been administered.¹⁸ As of March 8, 2021, 56.4% of the population had received their first dose of the vaccine and 43% had received both doses.²⁷

- As of February 6, 2021 (the most recent data available), the percentage of adults aged 60 years and older who had received one dose of the vaccine was 89.9% (80.0% had received two doses). The percentage of adults aged 16 to 59 years of age who had received one dose of the vaccine was 36.56% (19.9% had received two doses).²⁸
- Israel's vaccination program is using the standard interval between first and second doses for the Pfizer-BioNTech vaccine, different from the extended interval being used for the general population in Canada. The decision not to extend the interval for giving a second dose may have helped to achieve this high percentage of individuals who had received two doses.

PUBLIC HEALTH MEASURES

Vaccinations have been made available for anyone older than 16 years old. On February 4, 2021, as an initial step, the Israeli government launched a campaign issuing vaccine certificates that confers upon its holder the exemption from most isolation requirements.^{29,30} Vaccine certificate holders are not exempt from the requirement to isolate if they have tested positive for SARS-CoV-2 and have not recovered, or have developed symptoms associated with COVID-19 after contact with a confirmed patient.³⁰ Thus, vaccine certificate holders are exempt from isolation after close contact with a confirmed case of SARS-CoV-2 or arriving from international travel. Vaccination certificates in Hebrew and English that meet "international standards" are available through application one week (not including the date of vaccination) after the second dose of vaccine;²⁹ thus, a similar definition of fully vaccinated is used in Israel.

In addition to vaccination status, a certificate of recovery is available for individuals who qualify as recovered from COVID-19 which confers the same exemptions from isolation requirements as does a vaccination certificate.³¹ In order to qualify as recovered, one must meet both criteria below:³²

- "At least 10 days elapsed since the date of the first positive (or borderline positive) coronavirus test and within 7 days following the test you have been considered a confirmed case."
- "In the last three days, you had no symptoms: fever of 38 degrees Celsius or higher, difficulty breathing or shortness of breath, cough or any other respiratory symptom, which is not improving, vomiting or diarrhea. Nose discharge as a single symptom, loss of taste or smell and ongoing cough do not prevent assignment as a recovered patient."

On February 21, 2021, the Israeli government announced opening of various sectors using a 'Green Pass' operation strategy.³¹ A Green Pass is required to enter premises using a Green Pass operation strategy. Holding a vaccination certificate or a certificate of recovery makes an individual eligible to apply for a Green Pass. These certificates and passes are only valid for six months. Vaccinated or recovered individuals with a Green Pass are the only ones who can enter a place that operates under the Green Pass strategy. Children may be eligible to receive a Green Pass and be listed on their parents' pass if they recovered from COVID-19.³³

Public health measures that remain in place for vaccinated individuals include wearing a mask in public settings and physical distancing (as well as abiding by restrictions on gatherings).³⁴ For example, currently, masks are required everywhere outside of one's home (with some exceptions, E.g., for physical activity, children under seven, those giving lectures, at the beach if physical distancing observed).³⁵

Ethical Considerations Related to Documentation of Immunity Status

For the implementation of exceptions based on immunity status or ‘immunity passports’, there are a number of scientific, ethical and feasibility considerations. Firstly, COVID-19 vaccines are not 100% effective.³⁶ Currently, the extent of protection from either infection or vaccination is not well-understood, with either reliable indicators of protection in terms of antibody titres, other relevant immune correlates, or robust epidemiological data on the extent of protection from infection or vaccination.³⁷ Secondly, the duration of immunity from infection or vaccination at this time is unknown.³⁸ Thirdly, the level of protection provided by infection or vaccination against emerging VOC with evidence of immune escape is unknown. However, the decreased level of vaccine efficacy against VOC has prompted vaccine manufacturers to begin developing new versions of vaccine to increase coverage against emerging variants.³⁹ While we know that most previously infected individuals are likely to be protected from re-infection for several months,⁴⁰ it is important to monitor protection against SARS-CoV-2 over time to understand whether and when those with prior infection as certificate holders, need to reassess their immunity status and, possibly, renew their certificate.³⁷ Some suggest that the uncertainty about immunity, either by infection or vaccination, makes immunity passports unfeasible.⁹

Additionally, the WHO notes that “tests that can identify individuals who are immune must be available, and they must be sufficiently accurate and reliable to ensure false-positive and false-negative test results are within acceptable levels. What counts as an acceptable level of error is an inherently ethical issue about how much risk society is willing to accept”.³⁷ Requirements for testing to demonstrate immunity would also have ethical and equity implications given unequal access to health care services for this purpose. While there is emerging information regarding vaccine protection against asymptomatic infection,^{41,42} there is still some residual uncertainty about an individual’s ability to transmit the virus to others despite being protected themselves, through vaccination or infection.³⁸ Lastly, it is not yet well-understood how protection will manifest itself in groups that were not included in clinical trials (e.g., children), and this epidemiological context needs to be taken into account.

The content below describes published commentaries and viewpoints regarding ethical considerations related to documentation of immunity:

- Brown et al. published a personal view article on the use of immunity passports in the response to the COVID-19 pandemic.³⁸ The authors suggest that vaccine-induced immunity has more advantages than disease-induced immunity as: the stimulus is uniform and is more likely to have a more predictable pattern of duration and can be made available to the whole population; however, timely access to vaccination to the population is an issue. Additionally, immunity passports would potentially allow some proportion of the population to access more freedoms and have less restrictions. Some critics of immunity passports highlight that immunity passports can increase social stigmatization and exacerbate existing inequalities, particularly among marginalized groups. Privacy issues including monitoring of people’s movements and health status’ have also been noted.
- A viewpoint article by Persad and Emanuel discusses the ethics of COVID-19 immunity-based licences.⁴³ It suggests that immunity-based licences can enhance individual liberties among those who have been infected, benefiting both individuals and society. It argues that immunity-based licences do not cause unequal treatment and are not unethical because the factors that are used to grant licences are not discriminatory based on race/religion, but instead are based on evidence. However some challenges associated with immunity-based licences include: 1) the serological tests used to determine immunity must be valid and reliable with high sensitivity and

specificity; 2) in the absence of vaccine people might be encouraged to seek infection to gain immunity; and 3) there may be the development of illegal markets, or fraud by unethical physicians or testing facilities.

- Hall and Studdert examined public views on government or private use of immunity passports to selectively lift COVID-19 restrictions.⁴⁴ They conducted an online survey of 1315 nationally representative adults from the US in June 2020. They examined the level of support or opposition to immunity privileges (based on an antibody test that shows you have had the disease), and whether views differed based on government compared with private adoption, demographics, political affiliation or views, or various COVID-19-related attitudes and experiences. Overall, views on immunity passports were divided and did not vary substantially according to age groups, socioeconomic or employment status, urbanicity, political affiliation or views, or whether the respondent had chronic disease(s). However, they did find that support for immunity passports was lower among women, Hispanics and other minorities compared to men and white individuals (but not Black individuals), respectively. Additionally, opposition was higher among individuals who believed that the privileges of immunity would harm the social fabric of society. Support was greater for using passports to allow for the return to high-risk jobs or attendance at large recreational events compared to use for returning to work generally.
- A commentary by Wilson and Flood discusses the implementation of digital passports for COVID-19 immunization in Canada including how this could work, the infrastructure needed to operationalize, and any barrier or limitations to their use.⁴⁵ The authors propose that digital immunity passports could take the form of bar code or a Quick Response (QR) code that can be stored and scanned from a smartphone device. This passport could be downloaded from a provincial or federal immunization repository and be linked to an individual's identity. Implementing immunity passports would require core requirements (E.g., having defined uses, be internationally standardized, have verifiable credentials, be secure for personal data, and meet legal and ethical standards). It would also require mechanisms to revoke passports if needed (e.g., if new variants of COVID-19 emerge and are resistant to certain vaccines). They also highlight the issue of access to vaccines; specifically, deployment of vaccine passports might have to be limited until vaccines are available population-wide. A noted barrier to using digital passports is access to technology. Bar codes and QR codes can be printed in hard copy; however, accessing codes from electronic repositories may be difficult to obtain for some populations.
- A commentary by Kofler and Baylis highlights that marginalized groups will face more scrutiny, including increased monitoring and policing that results from having immunity passports, which increases the risk of profiling and potential harms to racial, sexual, religious or other minority groups.⁴⁶ Similarly, a commentary by Liz has argued that immunity passports may give way to a new system of "immunoprivilege" where those who lack the passport may be denied employment and educational opportunities, or use of certain services.⁴⁷ This may exacerbate existing social inequalities by justifying and even enabling discrimination.

Discussion and Implications for Practice

Currently, the US and Israel are the two countries that were identified to have exceptions or changes to public health measures specific to individuals who have acquired COVID-19 immunity either through vaccination or previous infection. Both jurisdictions still required vaccinated or previously infected individuals to follow general public health measures when in public, such as wearing masks and physical distancing. Both jurisdictions have implemented adjustments to measures at the individual-level using a definition of vaccination based on having completed the vaccination series, specifically receiving two doses for two-dose series vaccines.

Scientific considerations highlight that much remains unknown about the immune protection offered from vaccination, the duration of immunity and its effect on viral transmission. Ethical considerations for the use of immunity passports include the potential to increase social stigmatization and exacerbate existing inequalities, particularly among marginalized groups. There have been reports of disparities in early uptake of COVID-19 vaccination by racialized groups in the US and the UK.⁴⁸⁻⁵⁰ Further understanding of vaccine uptake in Ontario based on socio-demographic information would be important to understand if inequities experienced in Ontario during the COVID-19 pandemic persist related to provincial vaccination coverage,⁵¹ and the subsequent implications for individual vaccination-related freedoms/relaxation of restrictions.

As of March 6, 2021, 5.1% of the Canadian population has received at least one dose of vaccine,⁵² whereas 21.4% of the US population has received at least one dose of vaccine (March 15, 2021).¹⁶ The number of vaccines administered per capita per day in the US is roughly three times higher than Canada (7-day rolling average as of March 3, 2021 in the US was 1,989,842 daily administered doses versus a 7-day rolling average of 73,577 daily administered doses as of March 10, 2021 in Canada).^{6,53,54} In Israel, as of March 8, 2021, 56.4% of the population had received their first dose of the vaccine and 43% had received both doses.²⁷ Therefore, it is not appropriate to apply guidance related to fully vaccinated individuals in the US and Israel to fully vaccinated individuals in Canada, without consideration for the potential implications of the different vaccination program contexts. Of note, the CDC is a federal agency providing guidance for individuals; however, some US states have begun removing community-based public health measures and related enforcement.^{55,56} As such, the influence of this guidance change, given some states have removed community-level measures, is unclear.

Applying the CDC guidance to non-US settings is challenging, as is applying the Israel guidance to a non-Israel setting. The rate of vaccination of the population and corresponding immunity has a crucial relationship with the population-level vaccine effectiveness, herd immunity, and requirement for public health measures to be implemented. Further, the burden of the pandemic from COVID-19 on these jurisdictions is evident in their high cumulative case counts and mortality which is different than some other contexts, influencing the current pandemic context. It is important to have a robust framework by which to assess population-level risks and benefits of immunization-based relaxation of public health measures. Critically, advice should be sought from public health ethicists to examine the implications of unequal application of liberties and residual risks, and the potential for exacerbating the inequities experienced by Ontario populations during the pandemic. With emerging VOC demonstrating some risk for vaccine escape, relaxing measures must be addressed through a cautious and informed approach.^{57,58}

Given recent changes to the interval from first dose to second dose in Canada, the population of fully vaccinated individuals, using the US CDC definition, is unlikely to increase in the near-term, leaving primarily health care workers and residents of long-term care facilities as the main groups fully

vaccinated.⁵⁹ Relaxation of individual-level case and contact management measures (E.g., requirements for quarantine) and setting-specific measures (E.g., visitor policies for long-term care) may be contemplated given the full vaccination of these populations, but it is important to consider the low community-level rates of fully vaccinated individuals that is likely to persist for several months, as well the residual risks from VOC with vaccine escape and vaccine failure for those who are vaccinated.⁶⁰

Recent data from single dose vaccination is promising.⁶¹ It is unclear, however, and currently highly unlikely that partial vaccination will be sufficient for relaxing individual measures, such as exemption from quarantine and testing following a high-risk exposure to a case. It is also unclear how operationally feasible it will be for public health units to incorporate vaccination history into individual-level contact management guidance for the public (E.g., access to vaccination history records). Meanwhile, individual-level risk decision-making for assessing risks/benefits of activities such as socializing with unvaccinated members of a household may not require the same level of evidence of vaccine effectiveness from partial vaccination, compared to population-level risk decision-making for continued use of public health measures.

A recommended starting point would be to assess how to modify individual-level (E.g., need for quarantine) or setting-specific (E.g., long-term care) public health measures related to fully vaccinated individuals in the Ontario context, taking into account any equity or ethical issues that may arise. Subsequently, vaccination status at a population-level could be assessed considering the rates of disease spread, including population vulnerability and public health system capacity. Providing individual liberties based on individual vaccination status (E.g., being able to attend a specific setting/event) would be difficult to control and may have unintended consequences for those who are unvaccinated.

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