

WHAT CAN WE LEARN FROM COUNTRY EXPERIENCES OF COVID-19 VACCINE ROLL OUT?

Key messages

1. Over 120 countries and territories have introduced the COVID-19 vaccine so far. Many of these countries have developed strategies for the deployment of the vaccine that covers the key elements of implementation such as the identification of priority groups, vaccine delivery logistics and communication
2. All countries opted for a phased introduction of the vaccine based on priority groups that were identified as high risk for severe disease/death and infection. These priority groups include healthcare workers, the elderly, people with co-morbidities, and other frontline essential workers
3. Many countries will utilize, and build on existing structures for the delivery of other vaccines, to deliver the COVID-19 vaccine
4. In Africa, where only 15 countries have begun rolling out the vaccine, less than half of the countries (49%) have identified priority groups and have plans in place to implement their vaccination campaign
5. A centralized approach, early approval and access to vaccines and domestic supply are some of the factors that contribute to successful rollout of the vaccine
6. Limited vaccine supply, shortages of equipment, consumables and healthcare workers, lack of sufficient monitoring systems and vaccine hesitancy are some of the common challenges identified during roll out

Background

As of March 9th, 2021, there have been over 100 million COVID-19 cases worldwide and over 2 million deaths (1). While non-pharmaceutical interventions have been useful in slowing the spread of the virus, vaccination has long been considered the critical component in control strategies to reduce hospitalization and deaths. This has led to a large global effort to develop vaccines. So far, several vaccine candidates have been granted emergency use authorization/ conditional approval and are currently in use (2). However, to achieve global control of COVID-19 using vaccines, several requirements must be met. First, the vaccines have to be produced at scale to meet global demand. Second, they have to be affordable and finally, they have to be deployed equitably so that they are available where needed. Therefore, successful introduction of vaccines involves making several key strategic decisions. These plans cover the main considerations for the implementation of vaccination. These include infrastructural and logistical issues, selection of priority groups that will be vaccinated first, delivery of vaccination services, communication plans and vaccination monitoring systems among others.

This brief provides an overview of the vaccination plans of selected countries and highlights the lessons learnt and challenges faced by these countries when rolling out the COVID-19 vaccine.

Table 1: The total number of doses administered per 100 people in different regions of the world (3)

| Region | Doses administered per 100 people |
|---------------|-----------------------------------|
| North America | 16.9 |
| Europe | 10.0 |
| South America | 4.5 |
| Asia | 2.5 |
| Africa | 0.4 |

Table 2: A summary of the COVID-19 vaccines that are currently in use and the regions where they are used (3)

| Vaccine | Number of countries |
|--------------------|---------------------|
| Pfizer-BioNTech | 71 |
| Oxford-AstraZeneca | 64 |
| Moderna | 32 |
| Sinopharm | 17 |
| Sputnik V | 17 |
| Sinovac | 12 |

Prioritization: Who gets the vaccine?

As vaccine supply is currently limited, all countries that have started rolling out the COVID-19 vaccine have opted to prioritize the vaccination of individuals at high risk of infection and severe disease. The most common priority groups targeted for vaccination include older age individuals, healthcare workers and other essential workers and persons with underlying conditions. The rationale behind this selection is based on evidence that older people and people with underlying conditions are at high risk of hospitalisation and death. In addition, healthcare workers and other essential workers are at highest risk for work-related exposure to SARS-CoV-2 because their work-related duties must be performed on site and involve being in close proximity with COVID-19 patients and the public. The table below (Table 3) summarizes the priority groups identified by various countries.

Table 3: Summary of the priority groups recommendation of COVID-19 vaccination in different countries

| <i>Country</i> | <i>Healthcare workers</i> | <i>Elderly</i> | <i>Adults with comorbidities</i> | <i>Other risk groups</i> | <i>Phased approach</i> |
|-----------------------------|---------------------------|-----------------|----------------------------------|--------------------------|------------------------|
| <i>South Africa (3) (4)</i> | Yes | 60+ years | Yes | Yes | Yes |
| <i>EU/EEA countries (5)</i> | Yes | 60 to +80 years | Yes | Yes | Yes |
| <i>UK (5)</i> | Yes | 80+ years | Yes | Yes | Yes |
| <i>Morocco (6)</i> | Yes | Yes | Yes | Yes | Yes |
| <i>Israel</i> | Yes | 60+ | Yes | Yes | Yes |
| <i>USA (7)</i> | Yes | 60 to +75 years | Yes | Yes | Yes |
| <i>UAE (8)</i> | Yes | 60+ | Yes | Yes | Yes |
| <i>Egypt (9)</i> | Yes | Yes | Yes | Yes | Yes |
| <i>Seychelles (10)</i> | Yes | Yes | Yes | Yes | Yes |
| <i>Zimbabwe (11)</i> | Yes | 60+ years | Yes | Yes | Yes |

Vaccine delivery plans

For countries to kick-off successful vaccination programs, they need to have functioning logistics systems and supply chains. These systems guarantee the storage, handling, tracking, and inventory management of vaccines; and this implies a strict control of the cold chain and adequate logistics management systems. Although vaccination programs that utilize these systems already exist throughout the world, the urgency of introducing the COVID-19 vaccine and the scale at which it needs to be delivered poses a new challenge. Existing structures are also suited for childhood immunizations are there and questions about their suitability for rolling out adult vaccines at scale. Poorly managed logistics systems may result in unnecessary wastage of vaccines, and shortages which negatively impacts public health and raises operating costs.

What are some countries doing?

EU/EEA countries

Delivery: Countries plan to use and build on existing vaccination delivery services and structures for the roll-out of COVID-19 vaccination plans. In some countries, delivery of vaccines would be through general practitioners and primary health centres, while in other countries, vaccines would be delivered through designated vaccination centres (5).

Administration/workforce: eleven countries intend to use their existing workforce to administer the vaccines while thirteen countries reported on planning to mobilize and train other medical staff (e.g. general practitioners, nurses, midwives, medical students). In addition, thirteen countries plan to stockpile PPE for health workers administering vaccines through joint EU or national procurement, while twelve plan to use their own national reserves of PPE, and some plan to use both (5).

Transport and storage infrastructure: Twenty-six countries reported that cooled transport is available, with 23 countries reporting that adequate cold chain is in place. Three Member States advised that the logistics and infrastructure around storage and transport continue to be developed (5).

Vaccine communication: Twelve countries have communication plans in place to improve vaccine uptake while the others have drafted plans or have plans under development (5).

Cost: Vaccines will be available for free (5).

Zimbabwe

Delivery: Distribution of COVID-19 vaccine will follow the existing distribution structure of routine vaccines and supplies. Distribution planning is based on target population per province. Vaccination will be done at fixed and outreach points. 1-2 outreach teams will be allocated per rural district depending on the size of the district with 5 people per team (11).

Transport and storage infrastructure: Logistical support for vaccine distribution & cold chain management will be available throughout planning and implementation. Availability of adequate cold chain storage will be ensured. Vaccines will be store at provincial cold rooms with 9m3 capacity and transported to districts with cold chain capacity of 200 liters (11).

Vaccine communication: The country has plans in place to carry out community mobilization to increase vaccine demand. This will include use of Radio and TV programs & announcements, interpersonal communication with target groups, newspapers articles and advertisements, social media campaigns, bulk SMSs etc. (11).

Cost: Vaccines will be available for free (11).

Challenges faced during vaccine roll out

As countries begin their vaccination campaigns, several challenges have been faced. The most common challenge is a limited supply of vaccines. This issue is likely to persist as countries start vaccinating the larger population. Another notable challenge is limited supply of healthcare workers, equipment and consumables such as syringes. Vaccine hesitancy amongst the priority groups, logistical issues and a decentralized healthcare system which introduces confusion and delays are other challenges experienced by the countries that have introduced the COVID-19 vaccine. Table 4 highlights the problems some countries have faced while rolling out the COVID-19 vaccine.

Table 4: Challenges faced by some countries during vaccine roll out

| Region | Challenges |
|-----------------------------|--|
| EU/EEA countries (5) | Limited vaccine supply; limited availability of storage capacity, cold chain and transportation; shortage of equipment needed for vaccination such as syringes; staffing shortages; issues with vaccine monitoring systems; challenges with vaccine refusal, spread of misinformation, and vaccine hesitancy |
| USA (12) | Slow delivery of vaccines due to lack of co-ordination between administrative and health systems; lack of resources and capacity to administer vaccines at state level, scheduling people for vaccination appointments; vaccine hesitancy |
| Israel | Supply delays; vaccine hesitancy |
| Canada (13) | Delayed supply of vaccine from manufacturer |

Lessons learnt

Some countries have shown initial success in deploying the COVID-19 vaccine. Israel has fully vaccinated 43% of its population (9 million) while Seychelles has vaccinated 25.2% of its population (97,625) (2). While a small population is a significant factor contributing to this success, countries which have achieved greater rates of vaccine coverage have a few things in common:

A strong centralized coordination system gets the vaccine to people faster. Israel, the UAE and the UK have relied on their centralized health systems to drive their vaccine rollout. These systems connect all residents to a national digital health network which makes it easier to track and access information and roll out national healthcare agendas, such as vaccination campaigns. In addition, a centralized government does not require coordination of a public health response across different levels of government which makes designing vaccine rollout less complicated. In the US, where healthcare and governance are not centralized, a lack of co-ordination between the federal and local governments has led to some ambiguity regarding the vaccination strategy thus delaying the process (12).

Early access to vaccine doses ensures that vaccine introduction is started quicker. After promising phase III trials, high-income countries such as Canada, the US, UK and the EU pre-ordered vaccines which allowed them to introduce the vaccine earlier than other regions. Israel signed an agreement with Pfizer for an early supply of vaccines in exchange for anonymized data on how the vaccine performs

in the country (13). Although investing in vaccines that early was a huge financial gamble, it has paid off as Israel, the UK and the US are ahead in vaccine roll out (2). On the other hand, although Canada preordered vaccines early, delayed supply from the manufacturers has meant a slow start to their vaccination campaign (14).

Quick approval of vaccines is essential for early roll out of vaccines. The EU have administered 0.14 doses per 100 people while the US and the UK have administered 0.49 and 0.61 doses per 100 people respectively (2). Part of the disparity in this vaccine coverage stems from when vaccines were approved in each country. Health authorities in the European Union approved the Pfizer vaccine 10 days later than their counterparts in the United States and nearly three weeks after U.K. officials. In addition, the UAE, which has administered 0.89 doses per 100 people, approved and started rolling out the sinopharm vaccine while they were still in phase three clinical trials.

Domestic production ensures steady supply of the COVID-19 vaccine. Domestic production means that countries have secure supply of the vaccine. In addition, priority delivery is given to the host country which delays delivery in other countries. Canada pre-ordered enough vaccine doses to vaccinate their population 5 times but 3 months after starting vaccination, the country has managed to vaccinate only 922 000 people. This is partly because they ordered vaccines from European companies which are already grappling with supply issues and give first priority to EU countries (15).

Box 1: Israel's success so far

Israel has fully vaccinated 43% of its population as of March 8th, 2021. The country was one of the first to secure purchase agreements with Moderna, Pfizer, and AstraZeneca, and so had early access to the vaccines once they were available. Roll out was started on 19th December. Its centralized national system of government, and well-developed infrastructure for implementing prompt responses to large-scale national emergencies were important factors in facilitating vaccine introduction. Israel's healthcare data system also played a central role. Every resident is covered by a healthcare maintenance organization, which has current digital information for all patients. The system facilitates outreach to those needing vaccination by providing text message reminders to those in need of vaccination, facilitating appointment booking, and managing data on current vaccine distribution. With the approval of Pfizer, distribution was facilitated by repackaging the large frozen pallets of vaccines into smaller insulated boxes. By doing so, quantities of vaccines as small as 100 doses could be delivered to clinics and remote areas. This facilitated parallel distribution of vaccines, rather than centralizing distribution in hospitals in large urban centres. However, the country still faced some challenges. The rate of vaccination uptake was lower than expected. In some vaccination sites, a low turnout meant that vaccines had to be thrown out or administered to people who were not in the priority groups. This meant that while the number of people getting vaccinated was increasing, the supply available to the priority groups was diminishing.

Vaccine roll out in Africa: where are we?

According to analysis carried out by the WHO on vaccination preparedness, most African countries are not ready to roll out vaccines (16). The analysis reports that only 24% of African countries have adequate plans and resources to implement vaccination, 17% have vaccine monitoring tools available, 49% have identified priority groups, 44% have coordination structures in place and only 12% have communication plans to encourage vaccine uptake. However some African countries have started rolling out the COVID-19 vaccine (Table 5). These countries share similar priority group recommendation with healthcare workers being the top priority.

Table 5: Summary of the African countries that have started their vaccination campaign against COVID-19 (data from: Our World in Data (2)).

| Country | Vaccine | Start date | Doses administered | Groups vaccinated |
|---------------------|-------------------------|---------------|--------------------|---|
| Morocco | Sinopharm & AstraZeneca | 28 Jan 2021 | 1,707,091 | Health professionals, public authorities, security forces, and national education personnel, as well as the elderly and vulnerable groups at risk |
| Guinea | Russia Sputnik V | 30 Dec 2020 | 55 | Government officials |
| Seychelles | Sinopharm & Moderna | 10 Jan 2021 | 81715 | Healthcare workers, executive leaders and workers in essential services, elderly |
| Rwanda | Moderna | 14 Feb 2021 | 158,898 | High risk groups (not specified) |
| Egypt | Sinopharm & AstraZeneca | 24 Jan 2021 | 1,315 | Medical staff working in chest and fever hospitals and 40 isolation hospitals |
| Algeria | Russia Sputnik V | 30 Jan 2021 | 75000 | Health care workers, the elderly and other vulnerable populations. |
| Kenya | Oxford/AstraZeneca | 05 March 2021 | n/a | Health workers, critical service professionals, elderly, individuals in congregate settings |
| Nigeria | Oxford/AstraZeneca | 07 March 2021 | n/a | health workers, elderly and individuals with pre-existing conditions |
| Senegal | Sinopharm | 24 Feb 2021 | 66,768 | front-line health workers, persons beyond sixty years old and persons with comorbidities |
| Ivory Coast | Oxford/AstraZeneca | 01 March 2021 | n/a | health and essential workers, and other at-risk groups |
| Ghana | Oxford/AstraZeneca | 01 March 2021 | n/a | health and essential workers, and other at-risk groups |
| South Africa | Johnson & Johnsons | 18 Feb 2021 | 101,841 | Health workers, State leaders, elderly, persons with comorbidities, other risk groups |
| Zimbabwe | Sinopharm | 19 Feb 2021 | 35,518 | health professionals and immigration agents, security forces |
| Uganda | Oxford/AstraZeneca | 10 Marth 2021 | n/a | healthcare workers, teachers and those in high-risk groups, including the elderly |
| Mauritius | Oxford/AstraZeneca | 26 Jan 2021 | 3,843 | Health workers treating COVID-19 patients, workers meeting passengers at airport |

Conclusion

This brief provides an overview of the COVID-19 vaccination plans of some countries and provides insights into the selection of priority groups, vaccine delivery systems and lessons learnt from countries that have begun their vaccination campaign. Even as many countries progress with their plans, African countries still lag behind. As countries in Africa await their supply of vaccines, it is crucial that they use insights gained from other nations and develop plans that would contribute to a successful vaccination campaign.

References

1. **John Hopkins University of Medicine.** Coronavirus Resource center. John Hopkins University of Medicine. [Online] February 15, 2021. <https://coronavirus.jhu.edu/map.html>.
2. **Our World in Data.** COVID-19 vaccinations. Our World in Data. [Online] 2021. [Cited: February 15, 2021.] <https://ourworldindata.org/covid-vaccinations>.
3. **National Institute For Communicable Diseases.** COVID-19 vaccine rollout strategy. National Institute For Communicable Diseases. [Online] 2021. [Cited: 02 16, 2021.] <https://www.nicd.ac.za/covid-19-vaccine-rollout-strategy-faq/>.
4. **Department of Health, Republic of South Africa.** COVID-19: Vaccine strategy . COVID-19 online resource and news portal. [Online] 2021. [Cited: February 16, 2021.] <https://sacoronavirus.co.za/2021/01/03/covid-19-vaccine-strategy/>.
5. **European Union.** European Centre for Disease Prevention and Control. European Centre for Disease Prevention and Control. [Online] 2021. [Cited: February 2021, 2021.] <https://www.ecdc.europa.eu/sites/default/files/documents/Overview-of-COVID-19-vaccination-strategies-deployment-plans-in-the-EU-EEA.pdf>.
6. **Ministry of Health, Morocco. Vaccination process.** Ministry of Health, Morocco. [Online] 2021. [Cited: Feb 17, 2021.] <https://www.liqahcorona.ma/ar/operationdevaccination>.
7. The New York Times. The Coronavirus Outbreak. The Newyork Times. [Online] 2021. [Cited: February 18, 2021.] <https://www.nytimes.com/interactive/2020/us/covid-19-vaccine-doses.html>.
8. **The National. Coronavirus News.** The National. [Online] 2021. <https://www.thenationalnews.com/uae/health/abu-dhabi-limits-vaccines-to-elderly-and-disabled-for-next-six-weeks-1.1161411>.
9. **Ahram Online.** Guide to COVID-19 vaccination in Egypt: What we need to know. Ahram Online. [Online] 2021. <http://english.ahram.org.eg/NewsContent/7/48/402519/Life--Style/Health/Guide-to-COVID-vaccination-in-Egypt-What-we-need-t.aspx>.
10. **Ministry of Health, Republic of Seychelles.** COVID-19 vaccinations-FAQs. Ministry of Health, Republic of Seychelles web site. [Online] 2021. <http://www.health.gov.sc/index.php/covid-19-vaccination-faqs/>.
11. **Kubatana.** MOHCC COVID-19 vaccine deployment plan. Kubatana. [Online] 2021. http://kubatana.net/wp-content/uploads/2021/02/MOHCC_Covid19_Vaccine_Deployment_Plan_210216.pdf.
12. **The New York Times.** Here's Why Distribution of the Vaccine Is Taking Longer Than Expected. The New York Times Web site. [Online] 2021. <https://www.nytimes.com/2020/12/31/health/vaccine-distribution-delays.html>.
13. - Why Canada's Vaccine Rollout Slowed Down. The New York Times web site. [Online] 2021. <https://www.nytimes.com/2021/02/19/world/canada/why-canadas-vaccine-rollout-slowed-down.html>.
14. **NPR.** Vaccines For Data: Israel's Pfizer Deal Drives Quick Rollout — And Privacy Worries. npr web site. [Online] 2021. <https://www.npr.org/2021/01/31/960819083/vaccines-for-data-israels-pfizer-deal-drives-quick-rollout-and-privacy-worries>.
15. **Lexchin, Joel.** The roots of Canada's COVID-19 vaccine shortage go back decades. The Conversation web site. [Online] 2021. <https://theconversation.com/the-roots-of-canadas-covid-19-vaccine-shortage-go-back-decades-154792>.
16. **The World Health Organisation Africa.** WHO urges African countries to ramp up readiness for COVID-19 vaccination drive. The World Health Organisation Africa web site. [Online] 2021. <https://www.afro.who.int/news/who-urges-african-countries-ramp-readiness-covid-19-vaccination-drive>.