# Frequently Asked Questions about COVID-19 Vaccines

**Version 4, 7 April 2021**

## Section 1. COVID-19 vaccines in use at the global level and vaccine candidates

1. **What are the COVID-19 vaccines with authorization from the World Health Organization (WHO) and from national regulatory authorities?**

   As of April 1st, WHO has granted Emergency Use Listing (EUL) authorization to the following vaccines: Pfizer/BioNTech, AstraZeneca/Oxford-SKBio and Serum Institute of India, and Janssen.

   The following vaccines have received national regulatory authorization[1]:

   - **Moderna/ NIAID/ Lonza/ Catalent/ Rovi/ Medidata/ BIOQUAL**: in use in the United States , Canada, israel, Switzerland, and UK.
   - **AstraZeneca/Oxford:** in use in Argentina, Brazil, Dominican Republic, El Salvador, India, Mexico, Morocco, Pakistan, and the U.K.
   - **BioNTech/ Pfizer/ Fosun Pharma/ Rentschler Biopharma**: in use in the European Commission, Argentina, Mexico, Saudi Arabia, Canada, Bahrain, US and, UK.
   - **Janssen Pharmaceutical Companies/Sanofi/Merk**: Authorized for "emergency use" in the United States (U.S.).
   - **Gamaleya Research Institute:** in use in Algeria, Argentina, Bolivia, Hungary, Palestine, Paraguay, Serbia, Turkmenistan, UAE, and Venezuela, and "registered" in Belarus and Russia.
   - **CanSino Biologics/ Beijing Institute of Biotechnology/ Petrovax**: for "the military" by China's Central Military Commission.
   - **Wuhan Institute of Biological Products/ Sinopharm**: for "emergency use" in China and the United Arab Emirates.
   - **Sinovac/ Instituto Butantan/ Bio Farma**: for "emergency use" in Brazil, China, and Indonesia.
   - **Beijing Institute of Biological Products/ Sinopharm**: in use in China, Bahrain, Pakistan, and the United Arab Emirates.
   - **Bharat Biotech**/ Indian Council of Medical Research/ National Institute of Virology/ Ocugen/ Precisa Medicamentos in use for "emergency use" in India
   - **Research Institute for Biological Safety Problems**, Republic of Kazakhstan: in use through "temporary registration" in Kazakhstan

[1] The Milken Institute. COVID-19 Vaccine Tracker [intranet]. The Milken Institute; 2020. Available at: https://www.covid-19vaccinetracker.org/

**2. How many candidates vaccines are in clinical and pre-clinical evaluation and what are the main characteristics of the vaccines in clinical evaluation?**

As of April 6th , there are 86 candidate vaccines in clinical evaluation in humans, and 18 candidate vaccines in the preclinical phase[2].

Table 1. **Number of doses, schedule and route of administration of candidates in clinical phase**

| Number of doses & schedule | | Candidate vaccines (no. and %) | |
|---|---|---|---|
| **1 dose** | | **11** | **13%** |
| Day 0 | | 11 | |
| **2 doses** | | **55** | **64%** |
| Day 0 + 14 | | 6 | |
| Day 0 + 21 | | 21 | |
| Day 0 + 28 | | 28 | |
| **3 doses** | | **1** | **1%** |
| Day 0 + 28 + 56 | | 1 | |
| **TBD / No Data (ND)** | | **19** | **22%** |
| **Route of administration** | | | |
| **Oral** | | **2** | **2%** |
| **Injectable** | | **71** | **83%** |
| SC | Sub cutaneous | 3 | 3% |
| ID | Intra dermal | 3 | 3% |
| IM | Intra muscular | 65 | 76% |
| IN | Intra nasal | 7 | 8% |
| **TBD / No Data (ND)** | | **13** | **15%** |

*Source:* World Health Organization. Draft Landscape of COVID-19 candidate vaccines [Internet]. WHO; 2021. Accessed 04/06/2021. Available at: https://www.who.int/publications/m/item/draft-landscape-of-covid-19-candidate-vaccines

**3. What types of COVID-19 vaccines are being developed by April 7th ?**

Various technologies and platforms are being used such as[2]:

- Nucleic acids (DNA, RNA) vaccines: vaccines that use one or more of the coronavirus's own genes to provoke an immune response.
- Viral vector vaccines: vaccines that use a virus – non-replicating or replicating vector – to deliver coronavirus genes into cells and provoke an immune response.
- Protein-based vaccines: vaccines that use a coronavirus protein or a protein fragment (protein sub-unit) to provoke an immune response.

[2] For updated data, please visit: WHO Draft Landscape of COVID-19 candidate vaccines. Available at: https://www.who.int/publications/m/item/draft-landscape-of-covid-19-candidate-vaccines

- Whole-virus vaccines: vaccines that use a weakened (attenuated) or inactivated version of the coronavirus to provoke an immune response.

Table 2. Candidates in clinical phase – platform
For updated data, [Draft landscape and tracker of COVID-19 candidate vaccines (who.int)]

| Platform | | Candidate vaccines (no. and %) | |
|---|---|---|---|
| **PS** | Protein subunit | 28 | 33% |
| **VVnr** | Viral Vector (non-replicating) | 12 | 14% |
| **DNA** | DNA | 10 | 12% |
| **IV** | Inactivated Virus | 11 | 13% |
| **RNA** | RNA | 12 | 14% |
| **VVr** | Viral Vector (replicating) | 4 | 5% |
| **VLP** | Virus Like Particle | 4 | 5% |
| **VVr + APC** | VVr + Antigen Presenting Cell | 2 | 2% |
| **LAV** | Live Attenuated Virus | 2 | 2% |
| **VVnr + APC** | VVnr + Antigen Presenting Cell | 1 | 1% |
| | | **86** | |

*Source:* World Health Organization. Draft Landscape of COVID-19 candidate vaccines [Internet]. WHO; 2021. Accessed 04/06/2021. Available at: https://www.who.int/publications/m/item/draft-landscape-of-covid-19-candidate-vaccines

**4. Will all the COVID-19 candidate vaccines be successful?**

Only a portion of candidate vaccines will be successful. A study about vaccines targeting human infectious diseases showed that candidate vaccines in preclinical evaluation have an estimated marked entry probability of 7%, and once they have entered clinical evaluation of 17%.

**5. How do we know COVID-19 vaccines are safe?**

COVID-19 vaccines are novel vaccines that have never been used in humans on a large scale, therefore close safety monitoring post-authorization should be carefully conducted to continue to assess the safety profile of each vaccine. Currently, most available information has been provided by vaccine manufacturers during clinical trials. Dossiers containing safety data that are submitted to national regulatory authorities should be carefully assessed before the vaccine is approved (authorized) for use in a country or region. The summary of product characteristics of vaccines authorized for use by the WHO prequalification process are accessible on the WHO Prequalified Vaccines. Preparedness and basic training of staff to follow the WHO global and PAHO regional guidance and national protocols for AEFI surveillance and, therefore, strengthen local capacity, is ongoing. National Commissions for Vaccine Safety have to be convened in each country in order to do the causality assessment and adequate classification of the serious AEFI. All these actions will allow to detect any event that needs to make decisions in order to do corrective actions. The purpose for a Regional AEFI Surveillance System is to maintain the acceptance and confidence of the population based on scientific evidences in real time.

**6. What are the candidate vaccines in Phase 3 and vaccines in phase 4?**

As of April 1st 2021, there are 49 COVID-19 candidate vaccines in Phase 2/3 and Phase 3 There is no direct correlation between the trial phase of a vaccine and its superiority or future success. A vaccine reaching phase 3 would not necessarily indicate that it is better than a vaccine in phase 1 or phase 2. At the same time, it is important to consider that not all vaccine manufacturers with products in clinical studies have the capacity to scale up their production and distribution to respond to global demand. According to WHO, there are 4 vaccines in Phase 4 by April 1st. Vaccines in Phase 4 trial is also referred to as post marketing surveillance and it is conducted after the vaccine is already marketed and available to the general public (details are provided in Table 3).

Table 3: Main characteristic of COVID-19 candidate vaccines in Phase 4 (April 1st 2021)

| Vaccine platform description | Type of candidate vaccine | Number of doses | Schedule | Route of administration | Developers |
|---|---|---|---|---|---|
| Inactivated virus | CoronaVac; SARS-CoV-2 vaccine (inactivated) | 2 | Day 0 + 14 | IM | Sinovac Research and Development Co., Ltd |
| Inactivated virus | Inactivated SARS-CoV-2 vaccine (Vero cell), vaccine name BBIBP-CorV | 2 | Day 0 + 21 | IM | Sinopharm + China National Biotec Group Co + Beijing Institute of Biological Products |
| Viral vector (Non-replicating) | ChAdOx1-S - (AZD1222) (Covishield) | 1-2 | Day 0 + 28 | IM | AstraZeneca + University of Oxford |
| RNA based vaccine | mRNA -1273 | 2 | Day 0 + 28 | IM | Moderna + National Institute of Allergy and Infectious Diseases (NIAID) |
| RNA based vaccine | BNT162 (3 LNP-mRNAs ), also known as "Comirnaty" | 2 | Day 0 + 21 | IM | Pfizer/BioNTech + Fosun Pharma |

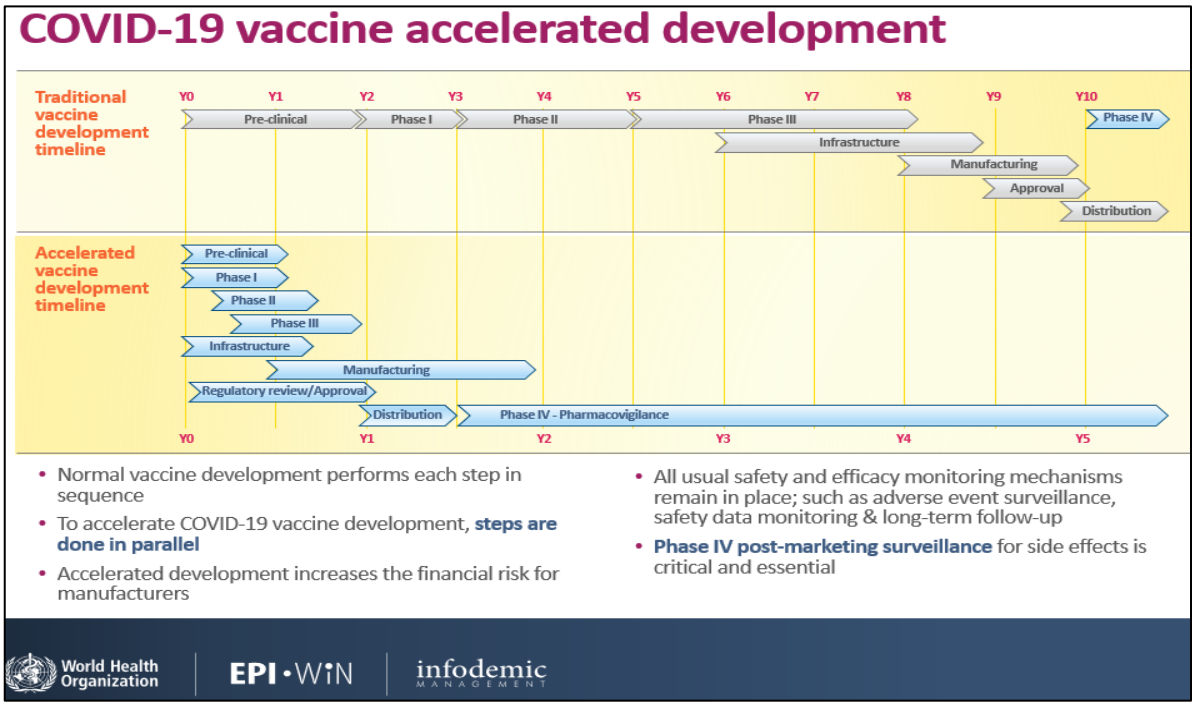
Source: COVID-19 vaccine tracker (shinyapps.io)

**7. How have COVID-19 vaccines been developed so quickly?**

The development of a novel vaccine is a complex and lengthy process that on average takes 10 years. However, COVID-19 vaccines are the culmination of years of research in new technologies and have been built on lessons learned from work on SARS and MERS vaccines in development, as well as the developed Ebola vaccines.

Given the current COVID-19 pandemic, institutions, commercial developers, and researchers around the world are working at an unprecedented speed and scale targeting for safe and effective COVID-19 vaccine(s) in approximately 12-18 months.

Imagen 1: COVID-19 Vaccine accelerated development




Source: WHO EPI-WIN updates. COVID-19 Vaccine Development.

8. **Where are these COVID-19 candidate vaccines being developed?**
   Most of the companies and institutions developing vaccines against COVID-19 are in countries such as the United States of America, United Kingdom, and China. Some of the vaccine clinical trials will take place in clinical sites in countries in Latin America (Argentina, Brazil, Colombia, Chile, Mexico, Peru, and Venezuela).

9. **Are mRNA new vaccines?**
   They are new but not unknown. Researchers have been studying and working with them for decades. Interest has grown in these vaccines because they can be developed in a laboratory using readily available materials. This means the process can be standardized and scaled up, making vaccine development faster than traditional methods of making vaccines. mRNA vaccines have been studied before for flu, Zika, rabies, and cytomegalovirus (CMV).

10. **How many doses of the vaccines will be needed?**
    Most of the ongoing COVID-19 vaccine candidate clinical trials are considering one or two. When the schedule considers two doses, there is an interval of 14, 21 or 28 days between the first and second dose.

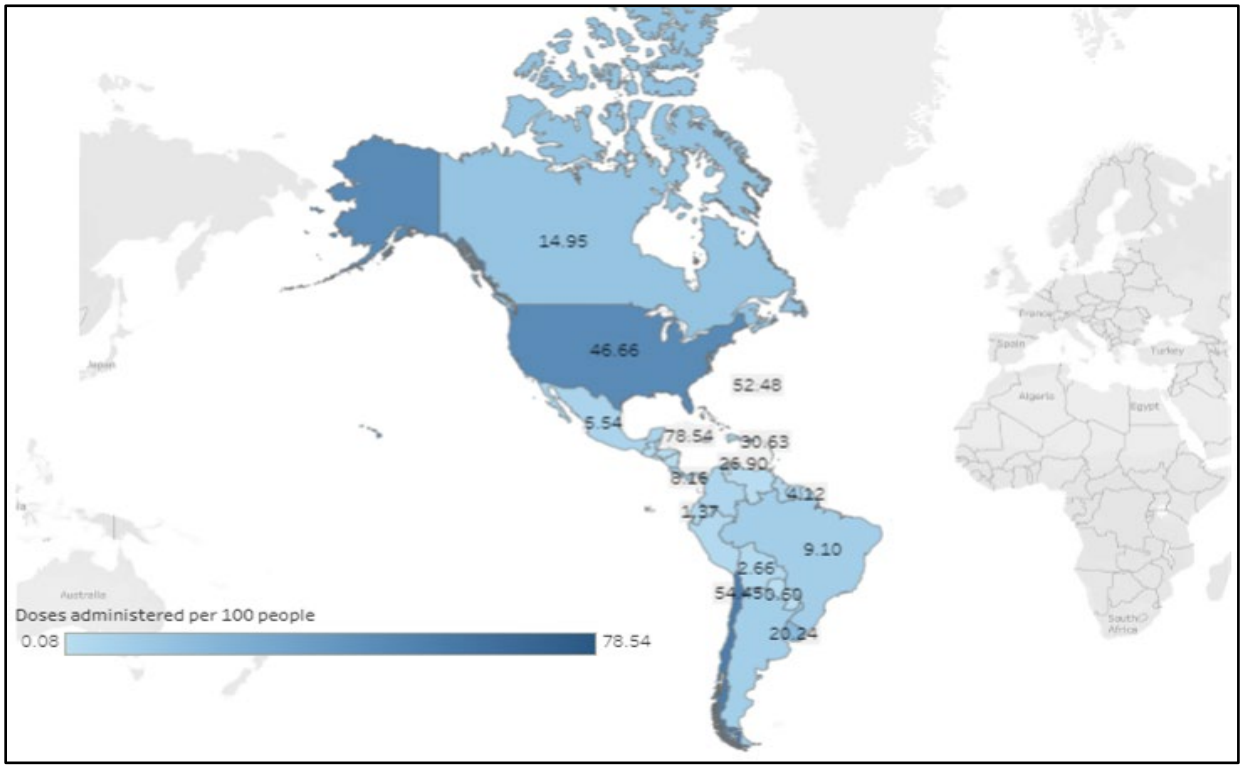
11. **What could be the administration routes of COVID-19 vaccines?**
    The COVID-19 candidate vaccines in preclinical and clinical evaluations, including vaccines in Phase 4, are using different administration routes. The specified WHO Target Product Profile (TPP) describes the preferred and minimally acceptable profiles for human COVID-19 vaccines, and indicates that any route of administration is acceptable, including intramuscular or subcutaneous injection, oral or intranasal.

**12. What will be the best vaccine delivery strategy?**

Countries should plan for different vaccine strategies to reach the targeted groups. It will be also important for countries to assess their cold chain capacities and sort out their inventory of equipment and training needs. Lessons learned from the delivery of the H1N1 pandemic vaccine and other new vaccine introductions could be leveraged.

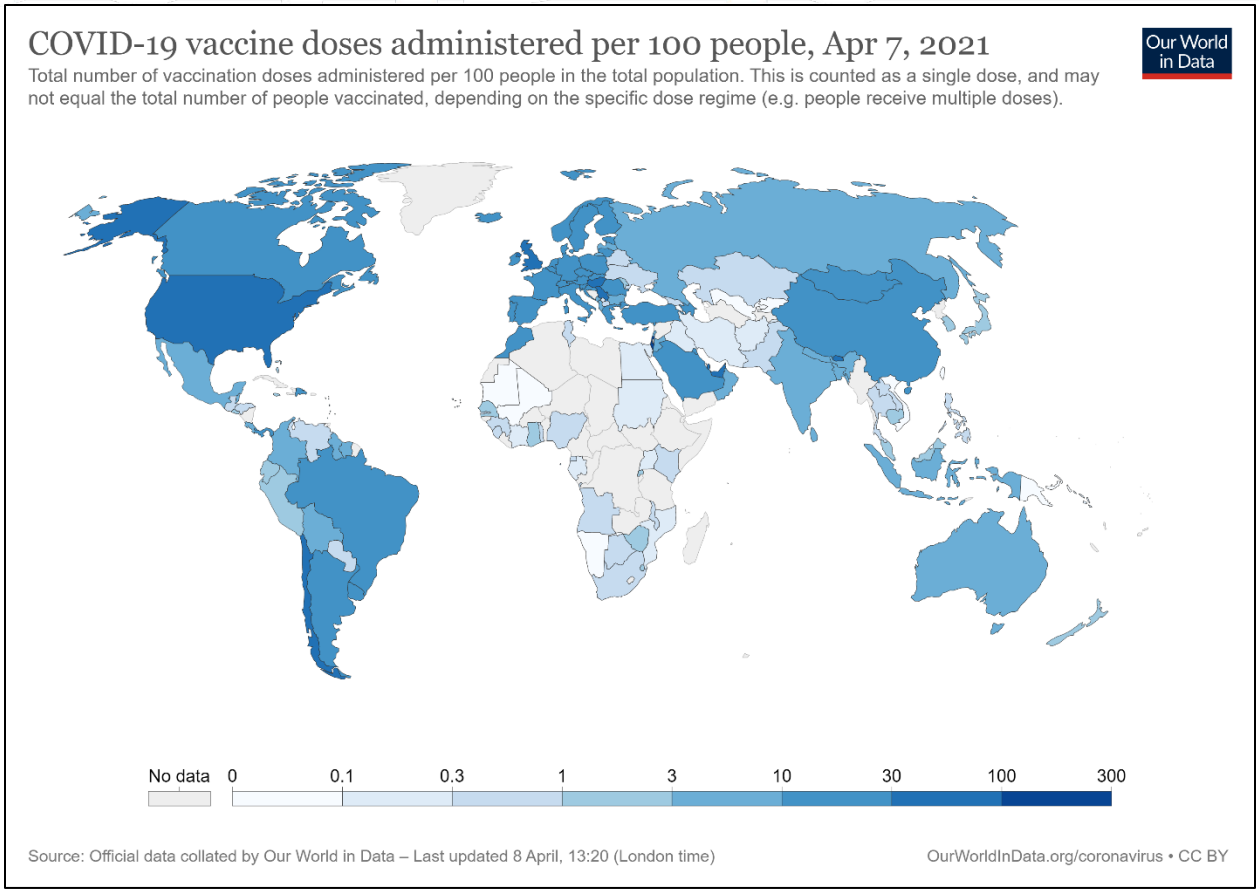
**13. How many doses of Covid-19 vaccines have been administered by country at Regional by April 1st and Global level by April 7th?**

Image 2: COVID-19 vaccination coverage in the Americas




Source: [COVID-19 vaccine doses administered in the Americas (paho.org)]

Image 3: COVID-19 vaccine doses administered per 100 people. 7 April 2021.




*Source:* [Coronavirus (COVID-19) Vaccinations - Statistics and Research - Our World in Data]

## Section 2. SAGE and TAG recommendations on COVID-19 vaccines

**14. What are the recommendations from SAGE and TAG to prioritize population groups to receive COVID-19 vaccination first?**

WHO's Strategic Advisory Group of Experts on Immunization (SAGE) has endorsed the Values Framework which offers guidance on the allocation of COVID-19 vaccines between countries and national prioritization of groups for vaccination within countries while supply is limited.

The Prioritization Roadmap considers 3 epidemiologic scenarios: community transmission, sporadic cases or clusters of cases, and no cases, but risk of importation. Different vaccine supply scenarios are applied: very limited, limited, and moderate availability (1–10%, 11–20% and 21–50% of population, respectively). Target populations were identified against various combinations of these scenarios in accordance with the general principles and objectives as laid out in the Values Framework. PAHO's Technical Advisory Group (TAG) on Immunizations supports the adoption of the WHO SAGE values framework for the allocation and prioritization of COVID-19 vaccination and the Roadmap for Prioritizing Population Groups for Vaccines against COVID-19 and urges their use to guide country planning and decision-making.

**16. What are the specific SAGE recommendations for vaccines interchangeability and vaccines coadministration for the vaccines reviewed by SAGE (Pfizer, Moderna, AstraZeneca, and Janssen)?**

- **Interchangeability with other vaccines**: No data are available on the interchangeability of this vaccine with other mRNA vaccines or other COVID-19 vaccine platforms. It is currently recommended that the same product should be used for both doses. If different COVID-19 vaccine products are inadvertently administered in the two doses, no additional doses of either vaccine are recommended at this time. Recommendations may be updated as further information becomes available on interchangeability[3,4,5,6].
- **Co-administration with other vaccines**: There should be a minimum interval of 14 days between administration of this vaccine and any other vaccine against other conditions, until data on co-administration with other vaccines become available[3,4,5,6].

**17. What are the recommendations from WHO for vaccination in pregnant women for the vaccines reviewed by SAGE?**

Pfizer[3]

Female study participants with childbearing potential were screened for pregnancy prior to each vaccination. Anyone who tested positive was excluded or discontinued from the study. The study is collecting data on outcomes of all reported pregnancies that occurred either after vaccination or before vaccination but without being detected by pre-vaccination screening tests. Twenty-three such pregnancies were reported up to the data cut-off date of 14 November 2020 (12 in the vaccine group, 11 in the placebo group). Pregnancy outcomes are currently not known. Available data on the BNT162b2 vaccine administered to pregnant women are insufficient to allow assessment of vaccine-associated risks in pregnancy.

· Moderna[4]

Women were screened for pregnancy prior to each vaccination and were excluded or discontinued from vaccination if there was a positive test. As of 2 December 2020, 13 pregnancies (6 in the vaccine group and 7 in the placebo group) had been reported.

The pregnancy outcomes in the placebo group included one spontaneous abortion and one elective abortion. The other outcomes are not known to date and the pregnant women are being followed.

A combined developmental and perinatal/postnatal reproductive toxicity study of the vaccine in rats concluded that the vaccine at a dose of 100 µg, given prior to mating and during gestation periods, did not have any adverse effects (including on female reproduction, fetal/embryonal development, or postnatal development).

[3] SAGE recommendations Pfizer vaccine.
[4] SAGE recommendations Moderna vaccine.

- AstraZeneca[5]

  Pregnant women are at higher risk of severe COVID-19 than women of childbearing age who are not pregnant, and COVID-19 has been associated with an increased risk of preterm birth. The available data on AZD1222 vaccination of pregnant women are insufficient to assess vaccine efficacy or vaccine-associated risks in pregnancy. However, it should be noted that the AZD1222 is non-replicating vaccine.

  Animal developmental and reproductive toxicity (DART) studies are ongoing. Based on preliminary findings, no harm is expected on the development of the fetus. Further studies are planned in pregnant women in the coming months, including a pregnancy sub study and a pregnancy registry. As data from these studies become available, recommendations on vaccination will be updated accordingly. In the interim, pregnant women should receive AZD 1222 only if the benefit of vaccination to the pregnant woman outweighs the potential vaccine risks, such as pregnant women who are health workers at high risk of exposure and pregnant women with comorbidities that already place them in a high-risk group for severe COVID-19. Information and, if possible, counselling on the lack of safety and efficacy data for pregnant women should be provided.

  WHO does not recommend pregnancy testing prior to vaccination. WHO does not recommend delaying pregnancy because of vaccination

- Janssen[6]

  Pregnant women are at higher risk of severe COVID-19 compared with women of childbearing age who are not pregnant, and COVID-19 has been associated with an increased risk of preterm birth. The available data on Ad26.COV2.S of pregnant women are insufficient to assess vaccine-associated risks in pregnancy. However, it should be noted that Ad26.COV2.S is a nonreplicating vaccine. No safety issues in more than 1 600 pregnant women were identified using the Ad26 vaccine platform for other pathogens including Ebola virus.

  Animal developmental and reproductive toxicity studies show no harm to the development of the fetus. Further studies are planned in pregnant women in the coming months, including a pregnancy sub-study and a pregnancy registry. As data from these studies become available, recommendations on vaccination will be updated accordingly. In the interim, pregnant women should receive Ad26.COV2.S only if the benefit of vaccination to the pregnant woman outweighs the potential vaccine risks, such as if they are health workers at high risk of exposure or have comorbidities that place them in a high-risk group for severe COVID-19. Information and, if possible, counselling on the lack of safety data for pregnant women and the potential benefit of vaccination should be provided.

  WHO does not recommend pregnancy testing prior to vaccination. WHO does not recommend delaying pregnancy because of vaccination.

[5] SAGE recommendations on AstraZeneca/U. of Oxford vaccine.
[6] SAGE recommendations on Janseen vaccine.

# Section 3. Concepts related to vaccines and vaccination

**18. What is herd immunity?**

When most of a population is immune to an infectious disease, this provides indirect protection—or herd immunity (also called herd protection)—to those who are not immune to the disease.
For example, if 80% of a population is immune to a virus, four out of every five people who encounter someone with the disease won't get sick (and won't spread the disease any further). In this way, the spread of infectious diseases is kept under control. Depending on how contagious an infection is, usually, 50% to 90% of a population needs immunity to achieve herd immunity[7].

**19. What will it take to achieve herd immunity with SARS-CoV-2?**

As with any other infection, there are two ways to achieve herd immunity: A large proportion of the population either gets infected or gets a protective vaccine.

In the worst case (for example, if we do not practice physical distancing or enact other measures to slow the spread of SARS-CoV-2), the virus can infect this many people in a matter of a few months. This would overwhelm our hospitals and lead to high death rates.

The most likely case is somewhere in the middle, where infection rates rise and fall over time; we may relax social physical distancing measures when numbers of infections fall, and then may need to re-implement these measures as numbers increase again. Prolonged efforts will be required to prevent major outbreaks until even after a vaccine is developed and first introduced. Even then, SARS-CoV-2 could still infect children before they can be vaccinated or adults after their immunity wanes. But it is unlikely in the long term to have the explosive spread that we are seeing right now because much of the population will be immune in the future[7].

**20. How long will immunity from COVID-19 vaccines last? ?**

COVID vaccines have only been developed in the past months, therefore it's too early to know the duration of protection of COVID-19 vaccines. Research is ongoing to answer this question. However, it's encouraging that available data suggest that most people who recover from COVID-19 develop an immune response that provides at least some period of protection against reinfection – although we're still learning how strong this protection is, and how long it lasts.

**21. Will other vaccines help protect me from COVID-19?**

Currently, there is no evidence that any other vaccines, apart from those specifically designed for the SARS-Cov-2 virus, will protect against COVID-19. However, scientists are studying whether some existing vaccines – such as the Bacille Calmette-Guérin (BCG) vaccine, which is used to prevent tuberculosis – are also effective for COVID-19. WHO will evaluate evidence from these studies when available.

**22. What's the difference between vaccine efficacy and vaccine effectiveness?**

These two terms are often used interchangeably in the context of the performance of COVID-19 vaccines in clinical trials. But there's a key difference: Efficacy refers specifically to how a vaccine is performing in

[7] What is Herd Immunity and How Can We Achieve It With COVID-19? - COVID-19 - Johns Hopkins Bloomberg School of Public Health (jhsph.edu)

the trials. This is an ideal performance of the vaccine, as it is in a trial environment that can be more tightly controlled than everyday life. Effectiveness refers more broadly to how the vaccine meets standards of success in the "real world," after it has been released for consumer use. This gives a more realistic performance of a vaccine, and takes into account that in the real world, the vaccine may be offered in a range of primary care settings, and offered to a broader population of people, including those who may have health conditions or other factors which could affect how well the vaccine protects against disease.

## Section 4. PAHO's Revolving Fund and COVAX Facility

**1. What are the prices of COVID-19 vaccines?**

"The COVAX Facility will endeavor to negotiate the best possible pricing from manufacturers that is lower than or at least no higher than pricing manufacturers have agreed in bilateral deals. The cost per dose will vary by vaccine and manufacturer and the Facility will pass-through the actual, negotiated price to participants. The deals negotiated between the Facility and the manufacturers will dictate the final price of the vaccine and whether the pricing structure is flat/ single or tiered".[8]

**2. What is PAHO's Revolving Fund?**

PAHO's Revolving Fund for Access to Vaccines is a technical cooperation mechanism that supports PAHO Member States to plan for their annual vaccine needs, consolidates forecasted vaccine demand and leverages economies of scale to achieve lower prices and contribute this way to the sustainability of the National Immunization Programs. For more than 40 years, the Revolving Fund has facilitated access to high-quality life-saving vaccines and related products at the most affordable price for countries in the Americas. Currently, 42 Member States and 7 territories benefit from services offered by the Revolving Fund.

**3. What is the ACT-Accelerator?**

The Access to COVID-19 Tools (ACT) Accelerator is a mechanism that brings together numerous partners under one global effort to support equal access to the four pillars related to COVID-19: diagnostics, treatments, vaccines and health system strengthening,

The vaccine pillar includes three components: development and manufacturing, coordinated by the Coalition for Epidemic Preparedness Innovations (CEPI); policy and allocation, coordinated by WHO; and procurement and delivery at a global scale, coordinated by Gavi with participation from other partners, including WHO. [9]

**4. What is the COVAX Facility?**

The COVID-19 Vaccine Global Access (COVAX) Facility is the vaccine pillar of the ACT Accelerator and the globally coordinated mechanism to provide equitable access, risk pooling, and affordable options for all participating countries. COVAX is co-led by Gavi (The Vaccine Alliance), the Coalition for Epidemic Preparedness Innovations (CEPI), and the World Health Organization (WHO). Gavi is the COVAX Facility administrator and, as such, is responsible for making investments across a broad portfolio of promising vaccine candidates and EUL authorized vaccines being delivered to participating countries.

[8] Extracted from: https://www.gavi.org/vaccineswork/covax-explained
[9] More information https://www.who.int/initiatives/act-accelerator/about

**5. What is the Gavi COVAX Advance Market Commitment (AMC)?**

Within the COVAX Facility, there are two groupings of countries. The first grouping is composed of the self-financing countries: self-financing (95) and countries that meet the requirements to receive COVAX Advanced Market Commitment (AMC) support. The latest is composed by 92 countries. In the Americas, they are: Bolivia, Dominica, El Salvador, Grenada, Guyana, Haiti, Honduras, Nicaragua, St. Lucia, and St. Vincent and the Grenadines.

**6. How is PAHO's Revolving Fund engaged with the COVAX Facility?**

Since the design and initiation of the COVAX Facility, PAHO has taken an active role in advocating for PAHO Member States' needs, including the proposed use of existing mechanisms like the PAHO Revolving Fund for Access to Vaccines (the Revolving Fund) as a platform to ensure access to vaccines in the Region. In addition, as the largest pooled procurement mechanism in the world for self-financing countries, the Revolving Fund has made important contributions to the implementation of the COVAX Facility, based on its 40-year experience of working side to side with national immunization programs of the Americas.

PAHO/FPL/IM/COVID-19/21-0023