McMaster University | HEALTH FORUM

COVID-END COVID-19 Evidence Network to support Decision-making ... in Canada

COVID-19 Living Evidence Profile #1

(Version 6: 20 April 2021)

Question

What is known about anticipated COVID-19 vaccine roll-out elements?

Background to the question

The roll-out of the COVID-19 vaccine is arguably one of the largest health-system initiatives ever conducted. As such, there are many activities that vaccine roll-out plans will need to consider, which we summarize in the framework below. We use this framework to organize key findings from evidence documents and experiences from other countries and from Canadian provinces and territories in this fourth version of our living evidence profile (LEP).

It is important to note that this living evidence profile does not include evidence about the efficacy or effectiveness of COVID-19 vaccines. Four evidence-synthesis teams (COVID-NMA, McMaster/BMJ, Copenhagen Trials Unit, and PAHO/L*VE) are already addressing the question of vaccine efficacy in their respective living evidence syntheses, and they are each planning to address or are considering also addressing vaccine effectiveness by including 'real-world' observational studies, at least in some form. As well, a team led by Alfonso Iorio (McMaster University) and Julian Little (University of Ottawa) are maintaining, with support from COVID-END, a living evidence profile about vaccine effectiveness in general and for variants of concern, which will be updated every Friday for the foreseeable future.

Box 1: Our approach

We identified new research evidence addressing the question by searching the COVID-END inventory of best evidence syntheses and the COVID-END guide to key COVID-19 evidence sources in the 12-15 April 2021 period. We updated jurisdictional experiences by searching jurisdiction-specific sources of evidence listed in the same COVID-END guide to key COVID-19 evidence sources, and by hand searching government and stakeholder websites. We selected eight countries (Australia, China, France, Germany, Israel, New Zealand, the U.K., and the U.S.) that are advanced in their thinking and/or experiences with the roll-out of the COVID-19 vaccine.

We searched for guidelines, full systematic reviews (or review-derived products such as overviews of systematic reviews), rapid reviews, protocols for systematic reviews, and titles/questions for systematic reviews or rapid reviews that have been identified as either being conducted or prioritized to be conducted. Single studies were only included if no relevant systematic reviews were identified.

We appraised the methodological quality of full systematic reviews and rapid reviews that were deemed to be highly relevant using AMSTAR. Note that quality appraisal scores for rapid reviews are often lower because of the methodological shortcuts that need to be taken to accommodate compressed timeframes. AMSTAR rates overall quality on a scale of 0 to 11, where 11/11 represents a review of the highest quality. It is important to note that the AMSTAR tool was developed to assess reviews focused on clinical interventions, so not all criteria apply to systematic reviews pertaining to delivery, financial or governance arrangements within health systems or to broader social systems. We appraised the quality of the highly relevant guidelines using three domains in AGREE II (stakeholder involvement, rigour of development, and editorial independence) and classified guidelines as high quality if they were scored as 60% or higher on each domain.

This update of the living evidence profile was prepared in the equivalent of two days of a 'full-court press' by all involved staff, and will continue to be updated once per month to provide evidence updates that can support COVID-19 vaccine roll-out.

Organizing framework

- **Securing and distributing a reliable supply of vaccines and ancillary supplies** (e.g., needles, diluents)
  - National purchasing
  - Delivery to country
  - Inventory management within country
  - Ordering within country
  - Distribution within country and to administration sites (including whether direct from centralized distributor to administering location and whether redistribution is allowed)
  - Storage and handling within country (e.g., cold-chain requirements and related supplies such as liquid nitrogen)
- **Allocating vaccines and ancillary supplies equitably**
  - Approaches to developing and adjusting allocation rules (e.g., citizen- and stakeholder-engagement processes)
  - Allocation rules (to priority populations, including those listed below, as well as to 'lower levels' in a federation and/or to providers who can reach priority populations)
    - Front-line healthcare workers
    - Residents in long-term care homes and other congregate-care settings
    - People at increased risk of severe COVID-19 (e.g., older and/or frail adults, those with chronic health conditions)
    - Essential workers (beyond front-line healthcare workers) and/or those in work environments that put them at elevated risk (e.g., food processing and transit)
    - Children (school aged)
    - Migrant workers
    - People in social environments that put them at elevated risk for COVID-19 (e.g., Black, Indigenous and other people of colour; those with low socio-economic status and/or living in crowded and poorly ventilated housing; and those living in communities with outbreaks)
    - People who have already had confirmed COVID-19
    - Mass public
    - People for whom vaccine safety and effectiveness has not yet been established (e.g., children under the age of 12 or 15, women who are pregnant or breastfeeding, immunocompromised, those with autoimmune conditions, those experiencing long episodes of COVID-19)
    - People at significant risk for severe allergic reaction
  - Dosing rules (number, timing of second dose, and potential for second dose to be a different vaccine)
  - Ensuring equity (including whether and how access through private means can be achieved by those not initially prioritized)
- **Communicating vaccine-allocation plans and the safety and effectiveness of vaccines**
  - Target of intervention
    - General public
    - High-risk groups (see above list)
    - Individuals who are hesitant about or opposed to vaccination
  - Delivery of the intervention
    - By whom (e.g., health worker, research expert, teacher, business leader, government leader, community leader, citizen champion, media)
    - Frequency (e.g., daily, weekly)

        - Duration (i.e., how much or for how long)
        - Modality of delivery (e.g., social media, text, email, telephone, radio, television, face-to-face by video, face-to-face in person)
    - Content of messaging
        - Data and evidence about safety and about effectiveness in terms of both protection against COVID-19 (including duration of protection) and protection against transmission (and other factors that may contribute to vaccine acceptance and hesitancy)
        - Information about novel vaccine platforms (e.g., mRNA), current vaccine options (e.g., number of vaccines available in a country, number of doses required of any given vaccine), prioritized populations, and behaviours after vaccination
        - Information (for health workers) about vaccine-administration protocols
        - Myths and misinformation about vaccines
        - Risk-mitigation efforts (including complementary public-health measures used at time of vaccination)
        - Anticipated timing of when all those who want a vaccine will have been vaccinated
- **Administering vaccines in ways that optimize timely uptake**
    - With what explicit effort to leverage existing health-system arrangements (e.g., vaccination systems and primary-care practices/community health centres)
    - Where
        - Community-based health settings (e.g., mobile clinics and pharmacies)
        - Other community settings (e.g., schools, workplaces, shelters, community centres, Indigenous community hubs, and unconventional spaces like drive-through lots and arenas or tents)
        - Primary-care settings (e.g., family doctor offices, nursing stations, community health centres)
        - Acute care (e.g., hospitals)
        - Long-term care homes
        - Public-health offices/centres
        - Other (e.g., private clinics, prisons)
    - With what appointment/scheduling and screening support, changes to physical spaces and patient flows through these spaces, and changes to hours of operation
    - With what post-vaccination observation period and what physical distancing, personal protective equipment, sanitation and other public-health measures
    - By whom (e.g., nurses, public-health workers, retired health workers) and with what changes to remuneration (e.g., increased vaccine-administration fee code)
    - With what partnerships to reach early populations of focus (e.g., among Black, Indigenous and people of color (BIPOC), and Indigenous leaders)
    - With what broader, complementary health interventions (e.g., flu vaccination and routine immunization, ongoing public-health measures)
    - With what second-dose provisions (e.g., from same manufacturer and from same or later supply than original dose)
    - With what second-dose reminders
    - With what reporting requirements (e.g., vaccine supply, expiration dates, temperature excursion, and uptake) and supporting immunization information systems (e.g., vaccine registries and COVID-19 apps) and broader healthcare information systems (e.g., EHRs)
    - With what safety monitoring requirements (e.g., adverse events)
    - With what injury-compensation program (for vaccine recipients) and liability immunity (for vaccine distributors, planners and administering staff)

- **Surveillance, monitoring and evaluation, and reporting**
  - Documenting vaccine-related opinions (e.g., vaccine acceptance and hesitancy)
  - Documenting vaccine status (e.g., for number of doses received and for use in cross-border travel and work-related migration)
  - Documenting adverse events and follow-up
  - Identifying sources of vaccine hesitancy
  - Monitoring supply safety (e.g., expiration dates, temperature excursion)
  - Identifying and measuring performance indicators (particularly those adjusted from standard vaccine programs)
  - Infrastructure to enable surveillance, monitoring and evaluation (e.g., patient-held records, electronic health records or reporting systems, online vaccination registries, COVID-19 apps)

What we found

We identified 97 new evidence documents since the last update of this LEP, of which we deemed 29 to be highly relevant. The newly added highly relevant evidence documents are:

- seven new guidelines that meet our minimum requirements for a guideline (includes explicit recommendations and an explicit process for developing them);
- two systematic reviews;
- 10 new rapid reviews;
- five protocols for reviews that are underway; and
- five new single studies that provides additional insight.

Note that guidelines that do not meet minimum requirements for a guideline are assessed in terms of whether they include an evidence synthesis that we then consider as a systematic or rapid review, and whether they describe jurisdictional experiences that we can then consider as a document included in our jurisdictional scan. We list documents that do not meet our requirements for a guideline, evidence synthesis or jurisdictional-experiences document in Appendix 5.

In addition, we identified two evidence documents that were published before the previous update in mid-March, with one about Israel's three programs of mass PCR testing and the other about processes for school-located vaccination clinics. This LEP also includes evidence documents from the previous version that we deemed to still be highly relevant, for a total of 122 highly relevant documents.

We outline insights from the most salient information from the newly identified highly relevant evidence documents and from the jurisdictional scans in narrative form below. This is accompanied by Table 1, which provides more details about key findings from each of the newly identified evidence documents and new insights from the jurisdictional scans. In Table 2, we provide findings from still-relevant evidence documents and jurisdictional scans from the previous version of our LEP. We also outline the type and number of all documents that were identified in Table 3.

For those who want to know more about our approach, we provide a detailed summary of our methods in Appendix 1. In addition, we provide: all highly relevant evidence documents identified from the updated searches in this LEP version in Appendix 2a; all highly relevant documents that were identified in previous versions in Appendix 2b (including their relevance to the categories in the organizing framework, key findings, and when they were conducted or published); medium- and low-relevance documents identified from the updated searches in this LEP version in Appendix 2c; and detailed summaries of COVID-19 vaccine roll-out plans from other countries in Appendix 3

and from Canadian provinces and territories in Appendix 4. Documents excluded at the final stages of reviewing are provided in Appendix 5.

Key findings from highly relevant evidence documents

The highly relevant evidence documents included in this LEP address one or more of the following four key areas of current focus in the vaccine roll-out (which often cut across multiple domains of the organizing framework):

- adjusting plans for allocating vaccines equitably (e.g., focusing on 'hot spots', marginalized communities, and medical risk);
- engaging community and primary-care settings to administer vaccines in ways that optimize timely and equitable uptake (e.g., mobile clinics for hard-to-reach people);
- adjusting public-health guidance for people who are fully vaccinated; and
- monitoring the COVID-19 vaccine roll-out (including documentation of vaccination, adverse events, and hesitancy/intention).

First, we found five highly relevant guidelines (of which two are high quality), five rapid reviews (low and medium quality), and four single studies (including two modelling studies) with insights about adjusting plans for allocating vaccines equitably. Of the identified evidence documents, all four of the guidelines, three low-quality rapid reviews, and one single study provide recommendations on COVID-19 vaccine provision for different population groups with increased risk of severe illness from SARS-CoV-2 including:

- pregnant or lactating people (two low-quality guidelines from the American College of Obstetrics and Gynecology, and the Japan Society of Obstetrics and Gynecology);
- people with neurodegenerative diseases (rapid review);
- people with autoimmune and/or autoinflammatory rheumatic diseases (two high-quality guidelines from the American College of Rheumatology, and published in Clinical Rheumatology, a low-quality guideline from the Korean College of Rheumatology, and one low-quality rapid review describing COVID-19 vaccination for this population group during certain timepoints of the pandemic);
- immunosuppressed cancer patients (rapid review); and
- people with certain chronic conditions and/or risk factors such as obesity, diabetes and hypertension (single study – pre-print).

Specifically related to ensuring equitable access to vaccines, we found:

- one medium-quality review that examined the differences between the U.S. state and federal vaccine allocation plans, which found general agreement when prioritizing front-line workers and long-term care facilities, but differed on how essential workers, older adults, and underlying medical conditions were defined and prioritized;
- a low-quality review that identified additional key considerations when designating priority groups (aged 18 – 64 years living or working in crowded conditions);
- a single study that reported that U.S. states with a highly equitable distribution of vaccines had prioritized people in racial/minority groups during the early vaccination phases, actively monitored and addressed barriers to vaccinating marginalized communities, offered free transportation, and collaborated with community partners;
- a mathematical modelling study using Ontario-based parameters that examined four different prioritization strategies for COVID-19 vaccines (i.e., oldest-first, uniform, contact-based, and youngest-first) and its effects on mortality; and

- for dosing rules, a mathematical modelling study indicating that for vaccines that offer high protection from a single dose, vaccination strategies should prioritize administering a first dose to more people than other strategies (e.g., allocating a percentage of vaccines for first dose and the remainder for second doses).

Second, we found a high-quality guideline, two low-quality rapid reviews and one single study that describe considerations and/or resources to engage community and primary-care settings to administer vaccines in ways that optimize timely and equitable uptake. The high-quality guideline from the WHO provides guidance on administering the Janssen vaccine, and a low-quality rapid review provides contextual considerations when integrating COVID-19 vaccination into services delivered by primary healthcare networks. The single study describ key enablers to Israel's vaccination campaign found that trust among population groups was built through the public's familiarity of its integrated health system (which includes primary care and community clinics). Additionally, the other low-quality rapid review described vaccine deployment strategies and plans in the United Kingdom and briefly mentioned the involvement of other types of settings (e.g., community-based settings such as mobile units and community pharmacists) to administer vaccines in ways that optimize timely and equitable uptake. We further describe this emerging area of focus in the findings from the jurisdictional scans below.

Third, with respect to adjusting public-health guidance for people who are fully vaccinated, a low-quality rapid review reported that the risk of COVID-19 infection in a residence decreases by 30% after having a household member vaccinated (with peak antibody titres occurring three to four weeks after vaccination).

Lastly, evidence and guidance continue to emerge for monitoring the COVID-19 vaccine roll-out, including documentation of vaccination, adverse events, and hesitancy/intention.
A medium-quality scoping review identified eight COVID-19 vaccine certificate technologies that are currently in beta-testing and described how technology leaders are calling for standardization. A medium-quality review and a low-quality guideline produced by the Canadian Society of Allergy and Clinical Immunology (CSACI) described adverse events and any that require follow-up. The review reported on safety data from 11 clinical trials of COVID-19 vaccines and reported that most individuals had mild to moderate adverse events, but recommended long-term observations, especially among marginalized and at-risk populations. Related to individuals with suspected allergies to the components of COVID-19 vaccine, the CSACI recommend assessing these individuals prior to vaccination, but assessments are not required for people with other types of allergies (e.g., food, drugs, insects, environmental allergens). We also found many single studies about vaccine hesitancy among a wide range of marginalized population groups, but we classified these documents as being of medium relevance given that there are systematic reviews underway that aim to provide a comprehensive synthesis on the topic (these studies are listed in Appendix 2c).

Key findings from the jurisdictional scan

We identified several new insights across each of the five domains of the organizing framework based on the experiences with the roll-out of the COVID-19 vaccine in eight countries (Australia, China, France, Germany, Israel, New Zealand, the U.K., and the U.S.), as well as all provinces and territories in Canada. We summarize these insights according to each domain of the framework below.

In terms of securing and distributing a reliable supply of vaccines and ancillary supplies, we found that:

- in addition to developing and manufacturing vaccines for their own population, China continues to distribute their vaccines in over 60 countries that have approved their vaccines, and may see their Sinopharm and CoronaVac (Sinovac) vaccines being distributed in more countries should they be approved for emergency use by the World Health Organization in the coming weeks;
- both the U.K. and Canada have entered into new vaccine-procurement agreements, with the U.K. signing a procurement contract for 30 million Johnson & Johnson vaccines and 60 million Novavax vaccines, and Canada negotiating an agreement with the U.S. to purchase 1.5 million doses of the Oxford-AstraZeneca vaccine;
- Health Canada changed its temperature requirement for the Pfizer-BioNTech vaccine, which enables easier handling and distribution, and the U.S. made revisions to its Moderna authorization, which enables the use of more vaccine doses in each vial;
- the Canadian government expects to receive four million additional vaccine doses from Pfizer in May, two million more in June and an additional two million in July, but the number of doses from Moderna in April was cut from 1.2 million to 650,000;
- officials have not been able to confirm Johnson & Johnson and Oxford-AstraZeneca vaccines from the COVAX facility will arrive in Canada during the month of April; and
- on 16 March 2021, the Canadian government announced that it is investing millions of dollars in domestic biomanufacturing companies to boost future vaccine and medicine development capacity.

In terms of adjusting plans for allocating vaccines and ancillary supplies equitably, we found that:

- all countries identified where the Oxford-AstraZeneca vaccine is approved for use (Australia, France, Germany, the U.K., Canada) have limited the administration of the vaccine to older adults after rare reports of thrombosis with thrombocytopenia syndrome (blood clots) in individuals under 55 years who had received the vaccine in Europe;
- in Australia, residents who have already been vaccinated with the first dose of the Oxford-AstraZeneca vaccine, without any prior side effects, will still be able to receive their second dose, and under specific situations, residents under the age of 50 years old can consent to receive the Oxford-AstraZeneca vaccine;
- in Germany, residents under the age of 60 years, who previously received their initial dose of the vaccine, will be able to choose whether to delay their second dose;
- on 13 April 2021, the CDC and FDA in the U.S. made a joint statement to pause the use of the Johnson & Johnson COVID-19 vaccine to review six cases of blood clots in individuals who had received the vaccine;
- while most countries are continuing to progress through their vaccine roll-outs according to plan, several Canadian provinces have adjusted their age-based roll-outs to prioritize people living in regions with high rates of COVID-19 transmission;
- in Saskatchewan, eligibility is expanding in the Regina region, and in the coming weeks, first responders and grocery-store workers will be targeted by mobile vaccination units and pharmacies;
- on 6 April 2021, Ontario announced that it would be increasing vaccine allocations to all adults 18 years and older in hot-spot communities identified by postal codes in 13 public-health units in the province;

- Montreal residents under 60 years of age with very high-risk health conditions and essential workers in Montreal in environments deemed to be at high risk of outbreak were prioritized for vaccination as of 13 April 2021;
- all adults 18 years and older in Yukon and Northwest Territories are now eligible to receive vaccination;
- New Zealand will allow early vaccinations for people who need to leave New Zealand before 31 August 2021 on compassionate grounds or for reasons of national significance, and will also require that border workers must be vaccinated by the end of April or risk being moved out of their role;
- with the summer Olympics approaching, China is willing to provide vaccines to Olympians and New Zealand will be allowing its Olympic athletes to be vaccinated early once they meet certain criteria;
- in terms of vaccine-dose intervals, China made recommendations for dose intervals of a few of its vaccines, Canada's National Advisory Committee on Immunization (NACI) reconfirmed its four-month dose interval recommendation, however, Ontario exempted certain individuals with health conditions from the extended second-dose interval of four months; and
- Israel has vaccinated more than 60% of its population with at least one dose, France and Germany have vaccinated approximately 17% and 16% of their populations, respectively, with one dose, and as of 15 April 2021, about 22% of the Canadian population has been vaccinated with at least one dose of COVID-19 vaccine.

In terms of engaging community and primary care to administer vaccines in ways that optimize timely and equitable uptake, we found that:

- to get vaccines to hard-to-reach populations, China has deployed mobile-vaccination vehicles offering a one-stop service for registration and vaccination, and vaccinations are being offered now in pharmacies and medical practices in France, Australia, Germany, Israel, and Canadian provinces, but pharmacies must be contacted directly in most Canadian provinces to book an appointment;
- to increase vaccinators, France is recruiting firefighters, Germany and Israel are recruiting its military, and New Zealand is allowing non-regulated professionals to be trained to administer vaccines;
- British Columbia, Saskatchewan, Manitoba and Ontario have opened drive-thru mass-vaccination sites and appointments can be booked on provincial websites;
- Ontario and Quebec are exploring programs for employer-operated vaccination clinics to complement public-sector vaccination efforts and to serve their employees, families and local communities;
- primary-care providers in six public-health units in Ontario have begun contacting eligible patients to book vaccination appointments;
- the first African community-targeted vaccination clinic was opened at the Emmanuel Baptist Church in Nova Scotia;
- Saskatchewan has made an agreement with the Pharmacy Association of Saskatchewan for pharmacists to follow the influenza immunization model to administer COVID-19 vaccines; and
- The People's Insurance Company of China (PICC) Life Insurance launched a medical-accident insurance for COVID-19 and other vaccines, which covers compensation for abnormal reactions.

In terms of adjusting public-health guidance for people who are fully vaccinated, we found that:

- China officially launched the international travel health certificate on 8 March 2021 and has eased visa-application procedures for people inoculated with Chinese COVID-19 vaccines;
- Israeli residents with a 'green pass' certificate" can now volunteer in hospital wards;
- the CDC updated its guidelines for fully vaccinated people in the U.S., which allows them to resume travel domestically and to not be required to get tested or quarantine before or after travel, and for those travelling internationally to not have to be tested prior to leaving the U.S. (unless required by the destination) and to not quarantine upon return to the U.S.;
- the Public Health Ethics Committee in Quebec has published a bulletin on the topic of immunity passports, concluding that immunity passports are justifiable and can play a complementary and temporary role in deconfinement efforts (the committee estimates that the benefits from immunity passports slightly outweigh the disadvantages, but will not issue any formal recommendation until August 2021); and
- vaccinated individuals are still required to follow all public-health measures in Canadian provinces and territories.

In terms of communicating vaccine allocation plans and the safety and effectiveness of vaccines, we found that:

- vaccine-information campaigns were launched in Australia, China and the U.S. to combat vaccine misinformation, and in France, Israel and New Zealand, initiatives were created to engage with vaccine-hesitant communities and incentivize vaccine uptake;
- online tools, such as 'vaccine trackers,' are being used in Canada and New Zealand to help residents find the best vaccination options and determine their eligibility; and
- Ontario has published vaccine-administration guidelines and information packets on all authorized vaccines for healthcare providers.

Lastly, in terms of monitoring COVID-19 roll-outs, we found that:

- China has established a national electronic vaccine-traceability platform, where all localities can report required information so that vaccines can be traced throughout the whole process;
- China's National Health Commission (NHC) and CDC developed guidelines on adverse events following immunization (AEFI) monitoring and management, and vaccination registration and reporting;
- in Australia, the reporting of adverse effects after COVID-19 vaccine administration can be directed to healthcare providers, state health departments, the Therapeutic Goods Administration (TGA), and the NPS MedicineWise Adverse Medicine Events (AME) Line;
- Quebec has released guidance regarding the surveillance, management and reporting of vaccine-induced conditions in vaccinated patients, and the Ministry of Health and Social Services established a directive to introduce quality-assessment audits of vaccine management and handling at administration sites; and
- Yukoners can download the CanImmunize app to keep track of their COVID-19 vaccine and other vaccines.

Table 1: Highlights from new highly relevant evidence documents and experiences

COVID-19 vaccine roll-out activities	New evidence	New experiences
General/cross-cutting insights	• A low-quality rapid review summarizes available information on vaccines (and storage and administration requirements), priority groups, surveillance and adverse events, and key training recommendations when administering vaccines in the United Kingdom	• Concerns of the Oxford-AstraZeneca vaccine, which has been authorized for use in most of the countries reviewed, causing thrombosis with thrombocytopenia syndrome (blood clots) in adults under 55 years has led to changes in vaccine allocations and distribution in all countries and provinces where the vaccine is approved for use • Chinese vaccines have been approved in over 60 countries and may be distributed in many more should the Sinopharm and CoronaVac (Sinovac) vaccines be approved in the coming weeks for emergency use by the World Health Organization, which partners with the COVAX facility • While most countries are continuing to progress through their vaccine roll-outs according to plan, several Canadian provinces have adjusted their age-based roll-outs to prioritize people living in regions with high rates of COVID-19 transmission • The European Centre for Disease Prevention and Control recently updated its overview of national COVID-19 vaccination campaign challenges in the European Union with notable updates to vaccine uptake, priority groups, vaccination strategies and policies, changes to vaccine products (e.g., resumed use of Oxford-AstraZeneca vaccine) monitoring, and the use of vaccination certificates

Securing and distributing a reliable supply of vaccines and ancillary supplies (e.g., needles, diluents)	*National purchasing*
	• No highly relevant evidence documents identified
		National purchasing
		• New procurement agreements for COVID-19 vaccines were finalized in both the U.K. and the Canada recently
		  ○ The U.K. signed a domestic manufacturing deal with GlaxoSmithKline for 60 million doses of Novavax COVID-19 vaccine
		  ○ The U.K. government has also ordered 30 million doses of the Johnson & Johnson vaccine, despite Johnson & Johnson halting deployment of its vaccine across Europe and the U.K. not yet approving the vaccine

		○ Canada negotiated a procurement agreement with the U.S. to purchase 1.5 million doses of unused Oxford-AstraZeneca vaccine on loan with the understanding that they will pay the U.S. back with doses in the future ○ Health Canada had to approve the sites where the vaccines were made in the U.S. in order for the doses to be received in Canada *Delivery to country* • China continues to provide vaccine aid to 80 countries worldwide by delivering vaccines and supplies during the month of March ○ Three factors are considered in formulating an aid plan: the benefits of equitable and timely access to vaccines for developing countries, the severity of the epidemic and the specific vaccine aid needs of the countries concerned, and the capacity of the Chinese government to provide vaccines • Germany is expected to receive 70 million vaccine doses in the second quarter of 2021 • On 29 March 2021, Moderna provided a vaccine-supply update for the U.S., stating that it met its goal to deliver 100 million doses by March 2021 ○ Moderna is on track to deliver an additional 100 million doses of its vaccine by the end of May and the third instalment of 100 million doses by the end of July • Canada expects to receive more than one million doses of COVID-19 vaccines each week in April and May of 2021 and approximately 44 million doses of vaccines by the end of June 2021 ○ Canada expects to receive two million more doses of Oxford-AstraZeneca vaccines from the Serum Institute of India and a total of 1.9 million doses of the vaccine from the COVAX facility ○ On 9 April 2021, Canada's Minister of Public Services and Procurement confirmed that Johnson & Johnson vaccines are on schedule to be delivered at the end of April but could not confirm how many doses will be arriving

		• Canada has and will continue to experience delays in expected shipments of Moderna vaccine during the month of April, which has led to cancelled vaccination appointments in some provinces *Ordering within country* • As of 21 March 2021, China's annual vaccine production can fully meet the whole country's needs, as judged by the existing production arrangements • The manufacturing of the Pfizer-BioNTech COVID-19 vaccine at a production facility in Marburg, Germany was approved on 26 March 2021 by the European Medicines Agency • On 16 March 2021, the Canadian government announced that it is investing millions of dollars in domestic biomanufacturing companies to boost future vaccine and medicine development capacity *Distribution within country and to administration sites* • The Civil Aviation Administration of China (CAAC) updated the guidebook for COVID-19 vaccine transport in February 2021 and established a special team to support and coordinate vaccine transportation • Vaccines are transported from the U.S. to Israel (and monitored under electronic surveillance to ensure proper shipping storage) and then transferred to the logistics department of a pharmaceutical company "Teva", which distributes them to the Health Plans • On 1 April 2021, the FDA in the U.S. made two revisions to Moderna COVID-19 Vaccine Emergency Use Authorization to help increase the number of vaccine doses available that: 1) clarified the number of doses per in the vials currently available (10-11 doses); and 2) authorized the availability of an additional multi-dose vial in which each vial contains 13-15 doses • In a recent interview, an executive director in Alberta Health Services' (AHS) central zone described how COVID-19 vaccines are moved in the province from the airport to vaccination clinics:

		○ All of Alberta's vaccine supply is flown into Calgary International Airport and AHS staff check the shipments to make sure that the cold-chain temperature did not get disrupted during transport ○ Contracted courier companies transport the vaccines from the airport to 36 vaccine storage sites set up around the province that are capable of administering vaccines ○ In the case where vaccines need to be transported from storage sites to other sites, like pharmacies, the vaccines are thawed and transported within a limited six-hour window ○ Thawed Pfizer-BioNTech vaccine can be stored in refrigerators at administration sites for up to five days and thawed Moderna vaccine for up to 30 days ○ Additional complications that must be managed include that both the Pfizer-BioNTech and the Moderna vaccines must be used within six hours of the vaccine vials being punctured, and the Pfizer-BioNTech vaccine must be diluted with sodium chloride prior to administration ● Vaccine distribution in Nova Scotia is based on census data and population estimates *Storage and handling within country* ● To facilitate easier handling and distribution of the Pfizer-BioNTech vaccine, Health Canada authorized on 3 March 2021 that the vaccine can be stored and shipped at "standard freezer temperatures" of -25C and -15C for up to 14 days ○ Although Health Canada approved eased temperature requirements for the Pfizer-BioNTech vaccine, Alberta continues to follow the original guidelines for transport and storage of the vaccine
Allocating vaccines and ancillary supplies equitably	*Allocation rules* ● A medium-quality rapid review assessed how U.S. state and federal vaccine-allocation plans differed and found general agreement related to prioritizing front-line workers and long-term care facilities, and distinguishing between medical and non-medical first responders, but differed on how essential workers, older adults, and underlying medical conditions were defined and prioritized (with fewer states including	*Allocation rules* ● Allocation rules around the administration of the Oxford-AstraZeneca vaccine have changed in several countries as a result of recent evidence of thrombosis with thrombocytopenia syndrome (blood clots) caused by the vaccine in adults under 55 years ○ In Australia, the Australian Technical Advisory Group on Immunisation recommended on 8 April 2021 that adults

	people living or working in congregate settings and developmental disabilities in priority groups) • A low-quality rapid review identified key considerations when designating certain populations as a potential vaccination group (e.g., accurate identification, vaccine roll-out logistics and operationalization, impact of variant transmission, transmission from certain groups and impact of the wider community) • A low-quality rapid review summarized existing evidence on the effects of SARS-CoV-2 and current vaccines for people with neurodegenerative diseases, and found sufficient immunogenicity across the different vaccines, but requires further consultation with their provider and additional clinical research • A low-quality rapid review, two high-quality guidelines (one from the American College of Rheumatology and the other published in Clinical Rheumatology*)* and a low-quality guideline from the Korean College of Rheumatology described available vaccination guidance for people with autoimmune/autoinflammatory rheumatic diseases and recommended that this group should receive a COVID-19 vaccine, however the review described only when the disease is under control and there are no risks of concurrent infections • A low-quality rapid review summarized available vaccination guidance for immunosuppressed cancer patients and found that inactivated, nucleic acid, protein subunit, and virus-like protein vaccines are safe, but may have reduced protection • Two low-quality guidelines published by the American College of Obstetrics and Gynecology and the Japan Society of Obstetrics and Gynecology updated their guidelines and recommend the COVID-19 vaccine to people considering future pregnancy, currently pregnant, or lactating given that symptomatic pregnant people with COVID-19 have increased risk of severe illness; however, consultation with the patient and provider are important	under the age of 50 be prioritized for the Pfizer-BioNTech vaccine rather than the Oxford-AstraZeneca vaccine, and that residents who have already been vaccinated with the first dose of the Oxford-AstraZeneca vaccine, without any prior side effects, will still be able to receive their second dose ○ Under specific situations, when the benefits outweigh the risks, residents in Australia under the age of 50 years can consent to receive the Oxford-AstraZeneca vaccine ○ Administration of the Oxford-AstraZeneca vaccine in France is only recommended in eligible population groups over the age of 55 years, while the Pfizer-BioNTech and Moderna vaccines can be administered to all eligible groups regardless of age ○ Administration of the Oxford-AstraZeneca vaccine in Germany is now being prioritized for residents aged 60 years and older, and residents under the age of 60 years who previously received their initial dose of the vaccine will be able to choose whether to delay their second dose ○ After a series of changing advice, Canada's National Advisory Committee on Immunization (NACI) recommended on 29 March 2021 that Canadian provinces pause the use of the Oxford-AstraZeneca vaccine on people under the age of 55 ○ Canadian provinces have adopted this recommendation, including B.C., Alberta, Manitoba, Ontario, Quebec, Prince Edward Island, and Newfoundland and Labrador • New Zealand's Prime Minister stated on 12 April 2021 that border workers must be vaccinated by the end of the month or risk being moved out of their role after an unvaccinated border worker tested positive and transmitted the virus to two other people • On 13 April 2021, the CDC and FDA made a joint statement to pause the use of the Johnson & Johnson COVID-19 vaccine to review cases of blood clots that occurred in six cases out of the more than 6.8 million doses that were administered • China is willing to cooperate with the International Olympic Committee to provide vaccines to Olympians

	• A pre-print single study found that obesity, diabetes and hypertension were associated with increased rates of severe illness and should be prioritized for vaccination *Dosing rules* • A pre-print modelling study found that vaccines offering high protection from a single dose favours vaccination strategies that prioritize providing a single dose to more people than heterogenous strategies (e.g., allocating a percentage of vaccines for first dose and the remainder for second doses) *Ensuring equity* • A single study reported through the U.S. CDC'S MMWR reported that U.S. states with high equity of vaccination had prioritized people in racial/minority groups during the early vaccination phases, actively monitored and addressed barriers to vaccination in marginalized communities, directed vaccines to these communities, offered free transportation, and collaborated with community partners • A mathematical modelling study using Ontario-based parameters concluded that interrupting transmission might reduce mortality more effectively than targeting vulnerable groups within populations with high seropositivity and later vaccination start date	• In recent weeks, several countries have made progress in their vaccine roll-outs and even added certain sub-populations to the priority groups currently being vaccinated ○ In Australia, household members of quarantine and border workers, residents living with a disability, and caregivers were added to the list of priority groups for COVID-19 vaccination ○ COVID-19 vaccinations for people aged 60 years and older in China began on 21 March 2021 COVID-19 ○ As of 12 April 2021, all residents aged 55 and older in France are eligible to receive a COVID-19 vaccine ○ After meeting its target for vaccinating phase 1 priority groups (cohort 1 to 9), the U.K. government has moved into phase 2 of their vaccine roll-out and will follow the Joint Committee on Vaccination and Immunization (JCVI)'s released advice to follow an age-based strategy, starting with older adults aged 40 to 49 years ○ Health authorities in Israel decided that when there was a decline in vaccination rates among priority groups, they would move on to the next priority group instead of waiting for everyone in the current priority group to be vaccinated in order to avoid wastage ○ Vaccination of border and MIQ workers in New Zealand is nearly complete as about 91% of these workers had begun receiving their second dose of COVID-19 vaccine by 17 March 2021 ○ The New Zealand government announced on 24 March 2021 that early vaccinations will be made available for people who need to leave New Zealand before 31 August 2021 on compassionate grounds or for reasons of national significance • Canadian provinces have also progressed in their roll-out plans and made some changes to priority groups ○ In B.C., which is now in phase 3 of its roll-out, people 45 years and older, Indigenous peoples 18 years and older, and people aged 16 to 74 who are considered clinically vulnerable can now register for vaccination

		▪ Health officials in B.C. reported that all eligible adults should receive at least their first vaccine by the end of June 2021 ○ Phase 2 vaccinations began in Alberta on 15 March 2021 and currently anyone aged 65 to 74, First Nations and Métis people aged 50 and older, staff of licensed supportive-living facilities not included in Phase 1, anyone aged 16 to 64 with high-risk underlying conditions, residents and staff in congregate-living settings, healthcare workers who have a high potential for spread, and caregivers who are most at risk of severe outcomes are eligible for vaccination ○ Saskatchewan also began phase 2 of its vaccine roll-out on 18 March 2021 and individuals 52 years and older province-wide, pregnant women, young adults ages 16 and 17 who are clinically extremely vulnerable, and individuals over the age of 40 in the far north are currently eligible to book a vaccination ○ In response to increasing COVID-19 transmission risk in the Regina region of Saskatchewan, eligibility for vaccination was expanded on 13 April 2021 at the Regina drive-thru vaccination clinic to residents ages 49 to 54 only, Regina police officers were prioritized for vaccination, and the Saskatchewan government announced that in the coming weeks first responders will be targeted by mobile vaccination units, and pharmacies will be offering vaccines to all pharmacy and grocery store staff working in the facilities where vaccines are offered ○ In Manitoba, all adults aged 60 and older, First Nations people aged 40 and older, and a range of individuals aged 18 and older working in high-risk health and social-care settings are currently eligible to book a vaccination at supersites and pop-up clinics ▪ Manitoba is modelling vaccine roll-out and distribution projections under high-supply and low-supply scenarios ○ Ontario is currently in phase 2 of its vaccine roll-out and intends for primary priority groups in the phase to be vaccinated first during the months of April and May and secondary priority groups to be vaccinated starting in June

		▪ Primary priority groups include older adults aged 75 to 79 in decreasing 5-year age increments, individuals with high-risk health conditions, residents, caregivers and staff in high-risk congregate settings, and adults aged 50 and older in hot-spot communities (defined as those with historic and ongoing high rates of virus transmission, severe illness, and death) ▪ Secondary priority groups include remaining individuals with at-risk health conditions and essential workers who cannot work from home ○ On 6 April 2021, Ontario announced it would be increasing vaccine allocations to hot-spot communities identified by postal codes in 13 public-health units in the province that have had elevated rates of virus transmission, hospitalizations and deaths ▪ Individuals 18 to 49 years of age living in the identified postal codes will be eligible, and upcoming mobile and pop-up clinics will be promoted by public-health units and community partners ▪ Low-barrier methods to verify age and residence in a hot-spot community are to be used, and public-health units are to ensure that vaccination clinics in hot-spot communities are readily accessible ▪ Public-health units are to leverage community-based organizations and local healthcare organizations to reach residents, build vaccine confidence and address misinformation, and identify unique needs and barriers to accessing vaccination ○ In Quebec, as of 13 April 2021, individuals aged 60 and older in all regions, health and social workers with direct patient contact who are part of priority group two, residents in Montreal under 60 years of age with very high-risk health conditions, essential workers in Montreal working in environments deemed to be at high risk of outbreak, and people aged 55 to 79 who attend pharmacy-based walk-in vaccination clinics are currently eligible to be vaccinated ○ Priority for vaccinations in New Brunswick is currently being given to individuals 70 years of age and older, all First

		Nations 16 years of age and older, individuals who travel across the border, rotational workers, healthcare workers, health-system staff and individuals with complex medical conditions ▪ Priority will be given next to individuals 40 years of age and older with three or more select chronic conditions, and individuals 60 to 69 years of age ▪ New Brunswick anticipates that individuals between the ages of 16 and 59 will be eligible for vaccination in June o In Yukon, all adults 18 years and older are eligible to receive vaccination, including individuals who are no longer infectious if they had a previous COVID-19 infection, individuals who are currently breastfeeding, pregnant or planning to be pregnant, and anyone with immune-system problems or autoimmune conditions ▪ Individuals in Yukon are advised not to receive the vaccine if they are 17 years of age or younger, have symptoms of a COVID-19 infection, are allergic to polyethylene glycol or had an allergic reaction without a known cause, had a serious allergic reaction with the previous dose of the COVID-19 vaccine, or have received another non-COVID-19 vaccine in the past 14 days o In Northwest Territories vaccination clinics in all communities are now providing a second immunization for individuals who have received their first dose, and first doses for any resident older than 18 years of age *Dosing rules* • A Chinese guideline published on 29 March 2021 recommended to use the same vaccine product to complete immunization • China's recommendations on doses and vaccination intervals are as follows: o An interval of three to eight weeks for inactivated vaccines with two doses o For recombinant protein subunit vaccines with three doses, an interval of no less than four weeks between two shots, with the second dose being administered within eight weeks

		after the first shot and the third dose being administered within six months after the first shot ○ People who have not completed the vaccination within the schedule should resume the vaccination as soon as possible without needing to start over again, and a booster shot is not recommended • In response to the widespread transmission of the COVID-19 outbreak, the Joint Committee on Vaccination and Immunisation in England recommended that the time interval between the first and second dose of the Pfizer-BioNTech and Oxford-AstraZeneca vaccines be extended to up to 12 weeks • After concerns about certain populations not being fully vaccinated were highlighted in the media, the Advisory Committee of Canada's National Advisory Committee on Immunization (NACI) reconfirmed their recommendation to extend the dose interval between two-dose vaccines to four months in their updated guidance on 7 April 2021 • Ontario's Vaccine Clinical Advisory Group recommended on 26 March 2021 that the following populations be exempted from the extended second dose interval of four months: ○ Transplant recipients ○ Individuals with malignant hematologic disorders ○ Non-hematologic malignant solid tumours receiving active treatment (excluding individuals receiving solely hormonal therapy or radiation therapy) • Yukoners are encouraged to get their second vaccine 28 to 35 days after receiving their first dose and residents in Northwest Territories who have received their first dose are asked to wait at least four weeks before getting their second dose • Millions of doses of COVID-19 vaccines have been administered in countries ○ As of 11 April 2021, over 167.34 million doses of COVID-19 vaccines have been administered across China ○ As of 13 April 2021, New Zealand has administered 135,585 doses of the Pfizer-BioNTech vaccine, Australia has administered 1,234,681 COVID-19 vaccine doses, France has administered 15,317,970 vaccine doses, Germany has administered over 18.6 million vaccine doses, the U.K. has

		administered more than 32 million first doses, and the U.S. has administered more than 192 million of the 245 million doses of the COVID-19 vaccines distributed ○ 61.5% of the population in Israel received at least one dose of COVID-19 vaccine as of 12 April 2021 and 57% of the population have been fully vaccinated ○ As of 13 April 2021, 16.9% of the total population in France and 16.3% of the German population have received their first dose of vaccine, and 5.9% of the French population and 6.2% of the German population have been fully vaccinated ○ Health Canada has confirmed distribution of 11,399,542 COVID-19 vaccines to the provinces and territories as of 12 April 2021 and 78.7% of the doses have been administered (7,703,437 first doses and 819,131 second doses) • Vaccination centres located in the federal states in Germany are scheduled to receive an estimated 2.25 million doses each week throughout April 2021 • In early April, Canada received the 1.5 million doses of the Oxford-AstraZeneca vaccine it procured on loan from the U.S. as well as a shipment of approximately 317,000 doses of Oxford-AstraZeneca vaccines procured from the COVAX facility • Vaccine doses administered in Canadian provinces range from 2,005,106 doses in Quebec to 1,025,019 doses in British Columbia to 290,921 doses in Saskatchewan and 23,569 vaccine doses in Nunavut • As of 15 April 2021, about 22% of the Canadian population has been vaccinated with at least one dose of COVID-19 vaccine *Ensuring equity* • Vaccinations in China have been extended to foreign nationals in the city of Beijing, and on 16 March 2021, China's embassy in Egypt launched a COVID-19 vaccination drive for over 5,000 Chinese citizens • New Zealand is making a concerted effort to promote vaccinations within Māori communities

		• Indigenous communities are being prioritized within the current phases of vaccine roll-outs in B.C., Alberta, Manitoba, and New Brunswick
Communicating vaccine-allocation plans and the safety and effectiveness of vaccines	*Target of intervention* • One single study found public trust through an integrated and familiar health system is one key factor for the successes of Israel's vaccination campaign *Content of messaging* • A high-quality guideline from the WHO on the use of Janssen (Johnson & Johnson) COVID-19-vaccine recommended it for individuals aged 18 years and older with caveats for specific population groups • One single study found that transparency regarding vaccine-safety information and culturally appropriate messages in digital and offline media could contribute to the successes of Israel's vaccination campaign	*Target and delivery of intervention* • A vaccine campaign was launched in France via text and call on 31 March 2021 to reach out to residents older than 75 years of age who have yet to be vaccinated • The Government of Australia launched a new website feature, "Is it true?", in an attempt to combat misinformation and reduce vaccine hesitancy among residents • On 2 April 2021, China's NHC and CDC developed a series of COVID-19 vaccination training materials for vaccination providers and staff, including a guideline on the use of COVID-19 vaccines, adverse events following immunization (AEFI) management guideline, vaccination-administration guideline, and registration and reporting guideline • To increase accessibility and persuade individuals who are hesitant or undecided about vaccination in Israel, mobile vaccination units have experts who travel with the units to answer questions, and also use free food or drink • The Associate Minister of Health (Māori Health) in New Zealand indicated that several initiatives had begun to promote vaccinations within Māori communities, including a roadshow, networking by Iwi leaders and communications networks, and the expansion of the engagement strategy to a number of social media platforms • An online tool was launched to help New Zealand residents determine which vaccination group they are in and when they can expect to get a COVID-19 vaccine • On 17 March 2021, the COVID-19 Response Minister of New Zealand released a graph illustrating the country's vaccine roll-out plan, and later on in the month, the minister and his associate minister both received the first dose of Pfizer vaccine and publicly discussed their experience afterwards to demonstrate confidence in the vaccine • The Canadian government has a dedicated telephone line for providing COVID-19 information and also maintains a database

		of COVID-19 announcements (inclusive of updates on vaccine efficacy and procurement) on its website that can be filtered by announcement type (e.g., news releases), minister, and government institution • The province of Manitoba has established a 'vaccine shot finder' webpage with a map to aid individuals in finding pharmacies and medical clinics participating in the vaccination campaign ○ The map distinguishes between sites that are and are not currently taking appointments • Ontario has published vaccine administration guidelines and information packets for healthcare providers regarding the Pfizer-BioNTech, Moderna, and Oxford-AstraZeneca vaccines • On 12 April 2021, a video explaining how the COVID-19 vaccines are being distributed was posted on the government of Nova Scotia Twitter account • An updated chart outlining a timeline for when priority groups are eligible to receive their COVID-19 vaccine has been posted on the Government of Newfoundland and Labrador website • An information package is additionally available on the Government of Nunavut website describing what residents can expect when visiting vaccine clinics *Content of the messaging* • New Zealand's COVID-19 Response Minister said on 17 March 2021 that the government introduced paid advertising with messaging about vaccines during the weekend and that the advertising campaign will ramp up throughout the year • On 22 March 2021, HKSAR chief executive urged Hong Kong residents to actively receive COVID-19 vaccine and to refer to the official vaccine information and professional opinions of health experts, instead of rumours and disinformation • China's NHC also encouraged more people to get vaccinated against COVID-19 on a voluntary, informed basis instead of a compulsory one • Media campaigns in Israel (including messages about social responsibility and use of celebrities) have launched to promote the "green pass"

		• On 22 March 2021, the New Zealand government released an online tool to help New Zealand residents determine which vaccination group they are in and when they can expect to get a COVID-19 vaccine
		  ○ The government is in the process of having the tool translated into 24 languages
		• The New Zealand Ministry of Health launched a dashboard on its website detailing key vaccination statistics, including the number of people vaccinated with first and second doses, the number of adverse reactions following vaccinations, and the forecasted and actual number of vaccinations administered each week
		• The U.S. FDA's Center for Biologics Evaluation and Research (CBER) and Office of Minority Health and Health Equity (OMHHE) collaborated to address vaccine confidence concerns in racial and ethnic minority communities through several initiatives:
		  ○ Holding listening sessions with diverse health professional organizations and other stakeholders
		  ○ Building awareness about clinical trial diversity
		  ○ Providing weekly COVID-19 communications to stakeholders
		  ○ Supporting development and translation of information for the COVID-19 Multilingual Resources webpage that features materials in more than 20 languages
		  ○ Launching a COVID-19 Bilingual (English/Spanish) Social Media Toolkit to promote consistent messaging
		  ○ Releasing English and Spanish videos about the importance of getting vaccinated
		  ○ Hosting a webinar about the vaccine-approval process and key information for minority communities to be aware of
		• The government of Canada's website has a designated COVID-19 webpage with links to sources and information on vaccines that have been authorized, the vaccines that have been purchased in advance, and how to get vaccinated or register
		• British Columbia's Centre for Disease Control and the Government of British Colombia have created designated public webpages that contain vaccine and eligibility FAQs, information

		sheets, a COVID-19 Digital Assistant Chat Box, and links to the online vaccine registration and booking system
		• The Saskatchewan Health Authority launched a website with information on COVID-19 vaccine drive-thru and walk-in sites as well as their wait times
		• Manitoba launched the #ProtectMB campaign to encourage vaccine uptake
		  ○ The campaign includes a dedicated website, an e-mail newsletter, and data-driven targeted advertising
		  ○ The program is based on research about the province's vaccine-intent profile that has identified groups that are keen to get vaccinated, those who are likely to get vaccinated but are not in a rush, and those who are ambivalent/concerned about vaccination
		  ○ To continually refine the campaign's strategy, the province is using EngageMB (the provincial public-engagement platform), monitoring trends in vaccine uptake, and continuing to conduct research
		  ○ A coordinating table has been established that includes Data Science, Public Health, Communications and Engagement, and Vaccine Task Force officials to guide the campaign and determine its informational needs
		• The Government of Yukon's website provides an after care information package that discusses steps to take after receiving the vaccine, what side effects to expect after the immunization, when to return for the second dose, and things to remember when signing up for immunization
		Both the Government of Yukon and the Government of Nunavut provide information packages about the Moderna vaccine that discusses COVID-19, the vaccine and its side effects, and who is eligible to receive the vaccine

Administering vaccines in ways that optimize timely uptake	*With what explicit effort to leverage existing health-system arrangements* • A low-quality rapid review describes some requirements for the integration of COVID-19 vaccination into the services delivered by the national primary-healthcare network in Lebanon, which include necessary physical environment and infrastructure, supplies, cold chain management, workforce requirements, training, policies and procedures, technology	*With what explicit effort to leverage existing health-system arrangements* • Saskatchewan has made an agreement with the Pharmacy Association of Saskatchewan for pharmacists to follow the influenza immunization model to administer COVID-19 vaccines ○ This agreement establishes the fee for pharmacist delivery of COVID-19 vaccines along with increases in dispensing fees

	and record-keeping, waste disposal, financing, public information and communication, and community engagement *Where* • The same rapid review also describes how to integrate COVID-19 vaccination into the primary-healthcare network in Lebanon • A low-quality rapid review found that mandatory vaccinations (through law or conditional by employment) for specific populations such as healthcare workers could increase vaccination uptake but may reduce trust, and where infeasible, to use education and promotional strategies supplemented with incentives and on-site vaccination clinics *With what broader, complementary health interventions* • One low-quality rapid review found that the potential harms and costs of screen testing among vaccinated LTC home staff likely outweigh the benefits given the high rates of protection of COVID-19 vaccines against symptomatic and asymptomatic SARS-CoV-2 infection	for prescription drugs and influenza vaccines for the 2021 flu season *Where* • Vaccinations in Australia began at 1,000 general practitioner-led respiratory clinics on 22 March 2021 and this number will gradually increase to over 4,000 by the end of April 2021 • Community pharmacies are also eligible to serve as vaccine administration sites in Australia as part of Phase 2A of the roll-out plan • To speed up the vaccination process, China deployed mobile vaccination vehicles offering a one-stop service for registration, disinfection and vaccination ○ The vehicle is equipped with vaccination stations, medical refrigerators and first-aid equipment, and the refrigerators are able to store 1,200 vaccine doses • In France, 1,700 vaccination centres are fully operational and administering Pfizer-BioNTech and Moderna vaccines, and the government has authorized both medical practices and pharmacies to assist in the administration of the Oxford-AstraZeneca and Janssen vaccines • As of 5 April 2021, vaccine-administration sites in Germany have expanded to include 50,000 general practitioner clinics • Within less than a month, Israel's portable immunization sites shifted to a focus on primary-care clinics to increase uptake in remote areas • Israel is also vaccinating populations confined to their homes and remote places by either vaccinating at homes or carrying confined people to vaccination sites by ambulance • In the U.K., Moderna vaccine roll-out has begun in Wales, Scotland, and England and will be available at 21 sites • Online tools have been developed to help Canadians find COVID-19 vaccination sites and determine their eligibility • Individuals aged 55 to 64 can book appointments to receive the Oxford-AstraZeneca vaccine at participating pharmacies and medical clinics in B.C., Alberta, Ontario, Saskatchewan, and Manitoba

		• The third phase of B.C.'s COVID-19 roll-out plan is occurring at immunization clinics throughout the province, including school gymnasiums, arenas, convention halls, pharmacies, community halls and mobile clinics
		  ○ As of 10 April 2021, 170 mass-vaccination sites across the province are in operation
		• At a press conference on 12 April 2021, Alberta's prime minister announced that the province is administering vaccines in more than 1,300 pharmacies and 103 clinics
		• Saskatchewan opened its first drive-thru and walk-in immunization site in Regina on 3 April 2021, and several more sites opened during the week of 12 April 2021
		  ○ Eligible residents for vaccination at the Regina drive-thru vaccination clinic are vaccinated on a first-come first-served basis
		• In Manitoba, focused immunization teams are focused on congregate-living settings, pop-up clinics are being launched to serve northern and rural communities, and supersites and pharmacies are currently in operation in major cities
		• A pilot project at 'Vaxport' was opened in Thompson, Manitoba to provide immunization for residents of remote northern First Nations, and municipal and Indigenous and Northern Affairs communities
		  ○ The pilot project at the Vaxport has concluded and it now serves as a backup location for the Thompson supersite
		• Ontario plans to have 1,500 pharmacies in the province administering vaccinations by the end of April 2021 and is working with public-health units, business groups, and large employers to set up employer-operated vaccination clinics for hot-spot communities at greatest risk
		  ○ These clinics are meant to be set up, operated, and funded by employers and to vaccinate employees as well as members of local communities
		  ○ Employers operating these clinics must meet certain conditions and have the support of local public-health units and hospitals

		• Public-health units and family health teams in Ontario are also developing strategies to reach homebound patients for vaccination
		• Quebec has launched a program to engage private companies in establishing vaccination centres to complement public-sector vaccination efforts and to serve their employees, families and local communities
		  ○ The province called for companies to propose establishing vaccination sites, but also let companies indicate resources they would be willing to contribute towards vaccination efforts
		  ○ More than 450 companies responded with their interest in participating in this campaign and 13 companies have thus far been selected to participate as vaccination centres
		  ○ Enterprise vaccination centres are expected to become operational by May 2021 and run until August 2021
		• Vaccinations will be taking place in pharmacies and at regional health authorities in Nova Scotia
		  ○ Oxford-AstraZeneca vaccines will be available at both locations for people 55 years of age and older
		• During the week of 6 April 2021, the first African-community vaccination clinic opened at the Emmanuel Baptist Church in Nova Scotia
		• As of 29 March 2021, six vaccination clinics running six days a week have opened in P.E.I. and are administering the Pfizer-BioNTech and Moderna vaccines
		• The Oxford-AstraZeneca vaccine is being administered to individuals in Newfoundland and Labrador between the ages of 55 and 64 years at vaccination clinics
		• As of 7 April 2021, mobile clinics will continue visiting Yukon communities to vaccinate residents aged 18 and older
		
		With what appointment/scheduling and screening support, changes to physical spaces and patient flows through these spaces, and changes to hours of operation
		• In B.C., the "Get Vaccinated" online registration and vaccine booking system was opened for the general public on 6 April

		2021, and vaccination appointments for front-line priority workers are organized by employers
		• In Alberta, a tool has been provided to help eligible individuals find a pharmacy that is providing COVID-19 vaccinations in the province
		• Eligible Manitobans can call a dedicated phone line to book vaccination appointments at pop-up sites and use the phone lines or the online booking portal
		  ○ As of 9 April 2021, 67% of appointment bookings in Manitoba were made over the phone with others being booked through the online appointment portal
		• Extremely vulnerable individuals in Saskatchewan who are now eligible to be vaccinated must book their appointments over the phone as the online booking system is aged-based and will not allow those under the eligible age range to book
		• Ontario residents are required to contact pharmacies directly to book vaccination appointments
		• Scheduling a vaccine appointment with a Regional Health Authority is booked through the government of New Brunswick website
		• Vaccine appointments at pharmacies in New Brunswick are booked directly through a pharmacy and a list of participating pharmacies is provided on the Government of New Brunswick website
		• An update to the COVID-19 vaccine booking site in Nova Scotia includes a postal code look-up to help users find available appointment times and which vaccine is available at specific clinics in their area
		  ○ Appointment dates in Nova Scotia are only released once supply is confirmed
		• To assist with the timely booking of appointments, P.E.I. has outlined who is eligible to schedule an appointment each week during the month of April
		• As of 13 April 2021, residents in Northwest Territories who are interested in being vaccinated are asked to contact their local health centre or public-health office

		○ A community visit may be organized if there is enough demand for vaccination in a particular community *With what post-vaccination observation period and what physical distancing, personal protective equipment, sanitation and other public-health measures* • Yukoners are asked to wait a minimum of 15 minutes at the vaccine clinic after receiving their immunization ○ For individuals with a history or concern about vaccine allergy, a waiting period of 30 minutes is recommended ○ Individuals are asked to inform a health provider if they feel unwell during the waiting period • In Nunavut, individuals are asked to wait 15-30 minutes after being vaccinated to monitor side effects or adverse reactions *By whom* • The Government of France is training 25,000 firefighters for vaccine administration at "mega-vaccination centres" that will be launched soon • Germany is deploying an additional 2,500 military personnel to vaccination centres in order to assist with the vaccine roll-out • Israel recruited at least 7,000 reserve medics to administer vaccines at vaccination centres • To increase the efficiency of the vaccination campaign, Israel has increased the hours of nurses and reduced their non-COVID-19 duties • The COVID-19 Response Minister said on 24 March 2021 that around 1,300 of the 2,000-3,000 additional full-time vaccinators needed to administer vaccines had been trained • At a press conference on 7 April 2021, Dr Ashley Bloomfield, Director-General of Health, mentioned that an exemption was approved for non-regulated workforces to be able to be trained to be vaccinators in order to increase the vaccination workforce in Māori and other similar communities • Healthcare practitioners in B.C. can sign up as immunizers and join a registry maintained by the Ministry of Health to support the COVID-19 emergency response

		• In Ontario, a "COVID-19 vaccine clinic operations planning checklist" was published to assist in local vaccination planning
		• As of 6 April 2021, there are 3,312 full-time equivalent staff working in vaccination centres in Manitoba
		• Primary care providers in six public-health units in Ontario have begun contacting eligible patients to book vaccination appointments, and mobile teams and pop-up clinics are being deployed to vaccinate individuals in hot-spot communities, beginning in Peel and Toronto
		  ○ The mobile teams and pop-up clinics will (for now) not be using the provincial booking system
		
		With what broader, complementary health interventions
		• On 21 March 2021, the China's CDC recommended that people, vaccinated or not, still need to wear masks in indoor or closed sites where people gather, maintain personal hygiene, and comply with local COVID-19 prevention and control measures, until population-level immunity is achieved through vaccination in China
		  ○ In Macao, a vaccination certificate and record card will be issued after completing two doses of vaccinations
		• On 8 March 2021, the Ministry of Foreign Affairs of China officially launched the international travel health certificate showing one's nucleic acid test and serum antibody results, vaccine inoculation and other information, which is available for Chinese citizens via a WeChat mini program
		• China has eased visa application procedures for people inoculated with Chinese COVID-19 vaccines
		• Israeli residents with a "green pass" certificate can now volunteer in hospital wards
		• The CDC updated its guidelines for fully vaccinated people on 2 April 2021
		  ○ Fully vaccinated people can resume travel domestically and do not need to get tested or quarantine before or after travel
		  ○ Fully vaccinated people who are travelling internationally do not need to get tested prior to leaving the U.S. (unless

		required by the destination) and do not need to quarantine after arriving back in the U.S.
		• Vaccinated individuals are still required to follow all public-health measures in Canadian provinces and territories
		• The Public Health Ethics Committee in Quebec has published a bulletin on the topic of immunity passports
		  ○ The committee's analysis concludes that immunity passports are justifiable and can play a complementary and temporary role in deconfinement efforts
		  ○ The committee estimates that the benefits from immunity passports slightly outweigh the disadvantages
		  ○ The committee will not issue any formal recommendation until August 2021
		• Public-health measures in Yukon, such as practising the Safe 6 Plus 1, getting tested if necessary, and following self-isolation requirements will be kept in place for all Yukoners, regardless of whether they have been vaccinated
		  ○ The Safe 6 Plus 1 includes physically distancing six feet, practising hand hygiene, staying at home when feeling sick, avoiding crowds, following guidelines when travelling to communities, self-isolating when necessary and staying connected with the outside world
		
		With what second-dose reminders
		• Yukoners are asked to bring their COVID-19 vaccine record cards, received during their first dose immunization, to their second immunization
		
		With what injury-compensation program and liability immunity
		• As of 13 April 2020, Australia has not yet implemented a no-fault COVID-19 vaccine injury compensation program
		
		With what injury-compensation program and liability immunity
		• People's Insurance Company of China (PICC) Life Insurance took the lead in launching medical accident insurance for COVID-19 and other vaccines, which covers compensation for abnormal reactions

Surveillance, monitoring and evaluation, and reporting	*Documenting adverse events and follow-up* • A medium-quality systematic review reported safety data from 11 clinical trials of COVID-19 vaccines and reported mild to moderate adverse events (e.g., pain and swelling at site of injection, fever, fatigue, myalgia, headache), with recommendations to monitor long term in some populations, especially marginalized and at-risk populations (e.g., elderly, people with comorbidities, pregnant people) • A low-quality guideline from the Canadian Society of Allergy and Clinical Immunology (CSACI) recommends that allergists and immunologists assess individuals who have a suspected allergy to the components of a COVID-19 vaccine prior to vaccination, but does not require assessments of individuals with other types of allergies (e.g., food, drugs, insects, environmental allergens) • With respect to immunity and virus transmission from vaccinated individuals, a low-quality rapid review reported that the risk of COVID-19 infection in a residence decreases by 30% after having a household member vaccinated, with peak antibody titres occurring three to four weeks after vaccination *Infrastructure to enable surveillance, monitoring and evaluation* • A medium-quality scoping review (pre-print) identified eight COVID-19 vaccine certificate technologies that are currently in beta-testing trials, and highlighted that technology leaders (e.g., IBM, World Economic Forum, International Air Transport Association) are calling for standardization	*Documenting vaccine-related opinions* • The Angus Reid Institute for independent research in Canada conducts ongoing surveys and research on public opinions about the COVID-19 vaccine roll-outs across Canada and vaccination in general *Documenting vaccine status* • Vaccination coverage across Canada is monitored by the government and reported on its website every Friday at 12 noon Eastern Standard Time • British Colombia's Centre for Disease Control has created a public dashboard displaying vaccination dosage rates in the province *Documenting adverse events and follow-up* • In Australia, the reporting of adverse effects after COVID-19 vaccine administration can be directed to the TGA, healthcare providers, state health departments, and the NPS MedicineWise Adverse Medicine Events (AME) Line • On 2 April 2021, China's NHC and CDC developed guidelines on adverse events following immunization (AEFI) monitoring and management, and vaccination registration and reporting • Quebec has released guidance regarding the surveillance, management and reporting of vaccine-induced prothrombotic immune thrombocytopenia in vaccinated patients • In Yukon, all serious side effects, such as hives, swelling or difficulty breathing, are asked to be reported to the Whitehorse Health Centre or to a local community health centre *Infrastructure to enable surveillance, monitoring and evaluation* • China has established a national electronic vaccine traceability platform, where all localities can timely and accurately report required information so that vaccines can be traced throughout the whole process ○ In Macao, vaccination records are updated in the health code with hyperlinks

		• The Ministry of Health and Social Service in Quebec established a directive to introduce quality-assessment audits of vaccine management and handling at administration sites ○ These audits are to occur at least every three months • Yukoners can download the CanImmunize app to keep track of their COVID-19 vaccine and other vaccines

Table 2: Key findings from highly relevant documents identified in previous versions related to one or more COVID-19 vaccine roll-out elements

COVID-19 vaccine roll-out activities	Evidence from previous versions	Experiences from previous versions

General/cross-cutting insights	• Two WHO guidelines provide insights across the organizing framework
	  ○ The Vaccine Introduction Readiness Assessment Tool is intended to be used by ministries of health as a roadmap for countries to plan for COVID-19 vaccine introduction
	  ○ Another guideline is designed to help countries develop their national COVID-19 vaccine deployment and plans in many aspects
	• A guideline from the American College of Obstetricians and Gynecologists (ACOG) recommends that:
	  ○ Pregnant and breastfeeding women should be offered the COVID-19 vaccine;
	  ○ A conversation between pregnant women and their clinical teams should include the potential efficacy of the vaccine, the safety of the vaccine for the pregnant patient and the fetus, and other prevention measures such as hand washing, physical distancing, and wearing a mask; and
	  ○ Vaccination of pregnant women may occur in any clinical setting and non-clinical community-based vaccination sites such as schools and community centres
	• A WHO guideline provides interim recommendations for use of the Moderna mRNA-1273 vaccine against COVID-19, including recommendations for:
	  ○ Use of the vaccine in specific populations, including those for whom supportive evidence is available and those for whom there is limited or no evidence available for use
	  ○ Administration, considerations for modifications, and co-administration with other vaccines
	• The same guideline indicated that there is no evidence for the need of a booster dose after the two-dose vaccine or about the interchangeability of Moderna mRNA-1273 vaccine with other mRNA vaccines
	• One single study identified and analyzed 12 specific factors contributing to the success of Israel's vaccine roll-out in its initial phase, which broadly relate to:
		• As vaccine manufacturing capacity for COVID-19 vaccines continues to expand around the globe, countries are currently ramping up or planning to ramp up their vaccination efforts by procuring large volumes of vaccines and ancillary supplies, adding vaccination locations to reach communities, increasing the vaccination workforce, and providing information to the public on the safety and efficacy of approved vaccines and processes for scheduling vaccination appointments
		• Vaccine roll-out plans have been developed in all countries that focus on vaccinating priority populations using a phased approach
		• The vaccine supply of countries is dependent on manufacturing capacity within countries and/or external manufacturers, timing of vaccine approvals by national vaccine regulators, and the quantity of appropriate storage equipment and supplies for vaccine distribution and administration
		• To facilitate mass vaccinations, countries are launching mobile and community-based clinics as well as upscaling their health workforce to ensure that all individuals in their populations will have access to a COVID-19 vaccine
		• As countries continue to ramp up their administration of COVID-19 vaccines, thought is being given to life post-vaccination, with actions being taken by governments to develop guidelines (U.S.) and ease restrictions (Israel) for fully vaccinated individuals

	○ Long-standing characteristics of Israel which are extrinsic to healthcare, such as Israel's small size in terms of both area and population ○ Long-standing health-system features, such as a tradition of effective cooperation (particularly during national emergencies) between government, health plans, hospitals, and emergency care providers • Specific features of the COVID-19 vaccination effort in Israel, such as the mobilization of special government funding for vaccine purchase and distribution • A WHO guideline provides the COVID-19 vaccine introduction and deployment costing tool (CVIC tool) to help governments, partners, and other stakeholders estimate the introductory and deployment cost of COVID-19 vaccine procurement and service delivery, before detailed planning can take place ○ These costs include central activities, international and domestic logistics, service delivery, and demand generation and communications ○ The tool focuses on operational costs and selected capital expenditures • A second WHO guideline outlines the step-by-step process for national deployment and vaccination plan for COVID-19 vaccines (NDVP) development, submission and review, which should be used in conjunction with: ○ The standard review form, which enables countries to prepare their NDVPs for the review process and supports regions in conducting a consistent and uniform assessment ○ Considerations for forming a regional COVID-19 review committee, which provides insight on how these committees can be established and conduct the review process for NDVPs • Interim guidance from WHO provides an overview of key activities and considerations to achieve high acceptance and uptake of COVID-19 vaccines, including the following aspects: ○ Coordination and planning ○ Implementation of mass-media plan ○ Social media monitoring and misinformation management ○ Crisis communications ○ Advocacy and stakeholder engagement ○ Community engagement and social mobilization	

	○ Capacity building ○ Monitoring, learning and evaluation • The same guidance includes a communication-planning template from WHO which provides countries with an outline of communication activities that should be considered when introducing COVID-19 vaccines, with relevant categories such as target audience, budget breakdown, timelines and responsibilities • Additional interim guidance from WHO provides recommendations about how to put community engagement at the centre of strategies for the COVID-19 vaccine roll-out, including tips and discussion topics about vaccine delivery and demand creation, as well as guiding steps to ensure a safe and community-centred approach when conducting community-engagement activities • The COVID-19 vaccine safety guidance manual from WHO provides countries with recommendations on preparedness plans for COVID-19 vaccine safety in their overall vaccine-introduction plans, including nine modules: ○ Description and general safety considerations for implementation of COVID-19 vaccines ○ Stakeholders in COVID-19 vaccine-safety surveillance ○ Establishing surveillance systems in countries using COVID-19 vaccines ○ Monitoring and responding to adverse events following immunization ○ Monitoring and responding to adverse events of special interest ○ Safety data-management systems, methods of post-introduction evaluation and assessing performance in countries using COVID-19 vaccines ○ Engaging with the pharmaceutical industry for COVID-19 vaccine-safety surveillance ○ Regulatory reliance and work sharing ○ COVID-19 vaccine-safety communication • One guideline from the European Centre for Disease Prevention and Control provides an updated overview of national COVID-19 vaccination roll-out across the EU/EEA countries, including new insights into some of the critical aspects and challenges they are experiencing with the implementation of national deployment plans	

	○ All 30 EU/EEA countries have initiated national vaccination campaigns, with 26 countries declaring that vaccination is not mandatory ○ As of 29 January 2021, 21.5 to 100% of doses distributed have been administered across the EU/EEA countries ○ Most of the EU/EEA countries are administering Pfizer-BioNTech, Cormirnaty, and Moderna vaccines ○ Most countries will not extend the time between the first and second dose (14 countries), while other countries are still undecided ○ All EU/EEA countries prioritized population groups with a higher chance of acquiring COVID-19 and/or developing severe disease (e.g., healthcare and front-line workers and elderly people), with some including other essential public workers such as police, firefighters and teachers ○ Most EU/EEA countries have adequate storage and management of vaccines, with 20 countries stating that health authorities are leading and coordinating the deployment of vaccines ○ Electronic immunization registries to monitor both individual and population-level vaccine uptake are used in 21 countries, with five countries utilizing an ad-hoc electronic system, four countries using electronic immunization cards, and one country recording them manually ○ Information on which vaccine product and when it was administered are important data elements, in addition to recording any adverse event following immunization ○ Challenges to roll-out include shortage of equipment (e.g., needles and syringes), misinformation about the vaccine, monitoring systems with consolidated data, logistical challenges, and limited vaccine supply ○ Extensive coordination between national and local authorities and multidisciplinary participation is required to enable the vaccine roll-out • One single study describes key characteristics of 26 candidate COVID-19 vaccines, including efficacy levels, dosing regimens, storage requirements, prices, production capacities in 2021, and stocks reserved for low-income and middle-income (LMIC) countries ○ The four dimensions of effective global immunization include development and production, affordability, allocation and deployment	

	○ The vaccines produced by Johnson & Johnson are likely easier to deploy in LMIC countries and resource-restrained settings given that it only needs to be refrigerated and is one-dose only ○ Diverse options of vaccines that can be administered are likely needed to control the pandemic • Interim guidance from the WHO provides recommendations and considerations about monitoring COVID-19 vaccination and presents different tools and digital systems for collecting and analyzing COVID-19 vaccination data, such as home-based records (vaccination cards), facility-based records (immunization registers), health-management information systems (HMIS), electronic immunization registries (EIR), and logistics-management information systems (LMIS) ○ One WHO guideline provides the COVID-19 vaccine checklist to help front-line health workers prepare and complete a COVID-19 vaccination session at a fixed post or outreach session	
Securing and distributing a reliable supply of vaccines and ancillary supplies (e.g., needles, diluents)	*National purchasing* • A U.S. CDC guideline describes several considerations related to securing and distributing a reliable supply of vaccines • One single study reveals that international institutions, governments and vaccine manufacturers need to plan for sufficient vaccine production and negotiate affordable prices for low- and middle-income countries • Another single study calls for equitable sharing globally by indicating that high-income countries have secured more than half of the vaccine doses *Delivery of vaccines at a country level* • One single study calls for strengthening national and international vaccine-supply chains to ensure the efficient distribution and administration for remote communities, and to avoid vaccine wastage *Vaccine distribution within country and to administration sites* • A WHO guideline provides a five-step decision-making framework for implementing mass-vaccination campaigns for the prevention of vaccine-preventable diseases and high-impact diseases • A European CDC guidelines reports that the COVID-19 vaccine will be provided free of charge in most countries • A guideline from the Health Information and Quality Authority guideline from Ireland stresses how vaccination-site location (and no or low vaccination costs) can contribute to equitable access	*National purchasing* • Recent efforts to procure vaccines include: ○ The Hong Kong Special Administrative Region (HKSAR) government has secured a total of 22.5 million doses of COVID-19 vaccines, enough to cover Hong Kong's 7.5-million population ○ Over $66 million has been allocated by the New Zealand government to support the roll-out of COVID-19 vaccines, including purchasing supplies to vaccinate the population and providing support to the Pacific countries ○ Pfizer-BioNTech announced that the U.S. government purchased an additional 100 million doses of the Pfizer-BioNTech COVID-19 Vaccine (bringing the total to 300 million) • Canada has recently (as of 26 February 2021) approved the AstraZeneca COVID-19 vaccine • Recent procurement activities include: ○ The province of Manitoba directly signing a deal to procure up to two million doses of a vaccine (that is currently in the first phase of human trials) being developed by Providence Therapeutics

	• Interim guidance from WHO recommends that long-term care facilities and local health authorities should conduct timely communications and plans to determine the logistics of how the COVID-19 vaccines will be deployed in their jurisdictions	○ Manitoba also procuring 400 shipping containers for transporting vaccines, 200 specialized freezers and fridges, and more than 80,000 syringes to enable the extraction of six doses per vial of the Pfizer-BioNTech vaccine ○ Efforts being made to secure COVID-19 vaccine storage equipment (freezers, fridges, power generators) for Saskatchewan First Nations communities • All countries assessed have finalized advance purchasing agreements with vaccine developers to secure COVID-19 vaccine doses as they become available, and some have even secured additional procurement agreements (in many occasions with multiple companies that have developed or are currently developing COVID-19 vaccines) • Given its advancement in its domestic vaccine roll-out, China is making efforts to assist developing countries in securing COVID-19 vaccines by offering its vaccines to countries directly or through COVAX • Ancillary supplies were mass ordered by France prior to the arrival of the COVID-19 vaccine • The Government of Canada established advance purchasing agreements with seven companies that have developed or are currently developing COVID-19 vaccines to secure enough doses for all Canadians who wish to be vaccinated • Following the approval of the Pfizer-BioNTech vaccine label change by Health Canada, the Government of Canada ordered 64 million special syringes to extract the additional dose of the Pfizer-BioNTech vaccine • A total of 75 million immunization supplies and 422 freezers have been purchased by the Government of Canada (e.g., syringes, needles, gauze, and sharps containers) to be distributed to provinces • New Zealand's Prime Minister announced on 8 March 2021 that the government has decided to make Pfizer-

		BioNTech the country's primary vaccine provider because of the high degree of efficacy of its vaccine, and the resulting simplification of the vaccine roll-out ○ An advance purchasing agreement has been signed with Pfizer-BioNTech for an additional 8.5 million vaccine doses to bring New Zealand's total order to 10 million doses, enough for the country's entire population to be fully vaccinated ○ The New Zealand government is still determining how to make use of other vaccines that it has already procured, and is considering delaying shipments to New Zealand until 2022 and donating surplus vaccines to other countries ○ The government may consider procuring a vaccine that is more easily transported as a "backup option" to make vaccines more accessible for rural communities • The U.K. has ordered more than 400 million doses of seven of the most promising vaccines and has announced a deal with an eighth biopharmaceutical company, CureVac, to purchase 50 million doses of its vaccine to be delivered later this year if required • Following the USDA's emergency use authorization for the Johnson & Johnson vaccine on 27 February 2021, reports surfaced that the Biden administration plans to buy an additional 100 million doses of the Johnson & Johnson COVID-19 vaccine • On 26 February 2021, Canada approved the Oxford-AstraZeneca COVID-19 vaccine and has pre-ordered 22 million doses of the vaccine • On 5 March 2021, Canada approved the Johnson & Johnson COVID-19 vaccine and has pre-ordered 10 million doses of the vaccine *Delivery to country* • On 15 February 2021, both Australia, and New Zealand received their first shipments of the Pfizer-BioNTech vaccine

		• Within the first quarter of 2021, Germany expects to receive between 11 and 13 million doses of the Pfizer-BioNTech vaccine and two million Moderna vaccine doses • Moderna announced that it expects to deliver 100 million doses of its vaccine to the U.S. by March 2021 and an additional 100 million doses by the end of May 2021 • Canada's vaccine program slowed between 18 January 2021 and 14 February 2021 when production issues limited shipments to fewer than 350,000 doses • As of 24 February 2021, Canada has received 2,003,810 vaccines from Pfizer-BioNTech and Moderna manufacturers, and 81.4% of doses delivered to Canada have been administered • The Public Health Agency of Canada says it expects more than 640,000 doses combined from Pfizer-BioNTech and Moderna the week of 24 February 2021, which would be the largest number of deliveries in a single week • In general, delivery of COVID-19 vaccines to countries is being facilitated by the vaccine manufacturers through the use of shipping carriers like DHL and FedEX • For France, the Pfizer-BioNTech vaccine is moved from the production plant to one of 11 private platforms capable of storing the vaccine at -80°C • The National Operations Centre has 14 vaccine delivery sites across Canada and is being assisted by FedEx Express Canada and Innomar Strategies with distribution • Canada experienced vaccine shortages for four weeks, with no Pfizer-BioNTech vaccine being received during the week of 25 January 2021 and delays in dose shipments of the Moderna vaccine • As a result of Health Canada's approval of the Pfizer-BioNTech vaccine label change from five doses to six

		doses, shipments of the Pfizer-BioNTech vaccine doses may change going forward • As of 7 March 2021, China has donated or is donating COVID vaccines to 69 developing countries and is exporting vaccines to 43 countries • Shipments of the Oxford-AstraZeneca vaccine have recently increased: o On 28 February 2021, 300,000 doses of the vaccine arrived in Australia o France will be receiving a shipment of 280,000 doses of the vaccine during the week of 15 March 2021 o 5.6 million doses of the vaccine are scheduled to be delivered to Germany by April 2021 o Canada received 500,000 doses of the vaccine from the Serum Institute of India on 3 March 2021 • As of 3 March 2021, over 10.3 million doses of Pfizer-BioNTech, Oxford-AstraZeneca, and Moderna vaccines have been delivered to Germany by manufacturers • As of 10 March 2021, Canada has received 3,182,510 vaccines from Pfizer-BioNTech, Moderna and Oxford-AstraZeneca manufacturers o The Public Health Agency of Canada says it is not expecting any new deliveries of the Oxford-AstraZeneca vaccine or the Johnson & Johnson vaccine until April 2021 o Shipments of the Pfizer-BioNTech and Moderna vaccines will continue to be delivered to Canada in the coming weeks *Inventory management within country* • Israel received permission from the Pfizer-BioNTech to repackage doses of its vaccine into tens or hundreds per shipment (instead of 1,000 per shipment) to avoid waste and create safer mobilization of doses to remote areas

		• China has established and implemented whole-process traceability systems for COVID-19 vaccines • The Government of Canada established an immunization National Operations Centre within the Public Health Agency of Canada to manage COVID-19 vaccine delivery and collaboration with provinces and territories • Manitoba maintains a complex data set to link vaccine deliveries with inventory levels and known appointments *Ordering within country* • Some countries that manufacture vaccines in country (Germany, the U.K., the U.S., and China) have re-purposed existing capacity and invested in new vaccine manufacturing capacity to help expedite the production of vaccine • As of 23 February 2021, China has granted conditional market approval to two domestically developed vaccines and now has 16 COVID-19 vaccines undergoing clinical trials, six of which have entered phase-3 clinical trials • As of 3 March 2021, China has put the Sinopharm inactivated COVID-19 vaccines into mass production and the output is expected to surpass one billion doses in 2021 • As of 3 March 2021, China has granted conditional market approval to four self-developed COVID-19 vaccines and 17 Chinese vaccines have entered clinical trials *Distribution within country and to administration sites* • COVID-19 vaccine distribution in Germany to medical practices is conducted with the following sequence: ○ Delivery from the federal government to wholesalers

		○ Delivery from wholesalers to pharmacies ○ Delivery from pharmacies to physician clinics • The Government of Canada has delivered shipments of all the Oxford-AstraZeneca vaccine doses received to all Canadian provinces, except Yukon, Northwest Territories and Nunavat, during the week of 8 March 2021 *Distribution within country and to administration sites* • The vehicles transporting COVID-19 vaccines in China will be exempted from tolls until 31 December 2021 • The Government of Canada continues to distribute the Pfizer-BioNTech and Moderna vaccines to provinces and territories on a weekly basis • All countries assessed have developed strategies and systems for managing distribution of vaccines as they are approved and become available, including for cold-chain requirements • In Israel, vaccines are repackaged and sent to national centres and subsequently repackaged in small boxes to ship three times a week to communities • In Germany, distribution of the Pfizer-BioNTech vaccine to federal states is based on the proportion of the population that reside in those regions • Once Pfizer-BioNTech vaccines arrive in France, they are then transported to pharmacies and institutional care facilities (e.g., long-term care) for use or delivered directly to one of 100 hospitals in the country that can safely store and administer them • Protocols have been established in Ontario to move the Pfizer-BioNTech vaccine so it can be used in long-term care and high-risk retirement home • In Newfoundland and Labrador, once a vaccine shipment arrives it is immediately distributed to regional health authority depots and then to

		communities where public-health nurses deliver the inoculations settings • Vaccines will be distributed to the Yukon and across Canada by the Immunization National Operation Centre for COVID-19 *Storage and handling within country* • Nova Scotia now has 10 cold-storage sites from which eight clinics across the province receive the vaccines on a rotational basis • The National Operations Centre within the Public Health Agency of Canada (PHAC) has developed vaccine storage and distribution capacity in the form of equipment, supplies and logistical coordination • Both Alberta and Ontario have published guidelines describing the requirements for storing and handling the Pfizer-BioNTech and Moderna vaccines • Eight storage sites in Nova Scotia have been developed with ultra-low freezers to store vaccines safely
Allocating vaccines and ancillary supplies equitably	*Approaches to developing and adjusting allocation rules* • A U.S. guideline provides a recommended approach for national, state, tribal, local and territorial levels that is guided by four ethical principles (maximize benefits and minimize harms; promote justice; mitigate health inequities; and promote transparency) which should be accompanied by additional considerations based on science (e.g., safety and efficacy) and feasibility of implementation (e.g., storage and handling) • One single study identified public perceptions in relation to allocation priorities for the COVID-19 vaccine and found that in addition to prioritizing health workers and those at risk for contracting COVID-19 or developing severe symptoms, participants emphasized the need to prioritize a broad range of other essential workers and to those of low socio-economic status *Allocation rules*	*Approaches to developing and adjusting allocation rules* • The New Zealand Ministry of Health is working in partnership with the Māori and Pacific neighbours to plan for their roll-out programs • The Government of British Columbia has reportedly been working closely with the Provincial Health Services Authority, First Nations Health Authority, Health Emergency Management BC, Canadian Red Cross and Canadian Armed Forces to prepare a system that is ready to distribute all vaccine types as they become available • The Government of Yukon is working closely with First Nation governments, NGOs, closely with First Nation governments, NGOs, community leaders, and community health centres to reach all Yukoners

	• A U.S. CDC guideline updated the interim vaccine-allocation recommendations for COVID-19 vaccination program planning and implementation in federal, state and local jurisdictions
	• A medium-quality rapid review emphasized that COVID-19 vaccines must be administered in accordance with the priority groups that have been established to uphold the ethical integrity of the process
	• A low-quality rapid review indicated that most U.S. medical centres will offer COVID-19 vaccination to pregnant or breastfeeding women based on the shared decision-making principle, but organizations in the U.K. consider pregnancy and breastfeeding to be contraindications for the vaccine
	• A guideline (from the European Academy of Allergy and Clinical Immunology) recommends that COVID-19 vaccines should be administered to patients with allergies who do not have a history of allergic reactions to vaccine components
	• However, one single study from the U.K. revealed that 32.6% of respondents were concerned that the government's priority list made no reference to Black, Asian and minority ethnic groups
	Ensuring equity
	• A WHO guidance document proposed a values framework for COVID-19 vaccine allocation and prioritization, which consists of six core principles: 1) human well-being; 2) equal respect; 3) global equity; 4) national equity; 5) reciprocity; and 6) legitimacy
	• Two single studies provided additional insights about the disparities in the availability and distribution of COVID-19 vaccines due to limited vaccine production, supply capacity, and market forces in developing countries and low- and middle-income countries
	• Interim WHO guidance recommends that long-term care facilities (LTCFs) should be a high priority for COVID-19 vaccine deployment, and the initial high-priority targets for immunization should be health workers (including those working in LTCFs and the private sector), older people and those with underlying health conditions
	• One guideline consolidates guidance issued by the U.S. Centers for Disease Control and Prevention, the American College of Obstetricians and Gynecologists, and the Society for Maternal-Fetal Medicine on COVID-19 vaccine provision to the pregnant population
		• The New Zealand government is negotiating with its Pacific neighbours to determine their specific preferences for vaccines
		
		Allocation rules
		• Australia recently specified in its vaccine roll-out plan that those younger than 16 years of age will be eligible to be vaccinated for the Pfizer-BioNTech vaccine only in Phase 3
		• China is aiming to vaccinate the eligible population as widely as possible and gradually build an immune barrier within the whole population to control the epidemic
		• The Ministry for Solidarity and Health in France recommends that individuals who have previously contracted COVID-19 wait at least three months, and preferably six months, prior to receiving a single dose of the COVID-19 vaccine
		• Germany and France released additional details about the priority groups within their phased vaccine-roll-out plans
		• Several changes and updates have been reported on vaccine roll-out plans in Canadian provinces:
		  ○ Ontario, New Brunswick and Nunavut released details on the priority groups that will be included in their phased vaccine roll-outs, and Alberta released its plan for Phase 2 vaccinations, targeted to begin in April 2021
		  ○ The Saskatchewan Ministry of Health announced that additional healthcare workers have been added to the priority list in Phase 1, including individuals who will be directly involved in delivering COVID-19 vaccinations in Phase 2 of the roll-out
		  ○ In Nunavut, if individuals miss their first-dose appointment and do not belong to the community scheduled to receive doses, they will be asked to wait until the next supply of vaccines is shipped to Nunavut

	Dosing rules • One single study found that a three-month dose interval may be advantageous compared to a program with a short dose interval to protect a larger number of individuals as soon as possible when vaccine supplies are limited	○ As of 19 February 2021, first doses of COVID-19 vaccines are available in the Northwest Territories to the majority of adults 18 years and older ○ Starting 1 March 2021, all residents of the Yukon will be eligible to receive the COVID-19 vaccine • Aside from minor differences in policies, most countries, including Canada, prioritize healthcare workers and long-term care residents, along with some other at-risk populations (e.g., older adults, individuals with chronic conditions, at-risk adults in Indigenous communities), and in some cases others such as immunocompromised individuals and select caregivers • Other prioritized groups for vaccination in some countries include border workers (New Zealand), those who plan to work or study in countries with medium or high risk of COVID-19 infection (China and Israel), other congregate facility residents and staff (Canada), and those who work in ship piloting, aviation, public transport, fresh markets, and healthcare settings (China) • New Zealand prepared three different scenarios for vaccine roll-out based on the level of transmission present within the country at the time of the roll-out • As more vaccines are approved and become available, some countries have adjusted their allocation rules to recommend that certain vaccines be administered to specific priority groups ○ French authorities have recommended the Pfizer-BioNTech and Moderna vaccines for individuals 65 years and older and those with comorbidities, while the Astra-Zeneca vaccine will be administered to those 50 to 64 years old and to professionals in the health sector aged 18 to 64 ○ Germany's Permanent Vaccination Commission recommends that individuals 65 years and younger should be vaccinated with the Oxford-AstraZeneca vaccine

		• Aside from minor differences in policies (e.g., Saskatchewan prioritizing long-term care residents over 50 years of age living in remote areas in addition to residents over 70), all provinces in Canada generally follow the National Advisory Committee on Immunization (NACI) recommendations and roll-out plans are relatively consistent across the country • Residents of British Columbia are eligible to receive vaccinations in Yukon if they typically receive healthcare in the territory • Australia allows unvaccinated individuals who were eligible to be vaccinated in a previous phase of their roll-out to remain eligible in subsequent phases • As vaccine supply has started to become more consistent in some countries, priority groups for vaccinations are expanding: o Australia is scheduled to begin vaccinating adults aged 70 years and over, healthcare workers, adults with pre-existing conditions, front-line workers, and Aboriginal and Torres Strait Islander people on 22 March 2021 o Hong Kong expanded its priority groups on 8 March 2021 to include workers in the catering industry, tourism, public transportation, property management, construction sites, and schools o France expanded its priority groups as of 2 March 2021 to residents aged 60 years and older in migrant worker homes, individuals between the ages of 50 and 74 who are living with comorbidities, individuals who have previously contracted COVID-19, and pregnant or breastfeeding women o French authorities have recently changed their recommendations to allow at-risk pregnant women to receive the Pfizer-BioNTech and Moderna vaccines, and individuals between the ages of 65 and 74 with comorbidities to receive the Oxford-AstraZeneca vaccine

		○ As of 24 February 2021, elementary school, childcare, and day care staff have been added to group 2 of Germany's phased roll-out ○ As of 3 February 2021, all residents in Israel aged 16 years and older became eligible for the COVID-19 vaccine • The New Zealand government released its official COVID-19 vaccine roll-out plan on 10 March 2021 with four main groups for phased vaccination: ○ Group 1: Border and MIQ workers and their household contacts (began in February 2021) ○ Group 2: Front-line workers and people living in high-risk settings (began in February 2021) ○ Group 3: People who are at higher risk if they contract COVID-19 (anticipated to begin in May 2021) ○ Group 4: The remainder of the population (anticipated to begin in July 2021) • Several Canadian provinces have also expanded their priority groups for vaccination ○ In British Columbia, people born in or before 1931 and Indigenous peoples born in or before 1956 can book a vaccine appointment as of 8 March 2021, and people born in or before 1936 and in or before 1941 will be able to book appointments within the next two weeks ○ The roll-out of vaccines in First Nations communities in Manitoba is expected to begin in mid-March and will prioritize communities at high-risk of floods, fires and other evacuation risks ○ On 5 March 2021, additional details on Phase II groups in Ontario were released, which focus on prioritizing primarily age and risk (based on hot spots, specific health conditions, congregate care setting, essential caregivers, and those who cannot work from home)

		○ In Phase III of Ontario's vaccine roll-out, remaining Ontarians aged 16 and older can be vaccinated ○ As of 10 March 2021, the general population aged 70 years of age or older is able to book an appointment for vaccination in all public-health units in Quebec ○ For P.E.I.'s vaccine roll-out phases, Phase 2 (April to June 2021) will include adults 18 years of age and older and Phase 3 (summer to September 2021) will include all individuals requiring a second dose and youth 15 years of age and older when an appropriate vaccine for this age category becomes available ○ Newfoundland and Labrador's Phase 2 (April to June 2021) will now include adults 60 years of age and older, adults who identify as First Nation, Inuit or Métis, adults in marginalized populations, first responders, front-line healthcare workers not immunized in phase 1, individuals 16-59 with medical conditions who could be at high risk if infected with COVID-19, individuals who travel in and out of the province for work, and front-line essential workers with direct contact with the public who cannot work from home; Phase 3 (July to September 2021) will include anyone in priority groups 1 and 2 who were not vaccinated and individuals 16-59 who have not been vaccinated ○ As of 5 March 2021, in Northwest Territories additional priority groups have been added for residents in Yellowknife, Hay River and Inuvik • Canadian provinces have adjusted their roll-out plans to incorporate the arrival of the Oxford-AstraZeneca vaccine during the week of 8 March 2021 ○ Starting 10 March 2021, Albertans aged 50 to 64 and First Nations, Métis and Inuit individuals aged 35 to 49 will be eligible to receive the Oxford-AstraZeneca vaccine

		○ Eligible groups in Saskatchewan who will be receiving the Oxford-AstraZeneca vaccine include individuals between the ages of 60 and 64 and priority healthcare workers ○ In Nova Scotia, the Oxford-AstraZeneca vaccine will be administered to individuals aged 63 and 64 starting 20 March 2021 ○ Starting 11 March 2021, individuals between the ages of 18 and 29 in P.E.I. who work in the food and beverage industry, including food delivery service, can register to receive the Oxford-AstraZeneca vaccine • The Quebec Immunization Committee has recommended that vaccination for pregnant women should be offered, and does not recommend systematically offering the Oxford-AstraZeneca vaccine to people in Quebec with a very high risk of sickness and complications (for example, residents of long-term care homes and immunocompromised people) • Once an individual becomes eligible for vaccination in Saskatchewan, they will continue to be eligible even if the province has moved on to a different phase of the roll-out *Dosing rules* • As of 7 March 2021, a total of 86,369 COVID-19 vaccines have been administered to Australians • As of 28 February 2021, over 52 million doses of COVID-19 vaccines have been administered in China • As of 10 March 2021, France has administered over 6,425,000 vaccines doses, with 6.5% of the population receiving their first dose, and 3.1% of the population being fully vaccinated • As of 10 March 2021, Germany has administered over 8.1 million vaccine doses, with 6.1% of the population receiving their first dose and 3.1% of the population being fully vaccinated

		• As of 9 March 2021, more than 5.18 million people (58.2% of the population) in Israel have received at least one dose of COVID-19 vaccine, and more than one million people (45.5% of the population) have been fully vaccinated)
		• As of 9 March 2021, more than 22.5 million people in the U.K. have had a first vaccine dose and more than one million have been fully vaccinated
		• The U.S. CDC reported that 127.9 million doses of COVID-19 vaccines have been distributed and 95.7 million doses have been administered in the U.S. as of 9 March 2021
		• As of 10 March 2021, 81.8% of doses delivered to Canada have been administered
		  ○ 2,020,056 first doses and 582,973 second doses of COVID-19 vaccine have been administered
		  ○ 5.31% of the population has received at least one dose of COVID-19 vaccine
		• The number of vaccine doses administered within Canadian provinces ranged from 978,797 doses in Ontario to 343,381 doses in British Columbia to 24,412 doses in Yukon as of 10 March 2021
		• As of 8 March 2021, all first doses as part of Operation Remote Immunity in Ontario had been administered (12,660 doses), and 2,664 second doses had been administered
		• As of 10 March 2021, residents 18 years and older in Nunavut became eligible to schedule a vaccination
		• The Government of Nunavut will not be releasing specific details about the level of vaccination in communities to prevent stigma
		• France maintains a second dose interval for the Pfizer-BioNTech vaccine of 21 days
		• According to Germany's Standing Committee on Vaccination (STIKO), the Oxford-AstraZeneca vaccine requires two doses in a 12-week interval

		• On 3 March 2021, the National Advisory Committee on Immunization (NACI) issued new guidance for Canada advising that the time between shots for the Pfizer-BioNTech, Moderna, and Oxford-AstraZeneca vaccines be extended to four months in order to vaccinate, and hopefully protect, more people
		  ○ British Columbia, Ontario, Quebec, Manitoba, Alberta, Saskatchewan, New Brunswick, and Newfoundland and Labrador have extended their second dose intervals to align with NACI's recommendations
		
		Ensuring equity
		• As of 9 February 2021, 11,800 vaccine doses had been allocated to First Nations communities in Manitoba, and a time-limited clinic in Winnipeg was opened to provide vaccination for First Nations health-care workers, knowledge keepers and traditional healers
		• Operation Remote Immunity was launched in Ontario to vaccinate adults in 31 fly-in First Nations communities and Moosonee in Northern Ontario
		• In Quebec, one companion of a person 85 years of age or older will be able to be vaccinated at the same time if the companion is 70 years of age or older and provides care to their partner at least three days per week
		• China will launch a "spring sprout" program to assist and secure vaccination for its citizens with Chinese or foreign vaccines
		  ○ This program will include setting up vaccination stations in countries where conditions allow to administer Chinese vaccines to nationals living in surrounding countries
		• As of 8 March 2021, vaccination has begun for 100,000 Palestinians who work in Israel or are in Israeli settlements in the West bank, with efforts to vaccinate 1,000 people per day

		• Every person in New Zealand will be eligible for free vaccination regardless of their immigration status, and any information collected will not be used for immigration purposes • An emergency order under the Emergency Measures Act enables Shared Health Manitoba to investigate and confirm the eligibility status of healthcare workers who have been vaccinated • If people are found to have provided false information to get early vaccination, the order enables Shared Health to disclose this information to the individual's employer, professional regulatory body, or law enforcement • In its guidance for COVID-19 vaccinations in Canada, NACI recommended that at-risk adults in Indigenous populations be among the first priority groups to be vaccinated in provinces and territories
Communicating vaccine-allocation plans and the safety and effectiveness of vaccines	*Target of the intervention* • A WHO guideline provides behavioural insights related to drivers of vaccine acceptance and uptake with a focus on the drivers of vaccine uptake including: 1) an enabling environment; 2) social influences; and 3) motivation • Some of the evidence focused on communication interventions targeting the general public or community opinion leaders to ensure evidence-based information is being relayed to the general public • It was also emphasized that communication interventions should be tailored to mitigate inequalities, particularly to Black, Asian and minority ethnic groups who have higher rates of infection, morbidity and mortality, as well as unvaccinated or under-vaccinated populations • Evidence was also found about the importance of targeting healthcare professionals (who should be educated about the vaccine prior to the initiation of any vaccination program) and ensuring that healthcare workers have the opportunity, skills and information to effectively communicate with patients and support vaccine-related decisions • A high-quality rapid review proposes that future vaccination-messaging campaigns for the public should ensure clear communication about vaccine eligibility and availability, and the engagement of target groups	*Target population* • The Australian government's Department of Health released educational material (e.g., videos) on COVID-19 vaccines in multiple languages (Arabic, Italian, Hindi, Korean, Russian and Spanish) with translated subtitles • In France, a citizen panel consisting of 35 citizens was announced to collate the concerns and queries posed by the public and present them to the national government • As of 10 February 2021, the province of Manitoba had 225 phone-line agents and plans to expand to 300 agents in March, as well as implement online self-service booking • Countries have used (or are recommending the use of) strategies to tailor information about COVID-19 and how to book vaccination appointments for culturally and linguistically diverse groups and at-risk populations (Australia, Germany, U.K., Israel), engaging the public and stakeholders through local

	• A single study found the majority of participants used traditional media to obtain information on the COVID-19 vaccine, but that there is an opportunity for social-media platforms to reduce vaccine hesitancy
	• A guideline from WHO updated the risk communication and community-engagement strategy to cover anticipated COVID-19 related events, and proposes four objectives for people-centred and community-led approaches to improve trust and social cohesion, and reduce negative impacts of COVID-19
	• Four single studies discussed COVID-19 vaccination intention and uptake among different populations, which found:
	  ○ Low COVID-19 vaccine uptake among healthcare workers in Saudi Arabia and recommended to scale up targeted public-health communication efforts
	  ○ News of a variant strain and case escalation could reduce COVID-19 vaccine hesitancy
	  ○ Exposure to misinformation reduced the intent to accept a vaccine relative to exposure to factually correct information
	  ○ Components of persuasive messaging had no significant effects on COVID-19 vaccination attitudes and intention
	
	Delivery of the intervention
	• A high-quality rapid review indicates that messages delivered in mixed-media campaigns in communities and hospitals could improve vaccine uptake
	• One WHO guideline provides health workers with a flow diagram for COVID-19 vaccination communication, which can be carried out during a COVID-19 vaccination session, or prior to the vaccination event, in-person or via a virtual platform, at a group educational session, community meeting, or one-on-one interaction
	
	• A medium-quality rapid review indicated that communication of reliable, frequent, and tailored information about vaccines should be shared with community members through multiple platforms, including social media, traditional media, and providers, and providers must be educated about vaccines and provided with appropriate training to increase provider vaccine recommendations to patients
		partnerships (U.K., U.S.), and having medical experts assist with information dissemination to the public (Australia)
		• The Mosques and Imams National Advisory Board in the U.K. is leading a campaign to reassure its faithful that COVID-19 vaccinations are safe and compatible with Islamic practices
		• Indigenous Services Canada (ISC) is developing resources to guide vaccination delivery, messaging and education of indigenous populations
		
		Delivery of intervention
		• Countries are using several modalities for communicating vaccine-allocation plans, including government websites, online FAQs and other online tools, social media and SMS messages on mobile devices, press releases, radio, public Q&A sessions with experts, and engaging the public and stakeholders through local partnerships
		• Efforts have been made in Israel to increase vaccine uptake by publicizing vaccination endorsements from political and religious leaders
		• The Ministry of Public Security of China has deployed a national campaign to combat vaccine-related crimes, including manufacture and sale of fake vaccines related fraud activities
		• Current priority and eligible population groups in Israel receive text messages from their health maintenance organizations (HMO) about information on booking an appointment (either by phone or through the HMO online portal)
		• The Government of Australia will be promoting an educational campaign on its COVID-19 vaccination program
		• Preparation is underway in New Zealand for a public awareness and reassurance campaign centred around vaccine safety that will include paid advertising

	• However, a high-quality systematic review found that interventions involving risk messages were found to have no effect on the intention of participants to vaccinate, their behaviour towards vaccines, and their perception of the severity of the disease *Content of messaging* • One guideline emphasized that eligible groups who understand why vaccination is particularly important for them are more likely to be vaccinated, and that professionals should address any misconceptions about it • A high-quality rapid review indicates that messages that provide information about virus risks, vaccine benefits and safety, and address vaccine misunderstandings could improve vaccine uptake • A medium-quality rapid review shows that vaccine hesitancy is universal across countries and is typically manifested in the preference to wait to be vaccinated or to reject vaccination altogether, and the most cited reasons for vaccine hesitancy or refusal included fear of side effects, safety, and effectiveness, as well as the expedited development of the COVID-19 vaccines, perceived political interference, and misinformation • It is recommended that confidence in the COVID-19 vaccines can be improved by emphasizing transparency and compliance with scientific standards throughout the vaccine development and approval processes, and that communication strategies use positive cues to vaccinate through engagement with loved ones and family members, and trusted figures like doctors and religious leaders • One single study indicated that effective public-health communication strategies should be tailored to counter vaccine misinformation • The same WHO guideline outlines key messages to communicate during a COVID-19 vaccination session, including benefits of vaccination, common potential side effects and how to handle them, myths and misinformation about vaccines, and complementary public-health and social measures	• In December 2020, the Public Health Agency of Canada required that federal, provincial and territorial governments provide ongoing access to comprehensive, clear and accurate information about COVID-19 vaccines and immunization plans through partnerships with First Nations, Inuit and Metis leaders, health professionals and other relevant stakeholders • Communication modalities used by provincial governments in Canada include FAQs (all provinces), news releases (Saskatchewan. Yukon), radio (Yukon), public Q&A sessions (Nunavut) and social media (Yukon and Nova Scotia) • Manitoba has released an interactive vaccine queue calculator for residents to understand their place in the vaccine priority line • Nunavut has created cash prize incentives for residents who choose to get vaccinated • In the Northwest Territories, local health personnel will be made available to community residents to answer questions about the vaccine before mobile-vaccine clinics arrive • On 1 March 2021, the second phase of Australia's educational COVID-19 campaign was launched which included health professionals and researchers responding to public enquiries through a series of "Top 3 COVID-19 Vaccine Questions" • On 8 March 2021, a COVID-19 vaccine eligibility tracker was launched in Australia to help provide residents with a projected vaccination timeline • A public website discussing vaccine progress in the Yukon is now available to residents *Content of messaging* • The Centre for Effective Practice in Ontario has put together resources for understanding vaccine

		hesitancy in Black and First Nations, Inuit and Métis communities • Common themes of the messaging on the websites of most countries and Canadian provinces include details on vaccine roll-out plans (including timelines for vaccinating priority groups), safety and efficacy of approved vaccines, vaccine options, possible adverse events following immunization, and updates on the number of vaccine doses received and administered o In addition to the above, China's CDC provides information on vaccine-administration protocols, contraindications, vaccine transportation and storage, monitoring and documentation, and risk-mitigation efforts • Alberta Health Services has a COVID-19 immunization booking webpage that is regularly updated with information about how eligible residents can book a vaccine appointment • Quebec's Ministry of Health maintains a website dedicated to demystifying beliefs regarding the risks of vaccination • Details on who is eligible to book an appointment during each phase of the vaccine roll-out is available on the Government of Prince Edward Island website • The Government of Germany has launched a COVID-19 vaccine information campaign, "Germany Pulls Up Its Sleeves", to help educate and inform the public o The first phase of the campaign focuses on raising awareness regarding priority populations o The campaign consists of educational videos, posters and advertisements • The New Zealand Ministry of Health has published information on its website about the safety, effectiveness and side effects of the Pfizer-BioNTech vaccine, how to get a vaccine (for border and MIQ workers), and what to expect at your vaccination

		• The Quebec government has released a document and video with guidance for the general public on how to register for vaccination through the online portal ○ The Ministry of Health and Social Services has produced and released several videos about COVID-19 vaccine safety and the provincial vaccination campaign for the general public (in English and French) • Nova Scotia, Prince Edward Island and Newfoundland and Labrador have added information sheets about the Oxford-AstraZeneca vaccine on their government websites • A website is available to residents of Northwest Territories to access information about the Moderna vaccine, the vaccination schedule, and to book appointments online
Administering vaccines in ways that optimize timely uptake	*With what explicit effort to leverage existing health-system arrangements* • A European CDC guideline recommends using pre-existing vaccination structures and delivery services in the models for the roll-out of COVID-19 vaccines • A low-quality rapid review noted that leveraging community-based teaching methods and community partnerships for greater vaccination uptake by hard-to-reach populations • Another low-quality rapid review provided a framework for operationalizing programs to increase vaccine coverage, including increasing vaccinator capacity and training, and synergistically re-integrating immunization services • A guideline (from the Johns Hopkins Center for Health Security and Texas State University Department of Anthropology) recommends enhancing vaccination by home visits, preparing educational materials, training vaccinators, and fostering partnerships with government, health departments, and the media • A WHO guideline indicates that there is no evidence for the need of a booster dose after the two-dose vaccine or about the interchangeability of Moderna mRNA-1273 vaccine with other mRNA vaccines *Where*	*With what explicit effort to leverage existing health system arrangements* • Most countries and Canadian provinces and territories are currently (or planning to) leverage existing health-system arrangements to administer COVID-19 vaccines in settings such as hospitals, general-practice clinics, pharmacies, and vaccination centres • The New Zealand government has partnered with some Māori and Pacific NGOs to set up small community vaccination clinics in South Auckland to support the roll-out of vaccines to household contacts of border and MIQ workers • Over 4,500 accredited general practices will serve as administration sites during Australia's vaccine roll-out, and the Australian Defense Force will provide additional personnel to assist with the vaccine roll-out in residential aged care facilities • The Government of France has authorized both medical practices and pharmacies to assist in vaccine administration ○ Medical practices in France will be distributing over 1.6 million doses of the Oxford-AstraZeneca

	• One medium-quality full systematic review found that school and childcare centre-located vaccination programs were beneficial for vaccination rates and outcomes, and a low-quality full systematic review highlighted the benefits of vaccination requirements for childcare, school, and college attendance • Another medium-quality full systematic review found that using an immunization information system was effective for increasing vaccination rates • A low-quality rapid review found three models for vaccination delivery in non-healthcare settings: social-distancing clinics, drive-through vaccination clinics, and mini-mobile teams • One single study indicated a heavy-lift UAV quadcopter can expand COVID-19 vaccine delivery to Indigenous people living in villages impeded by rugged terrain *By whom* • A medium-quality full systematic review found that allowing pharmacists to administer influenza vaccinations had small positive effects on vaccination rates, which was increased with greater autonomy • A low-quality rapid review discussed the recruitment of individuals with or without medical backgrounds and training approaches *With what partnerships to reach early populations of focus* • One low-quality rapid review discussed setting up familiar and accessible vaccination sites, community-based teaching methods and community partnerships for hard-to-reach populations • Another rapid review also focused on efforts through culturally specific education campaigns and engagement of stakeholders and community partners • One medium-quality full systematic review discussed the education of clinicians and parents to reduce vaccination pain, fear and distress • A guideline from the allergy centres in Germany provides guidance on allergological risk assessment regarding COVID-19 vaccination *With what broader, complementary health interventions* • One guideline from the U.S. CDC provides updated healthcare infection prevention and control recommendations in response to the COVID-19 vaccination in healthcare settings	vaccine by 12 March 2021, and pharmacies will be distributing an initial delivery of 67,000 doses of the Oxford-AstraZeneca vaccine • In April 2021, medical practices in Germany are scheduled to be delivery sites for vaccine administration • As of 21 February, university campuses and workplaces have launched as vaccination sites in Israel • Vaccination of the household contacts of border workers began on 9 March 2021 at the first large-scale COVID-19 vaccination clinic in New Zealand • Administration of the Oxford-AstraZeneca vaccine will commence soon at a drive-thru location in Regina according to a 9 March 2021 press release of the Saskatchewan government • Phase II will see vaccine administration in Ontario occur at municipally run vaccination sites, hospitals, mobile vaccination sites, pharmacies, clinics, primary-care settings, and community locations • Ontario is launching a pilot program for community pharmacy-based vaccine administration in three public-health units in mid-March 2021 • Within the month of March 2021, four more vaccine clinics will open in Nova Scotia • During Phases 2 and 3 of P.E.I.'s vaccine roll-out, mobile clinics will launch in smaller communities and clinics could be set up within large businesses and community-based settings • 25 pharmacies and family physician clinics in Nova Scotia and participating pharmacies in P.E.I. will be offering the Oxford-AstraZeneca vaccine in these provinces *Where* • Vaccines will be administered to long-term care home residents in Australia in an estimated 240 aged-care facilities in over 190 regions

	• Another guideline from the U.S. CDC provides the first set of public-health recommendations for fully vaccinated people in non-healthcare settings
	• One scientific brief from the U.S. CDC provides the background rationale and evidence for public-health recommendations for fully vaccinated people
	
	With what second-dose provisions
	• One guideline (from the U.S. CDC) developed using some type of evidence synthesis and/or expert opinion stating that adults should complete their second vaccination with the same vaccine product as the first dose
	With what safety monitoring requirements
	• One low-quality rapid review proposed several considerations for safety monitoring, including establishing a separate waiting area for post-vaccination monitoring, training staff, educating patients, administering to patients with a known history of adverse reactions, monitoring patient flow and clinic layout
		• New Zealand began vaccinating its border workers in Aotearoa on 20 February 2021 and in Wellington on 22 February 2021
		• Vaccinations recently began in various locations in several Canadian provinces
		  ○ starting 19 February 2021, Alberta Health Services (AHS) began vaccinating residents in retirement centres, lodges, supportive living, and other congregate-living facilities with people aged 75 and older
		  ○ vaccinations are taking place in Saskatchewan's long-term care homes, communities in the far north, and vaccination sites approved by the Saskatchewan Health Authority
		  ○ Manitoba vaccination supersites are in operation and there are plans to expand to up to 13 supersites (including two planned openings in March)
		  ○ Three more clinics have opened in Nova Scotia to vaccinate healthcare workers
		  ○ Vaccinations are being administered in Inuit communities in Labrador to anyone 17 years of age and older with priority given to healthcare workers and seniors
		  ○ In Nunavut, individuals must receive the second dose of the COVID-19 vaccine in the same location as where they received the first dose
		• Future plans for opening vaccination sites in provinces include:
		  ○ 172 vaccination sites across B.C. and mobile clinics in self-contained vehicles for some rural communities and home-bound residents
		  ○ The opening of the first mass immunization clinic in Saskatchewan in April 2021 and 230 vaccination clinics in 180 communities throughout rural, urban and northern Saskatchewan
		  ○ Fixed vaccination sites for staff working in personal-care homes and congregate-living settings in Manitoba

		○ In Ontario, Toronto Public Health launched a 'proof of concept' immunization clinic to test and adjust non-hospital vaccination plans ahead of mass vaccination ○ A clinic in New Brunswick's Madawaska Maliseet First Nation and additional clinics in other First Nation communities opening shortly after ○ The first of thirteen vaccination clinics in Mi'kmaq communities across Nova Scotia starting the week of March 1st ○ The first community-based clinic in Nova Scotia where individuals over the age of 80 not living in long-term care facilities will receive their vaccination • Community health nurses in P.E.I. will begin running clinics at Lennox Island First Nation at the end of February and beginning of March • For large-scale vaccinations, some countries are using venues in the community such as football stadiums (the U.K.), pharmacies (France), and/or mobile clinics for rural and remote areas (Israel, the U.K.) • In Australia, the Pfizer-BioNTech vaccines will only be administered at Hospital/Pfizer Hubs and the Oxford-AstraZeneca vaccine will be administered at general practitioner-led respiratory clinics, select general practices, state-run vaccination clinics, and Aboriginal Controlled Community Health Centres • In China, vaccination sites are set up in the health service centres, township health centres or general hospitals in the jurisdictions • Vaccines are administered in Germany in vaccination centres and in care facilities by mobile teams during the centralized vaccination phases • In Canada, several provinces are planning to open vaccination clinics in local communities to make vaccines more accessible to residents and Indigenous communities

		○ In B.C., the first phase of COVID-19 vaccine administration, which is of the priority populations, is occurring at public-health clinics ○ Focused Immunization Teams and Pop-up Clinics in Manitoba will each administer less than 5% of daily doses in the second quarter of 2021, and a 'Vaxport' , which is scheduled to open on 1 March 2021, will provide immunization for residents of remote Indigenous communities ○ In Yukon, there are 14 mobile clinics scheduled to visit rural and remote communities across the Yukon for vaccine administration ○ Prototype community clinics will be created in Nova Scotia beginning in February 2021 to increase access to vaccinations for vulnerable communities ○ Prince Edward Island is on track to have all individuals living and working in community-care and long-term care facilities fully vaccinated by 16 February 2021 *With what appointment/scheduling and screening support, changes to physical spaces and patient flows through these spaces, and changes to hours of operation* • Provinces in Canada continue to use a variety of tools to support the scheduling of vaccinations by eligible groups, including online booking tools (Alberta, P.E.I.) call centres (Manitoba, P.E.I.), and issuing letters by mail with booking information (Nova Scotia) • France requires an appointment to be made for COVID-19 vaccination at a select vaccination centre • Vaccination scheduling systems are being implemented in several Canadian provinces ○ Alberta Health Services has an online booking tool for eligible healthcare workers to book immunization appointments ○ A scheduling system is being developed in Saskatchewan for easy online access to vaccine

		appointments, and a toll-free telephone line will be operational in March 2021 to allow residents to book appointments ○ Starting 4 February 2021, commercial truck drivers and rotational workers in P.E.I. will receive phone calls from Health PEI to set up appointments to be vaccinated ○ Individuals in Nunavut must book an appointment with their local health centre in order to be vaccinated *With what post-vaccination observation period and what physical distancing, personal protective equipment, sanitation and other public-health measures* • In China, recipients of the vaccine should stay for 30 minutes, and if there is a suspected adverse reaction, immediately report to the vaccination institution and seek medical advice ○ Post-vaccination, mask-wearing is recommended along with other protective measures such as hand hygiene, ventilation, and social distancing need to be maintained • In Germany, an individual who suffers damage from the COVID-19 vaccine will receive care in accordance with the Federal Supply Act • In Israel, individuals are monitored for at least 15 minutes after vaccination or 30 minutes for individuals with history of anaphylaxis, and adverse-event reporting was conducted electronically • Vaccinated individuals in France are still required to respect and follow public-health measures (e.g., face mask and physical distancing) • Alberta's immunization record provides post-vaccination care instructions, including a list of potential side effects, contact information for Health Link, and a reference to the COVID-19 Self-Assessment for Albertans if unusual side effects persist

		• Electronic and paper copies of COVID-19 immunization records are made available for vaccinated individuals in Saskatchewan • The Quebec Immunization Committee is recommending that people in Quebec who have had severe reactions to other injections (that do not have common components with the COVID-19 vaccine) do not need specific pre-assessment, but should be monitored for 30 minutes following vaccination ○ The normal observation period following vaccination is 15 minutes *By whom and with what changes to remuneration* • Local vaccination service sites in the U.K. are being run by a mixture of primary-care networks and community pharmacies • More provinces are expanding the criteria for who can work as immunizers (Manitoba, B.C., P.E.I.) • Resources provided for health professionals involved in vaccine roll-outs in the countries assessed range from accredited training modules (Australia) to 24/7 call centres to provide guidance and vaccine shipment information (Israel) • In France, the Pfizer-BioNTech vaccine is only to be administered by nurses and physicians • Israel's Ministry of Health recruited community-based nurses, physicians, paramedics and EMTs to administer the vaccine • Vaccinators in New Zealand will be sourced from non-practising nurses, doctors or pharmacists, final-year medical, nursing or pharmacy students, and other health professionals who have vaccinations within their scope • To increase workforce capacity for administering COVID-19 vaccines, a few Canadian provinces (Manitoba, Quebec, New Brunswick) have developed online training to expand the scope of practice for some healthcare professionals while others (Nova

		Scotia) have called on retired health professionals to assist with administration • The Saskatchewan government intends for vaccines to be administered by physicians, nurse practitioners, and pharmacists in Phase 2 of its roll-out • The province of Manitoba is actively recruiting healthcare and non-healthcare staff to work in immunization clinics, and a distributed model of doctors' offices and pharmacists is expected to administer 25% of daily doses in the second quarter of 2021 • Expanded healthcare professionals in Ontario are able to register and apply to participate in vaccination efforts via Ontario's Matching Portal • On 10 March 2021, the Director-General of Health of New Zealand reported that more than 900 vaccinators have completed training to administer the Pfizer-BioNTech vaccine • Focused immunization teams have administered second doses to all personal-care home residents in Manitoba • As of 3 March 2021, 2,224 full-time equivalent staff were working in vaccination centres in Manitoba • To ensure a more timely approach to vaccinate a greater number of individuals in Phases 2 and 3, healthcare workers in Newfoundland and Labrador, including physicians and pharmacists, will assist with administering vaccines *With what broader, complementary health interventions* • As of 7 March 2021, fully vaccinated Israeli residents do not have to quarantine after entering the country, while unvaccinated individuals are required to isolate in designated hotels or in an alternate location using an electronic bracelet

		• China will launch health certificates for international travellers that will declare a person's vaccination status or recent test results
		• Israel's Ministry of Health unveiled a "Green Pass" system that allows fully vaccinated (one week after last dose) or those recovered from COVID-19 to enter specific businesses with a "green pass/certificate" and photo ID
		  ○ Israeli residents with a "green pass/certificate" can attend cultural and sports events, gyms, exhibitions, hotels, tourist areas, and worship houses (with restrictions)
		  ○ Failure to comply will result in a fine
		• On 8 March 2021, the CDC released interim public-health recommendations for people in the U.S. who have been fully vaccinated for COVID-19:
		  ○ Fully vaccinated people may visit other fully vaccinated people as well as unvaccinated people at low-risk for severe COVID-19 from a single household without wearing masks or physical distancing
		  ○ Fully vaccinated people do not have to quarantine or be tested after known exposure if they are asymptomatic
		  ○ Otherwise, fully vaccinated people should continue to follow existing prevention measures, including wearing a mask and physical distancing
		• As of 10 March 2021, the Government of Northwest Territories is exploring the possible implementation of vaccine passports to allow residents to travel easily
		
		With what second dose provisions
		• In both New Zealand and France, the second dose of the Pfizer-BioNTech vaccine will be administered after 21 days
		• In response to the vaccine-supply shortage in Canada, provinces have chosen to either set aside second doses for eligible residents in order to maintain the

		recommended vaccination interval (New Brunswick, Ontario), or administer first doses to as many residents as possible while extending the second-dose vaccination interval (Quebec, Alberta, Saskatchewan)
		• The Quebec Immunization Committee is recommending using the same vaccine for patients' first and second doses
		  ○ If the same vaccine is not available (or known) a similar type of vaccine (e.g., mRNA or viral vector) should be given
		  ○ Regardless of what type of second dose is given, it will be considered valid, and a third dose is not indicated
		• The Quebec Immunization Committee has recommended that people with prior confirmed COVID-19 infection may only need one vaccine dose to develop sufficient immunity, but noted that immunocompromised people who have had a confirmed COVID-19 infection and all those whose COVID-19 infection occurred very close (temporally) with a first vaccine dose should receive two doses as a precaution
		
		With what second-dose reminders
		• The vaccination campaign in the U.K. to reach as many people as possible was boosted by a shift in policy in early January which prioritized the first dose of a vaccine, with a second dose up to 12 weeks later
		• Saskatchewan's immunization system, Panorama, will be updated to set reminders for second-dose follow-ups
		• Individuals in Alberta will receive a reminder from AHS or participating pharmacies to book a second-dose appointment at a later date
		
		With what safety monitoring requirements
		OTHER COUNTRIES
		• Israel conducts adverse-event reporting electronically

Surveillance, monitoring and evaluation, and reporting	*Documenting vaccine-related opinions* • A medium-quality rapid review identified and summarized 135 studies on COVID-19 vaccination knowledge, attitudes, and behaviours of the Canadian and global population and found that intention to vaccinate varies between 54-75% in the Canadian context, and between 79-87% in the global context *Documenting vaccine status* • One WHO guideline focuses on the Vaccine Introduction Readiness Assessment Tool, which includes a framework and a set of recommended indicators for countries to self-monitor their readiness progress for COVID-19 vaccines *Documenting adverse events and follow-up* • A guideline states that the U.K. will identify 'safety signals' related to adverse events from COVID-19 vaccination, and has established a surveillance mechanism for vaccination in pregnancy • A guideline from the allergy centres in Germany states that reports of severe allergic reactions regarding COVID-19 vaccination can be made using an online questionnaire • One single study stated that two COVID-19 vaccines that received emergency use authorization (EUA) in the United States are undergoing safety monitoring during the initial implementation phases of the COVID-19 national vaccination program, using the vaccine adverse-event reporting system (VAERS) and v-safe *Identifying sources of vaccine hesitancy* • A low-quality rapid review (not yet publicly available) identified a series of associated factors that can influence the willingness to receive a COVID-19 vaccine • Two protocols for reviews that are underway aim to explore the hesitancy rate for COVID-19 vaccination and factors associated with COVID-19 vaccine uptake; and one protocol focuses on the barriers to vaccine acceptance in racial and ethnic minorities • A single study found that previous vaccine history could be an indicator to best predict COVID-19 vaccine acceptance	*Documenting vaccine status* • As of 9 February 2021, 40.5 million doses of COVID-19 vaccine have been administered in China • As of 19 February 2021, France has administered over 3,668,000 vaccines, with 2,535,436 individuals having received their first dose and 1,132,918 having been administered the second dose • As of 21 February 2021, Germany has administered over 5.3 million vaccine doses and an estimated 4.2% of the entire population of Germany has been vaccinated • As of 22 February 2021, 51.5% of Israel's population has received at least one dose of COVID-19 vaccine (which includes 89.9% of adults aged 60 years and older) • As of 24 February 2021, more than 17.9 million people in the U.K. have had a first vaccine dose and more than 642,000 have had a second dose • As of 22 February 2021, 75.2 million doses of COVID-19 vaccinations have been distributed in the U.S., according to the CDC, and 64.2 million doses have been administered • As of 24 February 2021, Canada has received 2,003,810 vaccines from Pfizer-BioNTech and Moderna manufacturers and 81.4% of doses delivered to Canada have been administered • Most provinces in Canada continue to update information on the number of vaccine doses administered on their government websites • Countries continue to ramp up their vaccination roll-outs, with administered doses ranging from 2.3 million in France as of 9 February 2021 to 31 million in China as of 3 February and 42.4 million doses in the U.S as of 8 February 2021 • The number of total doses administered in Canadian provinces range from nearly 400,000 in Ontario as of 9 February 2021 and more than 260,000 in Quebec as

	• One WHO interim guidance document contains a set of tools (surveys, interview guides and related tools) to support the gathering and use of quality data on the drivers and barriers to COVID-19 vaccine uptake
	• One WHO interim guidance document provides four tools to understand intentions for receiving COVID-19 vaccines among prioritized populations, including three steps (plan, investigate, and act)
	• The same medium-quality rapid review identified that common factors positively associated with vaccination intention in Canada and globally include male gender, older age, higher education, adequate knowledge or health literacy, trust in experts and the government, and higher socio-economic status; factors associated with vaccine hesitancy or refusal include religious beliefs, vaccine safety and efficacy, and belief that the COVID-19 vaccine is unnecessary
	
	Infrastructure to enable surveillance, monitoring and evaluation
	• A guideline from the European CDC recommends using electronic immunization registries to help monitor vaccine safety, efficacy, coverage and acceptance
	• One guideline from the European Centre for Disease Prevention and Control provides an updated metrics for COVID-19 vaccine roll-out within EU/EEA countries as of 21 February 2021
	• One guideline from the European Centre for Disease Prevention and Control states that EU/EEA countries described their deployment plans and cross-government arrangements, such as establishing a task force and electronic systems to support logistics management and vaccine registries, and they had the opportunity to compare their vaccination roll-out with an ideal vaccine deployment ('stress test') in order to identify gaps and the robustness of their current efforts
	• A guideline states that the U.K. will link the Second Generation Surveillance System and the National Immunisation Management System to monitor vaccine effectiveness
	• The same single study stated that the U.S. is implementing two safety monitoring systems for COVID-19 vaccination: VAERS is a passive surveillance system for adverse events that accepts input from healthcare providers, vaccine manufacturers and the public; and v-safe is an active
		of 8 February 2021, to 8,828 doses administered in Prince Edward Island as of 6 February 2021
		• A mobile application "Health Kit" was developed in China for checking individuals' vaccination status
		• The Quebec Vaccination Registry is an electronic database that keeps track of all persons receiving vaccines in Quebec and all vaccines received by Quebec residents who may be out of the province
		• Vaccinated individuals in New Brunswick receive a record of immunization
		• Ontario has begun voluntarily collecting socio-demographic data from those being vaccinated
		  ○ These data include race, household income, and linguistic profile
		
		Documenting adverse events and follow-up
		• Public Health Ontario has published a list of adverse events of special interest for COVID-19 vaccination surveillance
		• The Public Health Agency of Canada will monitor adverse reactions through several pre-existing mechanisms
		  ○ Canada Vigilance Program
		  ○ Canadian Adverse Events Following Immunization Surveillance System
		  ○ Immunization Monitoring Program ACTive (IMPACT) network
		  ○ Canadian Immunization Research Network
		  ○ Canadian Vaccine Safety Network
		  ○ Special Immunization Clinics Network
		• Alberta's Immunization Regulation requires health practitioners to report immunizations electronically to Alberta Health within a week
		• Health professionals in Ontario and Quebec are required to report adverse events to local public-health units who will investigate and provide support

	surveillance system that was established by CDC and allows participants to voluntarily self-enroll and receive smartphone text messages providing hyperlinks to web surveys about local injection site and systemic reactions	*Identifying and measuring performance indicators*
		• Through its surveillance efforts, Israel has seen a 41% drop in confirmed COVID-19 and 31% drop in hospitalizations from mid-January to early February in individuals aged 60 years and older
		• As of 17 January 2021, Israel's Ministry of Health and Pfizer signed an agreement to share anonymized medical-record data between hospitals or health plans and research entities in order to measure vaccine roll-out and immunity
		• Insights gleaned by the Economic, Social and Environmental Council in France found that the possibility of adverse side effects caused by the COVID-19 vaccine is the primary reason for hesitancy/rejection among participants
		
		Infrastructure to enable surveillance, monitoring and evaluation
		• Information from the Australian Immunisation Register is routinely uploaded to the Enterprise Data Warehouse (EDW)
		  ○ De-identified data from the EDW will be transferred to the Vaccine Data Solution software that helps to monitor the coverage and logistics of the COVID-19 vaccine roll-out
		• Several countries are utilizing national immunization registers and electronic health records to enable surveillance, monitoring and evaluation of COVID-19 vaccinations (Australia, China, Israel, U.K., U.S.)
		• New or additional surveillance systems or indicators have been developed in some countries (Australia, Germany, New Zealand, China, U.S, France) specific for COVID-19 to monitor vaccine roll-out program implementation
		  ○ Australia developed a monitoring program for COVID-19 through a partnership with Accenture
		  ○ In Germany, the Robert Koch Institute and Paul Ehrlich Institute will lead the surveillance and evaluation efforts for COVID-19 including app-

		based cohort studies and long-term hospital-based case-control studies o New Zealand is in the process of replacing their National Immunisation Register with the National Immunisation Solution to better support COVID-19 roll-out by allowing health workers to record vaccinations more efficiently o The CDC in the U.S. expanded safety monitoring systems that utilize a smartphone-based, post-vaccine health checker called V-safe which uses text messaging and web surveys from CDC to check in with vaccine recipients as well as provide second dose reminders if needed • Post-marketing surveillance of COVID-19 vaccine administration in Canada will be undertaken by the Public Health Agency and Health Canada through a number of surveillance programs • In addition to recording, storing and managing COVID-19 vaccination records, Saskatchewan and the Yukon both use an immunization administration system (Panorama), which also provides reminders for second-dose follow-ups • The Government of Australia released a series of informative resources to aid residential aged care providers with the vaccine roll-out (e.g., monitoring and reporting) • A public form is available for health professionals and the general public in Australia to make enquiries related to COVID-19 vaccines • Alberta Health Services provides a COVID-19 Client Immunization Record for individuals who have been administered a COVID-19 vaccine in Alberta • In Saskatchewan, COVID-19 vaccination records are stored electronically on MySaskHealthRecord • Manitobans who have been vaccinated can access their individual immunization record online with their health card number and email address, and family doctors also have access to immunization records

Table 3: Overview of type and number of documents related to one or more COVID-19 vaccine roll-out elements*

Type of document	Total (n=324)**	Securing and distributing a reliable supply of vaccines and ancillary supplies (n=10)	Allocating vaccines and ancillary supplies equitably (n=21)	Communicating vaccine-allocation plans and the safety and effectiveness of vaccines (n=46)	Administering vaccines in ways that optimize timely uptake (n=27)	Surveillance, monitoring and evaluation, and reporting (n=18)
Guidelines developed using a robust process (e.g., GRADE)	121	13	36	19	29	24
Full systematic reviews	15	0	1	5	5	4
Rapid reviews	34	1	13	7	10	3
Guidelines developed using some type of evidence synthesis and/or expert opinion	57	3	20	3	20	11
Protocols for reviews that are underway	26	0	2	3	0	21
Titles/questions for reviews that are being planned	-	-	-	-	-	-
Single studies that provide additional insight	128	8	18	29	9	64

*The table includes all newly identified evidence documents and all highly relevant evidence documents identified in previous versions of this LEP that continue to be deemed highly relevant.

**Some documents were tagged in more than one category so the column total does not match the total number of documents.

Bhuiya A, Bain T, Wang Q, Al-Khateeb S, Alam S, DeMaio P, Gauvin FP, Ahmad A, Drakos A, Rintjema J, Sharma K, Santesso N, Lavis JN, Wilson MG. COVID-19 living evidence profile #1 (version 1.6): What is known about anticipated COVID-19 vaccine roll-out elements? Hamilton: McMaster Health Forum, 20 April 2021.

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