

# Study of Awareness Regarding Covid-19 Vaccines Among General Population

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## Research Article

**Keywords:** COVID-19 Pandemic, COVID-19 Vaccines, compulsory vaccines, COVID-19 Vaccine Awareness

**Posted Date:** May 19th, 2021

**DOI:** <https://doi.org/10.21203/rs.3.rs-537278/v1>

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# Abstract

## BACKGROUND:

The COVID-19 pandemic is an ongoing global pandemic of coronavirus disease 2019 caused by SARS-Cov-2. COVID-19 Vaccines are developed to provide immunity against covid-19 and first mass vaccination started in early December 2020.

## METHOD:

This survey aims to provide knowledge of different types of vaccines, benefits, mechanisms, efficacy and concerns about people regarding vaccination.

230 people participated from different countries like INDIA, USA, CANADA, AUSTRALIA, KENYA and LONDON. It was conducted from 28 march 2021 to 8 April 2021. The randomized study was done and people from above countries who agreed to participate were included.

There were 128 female and 102 male.

## CONCLUSION:

From above survey, we conclude that:

55.7% of people are vaccinated and 44.3% of people are still not vaccinated.

Out of the above 44.3% of people who are not vaccinated, 32.6% of people want to be vaccinated as soon as possible.

Most of the people think that vaccines should be made compulsory and more awareness related to vaccines is required.

## Introduction

The World Health Organization (WHO) declared the outbreak of a new coronavirus disease, COVID-19, to be a Public Health Emergency of International Concern. In March 2020, WHO made the assessment that COVID-19 can be characterized as a pandemic. The pandemic outbreak of COVID-19, caused by coronavirus SARS-CoV-2, created an unprecedented challenge to the global public health system and biomedical community. Vaccination is an effective way to prevent viral infection, stop its transmission, and develop herd immunity. Rapid progress and advances have been made to date in the development of COVID-19 vaccines.

## WHAT IS VACCINATION?

Vaccination is a simple, safe, and effective way of protecting people against harmful diseases, before they come into contact with them. It uses your body's natural defenses to build resistance to specific infections and make your immune system stronger.

Vaccines train your immune system to create antibodies, just as it does when it's exposed to a disease. However because vaccines contain only killed or weakened forms of germs like viruses or bacteria, they don't cause the disease or put you at risk of its complications.

Most vaccines are given by injections but some are given orally (by mouth) or sprayed into the nose.

## Method

This paper aims to give the knowledge of different types of vaccines, benefits, mechanism, efficacy and concerns about people regarding vaccination. A survey was conducted through a google form link shared on various social media. It was conducted from 28 march 2021 to 8 april 2021. The population who agreed to participate in study were included by a simple random method. Populations aged 16 years or more were included in the survey.

### STUDY TOOLS

The online questionnaire consists of socio-demographic characteristics including name, age, gender, occupation and name of country.

On receiving and clicking the link the participants will be directed to the page of information about the study and informed consent. After they agreed to participate in the survey they would have to fill up their details and then the set of several questions will appear consecutively which is to be answered.

This study was conducted among 230 people in the world and responses came from INDIA, USA, LONDON, CANADA, AUSTRALIA and KENYA.

Out of 230 participants,

102 were male and 128 were female.

### VACCINE TYPES

India currently has 2 covid-19 vaccines being manufactured locally : COVISHIELD and COVAXIN, and we expect five more vaccines by Q3 2021. These vaccines are SPUTNIK V vaccine (in collaboration with Dr. Reddy's), JOHNSON & JOHNSON vaccine (in collaboration with biological E), NOVAVAX vaccine (in collaboration with Serum India), ZYDUS CADILA'S vaccine and BHARAT BIOTECH intranasal vaccine.

Vaccines used in other countries are SPUTNIK V vaccine, PFIZER vaccine, MODERNA vaccine, NOVAVAX vaccine, OXFORD- ASTRAZENECA vaccine, JOHNSON & JOHNSON vaccine and CORONAVAC vaccines.

## CLINICAL TRIALS OF VACCINES

Vaccine trial phases includes:

1. Pre-clinical: vaccine development in laboratory animals
2. Phase1 clinical trial (small number of participants) : assess vaccine safety, immune response and determine right dosage (short duration).
3. Phase2 clinical trial (few hundred participants): Assess safety and the ability of the vaccine to generate an immune response (short duration).
4. Phase3 clinical trial (Thousands of participants): determine vaccine effectiveness against the disease and safety in a larger group of people (duration1 to 2 years).

## VACCINE COMPOSITION

Composition of Covishield includes inactivated adenovirus with segments of coronavirus, Aluminium Hydroxide Gel, L-Histidine Hydrochloride Monohydrate, Magnesium Chloride Hexahydrate, Polysorbate 80, Ethanol, sucrose, Sodium Chloride and Disodium Edetate Dihydrate (EDTA).

Composition of Covaxin includes inactivated Coronavirus, aluminum Hydroxide Gel, TLR7/8 Agonist, 2-Phenoxyethanol and Phosphate Buffered Saline (NKA1).

Composition of Moderna vaccine includes messenger ribonucleic acid (mRNA), lipids(SM-102, polyethylene glycol [PEG] 2000 dimyristoyl glycerol [DMG], cholesterol, and 1,2-distearoyl-sn-glycero-3-phosphocholine [DSPC]), tromethamine, tromethamine hydrochloride, acetic acid, sodium acetate, sucrose

Composition of Pfizer vaccine include nucleoside-modified messenger RNA (modRNA) encoding the viral spike glycoprotein (S) of SARS-CoV-2, Lipid(4-hydroxybutyl)azanediyl)bis(hexane-6,1-diyl)bis(ALC-3015), (2-hexyldecanoate ),2-[(polyethylene glycol)-2000]-N,N-di tetradecyl acetamide(ALC-0159), 1,2-distearoyl-sn glycero-3-phosphocholine (DPSC), cholesterol

Salts (Potassium chloride, monobasic potassium phosphate, sodium chloride, basic sodium phosphate dihydrate)

Sucrose .

## VACCINE MECHANISM:

### 1. RNA VACCINE:

An RNA vaccine contains RNA which, when introduced into a tissue, acts as messenger RNA (mRNA) to cause the cells to build the foreign protein and stimulate an adaptive immune response which teaches the body how to identify and destroy the corresponding pathogen or cancer cells. RNA vaccines often, but

not always, use nucleoside-modified messenger RNA. The delivery of mRNA is achieved by a coformulation of the molecule into lipid nanoparticles which protect the RNA strands and help their absorption into the cells.

RNA vaccines were the first COVID-19 vaccines to be authorized in the United States and the European Union. As of January 2021, authorized vaccines of this type are the Pfizer–BioNTech COVID-19 vaccine<sup>1</sup> and the Moderna COVID-19 vaccine. As of February 2021, the CVnCoV RNA vaccine from CureVac is awaiting authorization in the EU.

## 2. ADENOVIRUS VECTOR VACCINE:

These vaccines are examples of non-replicating viral vector vaccines, using an adenovirus shell containing DNA that encodes a SARS-CoV-2 protein. The viral vector-based vaccines against COVID-19 are non-replicating, in that they do not make new virus particles, but rather produce only the antigen which elicits a systemic immune response.

As of January 2021, authorized vaccines of this type are the British Oxford–AstraZeneca COVID-19 vaccine, Russian Sputnik V, Chinese Convidecia, and the Johnson & Johnson COVID-19 vaccine.

## 3. INACTIVATED VIRUS VACCINE:

Inactivated vaccines consist of virus particles that have been grown in culture and then are killed using a method such as heat or formaldehyde to lose disease producing capacity, while still stimulating an immune response.

As of January 2021, authorized vaccines of this type are the Chinese CoronaVac, BIBP-CorV, Covishield and WIBP-CorV; the Indian Covexin; and the Russian CoviVac. Vaccines in clinical trials include the Valneva COVID-19 vaccine.

## 4. SUBUNIT VACCINE:

Subunit vaccines present one or more antigens without introducing whole pathogen particles. The antigens involved are often protein subunits, but can be any molecule that is a fragment of the pathogen.

As of April 2021, the two authorized vaccines of this type are the peptide vaccine EpiVacCorona and RBD-Dimer. Vaccines with pending authorizations include the Novavax COVID-19 vaccine, SOBERANA 02 (a conjugate vaccine), and the Sanofi–GSK vaccine. The V451 vaccine was previously in clinical trials, which were terminated because it was found that the vaccine may potentially cause incorrect results for subsequent HIV testing.

## 5) OTHER TYPES:

Additional types of vaccines that are in clinical trials include virus-like particle vaccines, multiple DNA plasmid vaccines at least two lentivirus vector vaccines conjugate vaccine, and a vesicular stomatitis

virus displaying the SARS-CoV-2 spike protein, Scientists investigated whether existing vaccines for unrelated conditions could prime the immune system and lessen the severity of COVID-19 infection. There is experimental evidence that the BCG vaccine for tuberculosis has non-specific effects on the immune system, but no evidence that this vaccine is effective against COVID-19.

#### VACCINES: EFFICACY, DOSE AND DURATION

Vaccine	Efficacy by severity of COVID-19			Trial location
	Mild or moderate	Severe without hospitalization or death	Severe with hospitalization or death	
Moderna	≈ 94% (89–97%)	≈ 100%	≈ 100%	United States
Pfizer–BioNTech	≈ 95% (90–98%)	Not reported	Not reported	Multinational
Sputnik V	≈ 92% (86–95%)	≈ 100% (94–100%)	≈ 100%	Russia
Oxford–AstraZeneca	≈ 81% (60–91%)	≈ 100% (97.5% CI, 72–100%)	≈ 100%	Multinational
	≈ 76% (68–82%)	≈ 100%	≈ 100%	United States
BIBP-CorV	≈ 79%	≈ 100%	≈ 100%	Multinational
CoronaVac	≈ 78%	≈ 84% (58–94%)	≈ 100% (56–100%)	Brazil
	≈ 67% (65–69%)	Not reported	≈ 80% (73–86%)	Chile
Novavax	≈ 89% (75–95%)	≈ 100%	≈ 100%	United Kingdom
	≈ 60% (20–80%)	≈ 100%	≈ 100%	South Africa
Johnson & Johnson	≈ 66% (55–75%)	≈ 85% (54–97%)	≈ 100%	Multinational
	≈ 72% (58–82%)	≈ 86% (–9 to 100%)	≈ 100%	United States
	≈ 68% (49–81%)	≈ 88% (8–100%)	≈ 100%	Brazil
	≈ 64% (41–79%)	≈ 82% (46–95%)	≈ 100%	South Africa
Covaxin	≈ 81%	Not reported	Not reported	India
Convidecia	≈ 66%	≈ 91%	Not reported	Multinational

Covishield vaccine : The time interval between the two doses has been extended from four-six weeks to four-eight weeks.

Covexin vaccine : The time interval between two doses is from four-six weeks.

Pfizer-BioNTech vaccine : The time interval between two doses is Three weeks.

Moderna vaccine : The time interval between two doses is two weeks

Johnson & Johnson vaccine : Only one dose is required

These vaccines are given through an intramuscular route.

All approved vaccines including Pfizer, Moderna, covishield, covaxin etc have high efficacy in preventing death due to covid infection, very high efficacy against severe covid and high to moderate efficacy against symptomatic covid infection.

#### BENEFITS OF VACCINES:

The COVID-19 vaccines produce protection against the disease, as a result of developing an immune response to the SARS-Cov-2 virus. Developing immunity through vaccination means there is reducing risk of developing illness and its consequences. This immunity helps you fight the virus if exposed. Getting vaccinated may also protect people around you, because if you are protected from getting infected and from disease, you are less likely to infect someone else. This is particularly important to protect people at increased risk for severe illness from covid-19.

When an increasing number of people get vaccinated in the community, indirect protection through herd immunity develops. The proportion of the population that must be vaccinated against COVID-19 to begin including herd immunity is not known.

Herd immunity is a form of indirect protection from an infectious disease. It occurs when a sufficient percentage of a population has become immune to an infection and hence, such people become a protective layer between the infected person and unaffected people, thereby breaking the chain of viral transmission.

#### SIDE EFFECTS:

Common side effects after vaccination, which indicate that a person's body is building protection to covid-19 infection include :

- Arm soreness
- Mild fever
- Tiredness
- Headache

- Muscle or joint ache

Contact your care provider if there is redness or tenderness where you get the shot that increases after 24 hours or if side effect donot go away after few days.

If you experience an immediate severe allergic reaction to a first dose of covid-19 vaccine, you should not receive an additional dose of vaccine. It's extremely rare for severe health reactions to be directly caused by vaccines.

## WHO SHOULD GET VACCINATED?

The COVID-19 vaccines are safe for most people 18 years and older, including those with pre-existing condition of any kind including auto-immune disorders. This conditions include: Hypertension, diabetes, asthma, pulmonary liver and kidney diseases, as well as chronic infections that are stable and controlled.

People who had covid infection in the past must go for covid vaccination around 4 to 6 weeks after recovery.

## PRE VACCINATION GUIDELINES

- Those undergoing bone marrow transplantation/Cell therapy should wait for the vaccine till absolute neutrophils count returns to normal.
- Those who are planning to undergo surgery should take the vaccine at least 2 weeks in advance for protection.
- For patients with autoimmune diseases, no disease specific data exists, but theoretically covishield and mRNA vaccination is unlikely to increase autoimmunity. Vaccination should be encouraged and extra caution must be taken.
- Older people should be encouraged to take vaccines, as risk of covid mortality is high among them.
- People with stable CKD, cardiac failure and liver failure can take vaccines but their immune response may be poor.
- Immunocompromised individuals should preferably be given the Covishield vaccine as it has non replicating viral vector coding for spike protein.
- People taking aspirin and clopidogrel need not stop these drugs before vaccination.
- People on anticoagulants can be given vaccines.

## WHAT SHOULD I DO AND EXPECT AFTER GETTING VACCINATED?

Stay at the place where you get vaccinated for at least 30minutes afterwards, just in case you have an unusual reaction, so health workers can help you.

Check when you should come in for a second dose if needed. Most of the vaccines available are two dose vaccines. Check with your care provider whether you need to get a second dose and when you



should get it. Second doses help to boost the immune response and strengthen immunity.

#### SYMPTOMS TO LOOK OUT FOR AFTER GETTING VACCINATED.

- Some of the side effects of the vaccine are similar to symptoms of COVID-19. The vaccine will not cause or give you COVID-19.
- Symptoms such as sore throat, runny nose, cough and other problems of breathing are NOT side effects of the vaccine.
- If you notice Covid symptoms after getting vaccinated then immediately consult the doctor instead of ignoring.
- Monitor for any of the following symptoms between 4 to 20 days after receiving your vaccine:
  1. Severe headache that does not go away.
  2. Seizure
  3. Difficulty moving part of your body.
  4. Blurry vision that does not go away.
  5. Difficulty speaking
  6. Shortness of breath.
  7. Chest pain
  8. Severe abdominal pain.
  9. New severe swelling, pain or colour change of an arm or leg
  10. Abnormal bruising, reddish or purple spots or blood blisters under the skin.

#### WHY IS IT NECESSARY TO TAKE TWO DOSES OF COVID-19 VACCINE ?

When a vaccine requires two shots, the first shot helps your body recognize the virus and gets your immune system ready and develops a primary immune response which is slow and weak and takes days for the body to generate enough antibodies and T cells to eliminate the virus.

The second shot strengthens that immune response and makes your body more prepared to fight infection, which is secondary immune response is stronger and quicker as memory B and T cells are rapidly activated in higher antibody concentration.

#### WILL CHILDREN BE GIVEN COVID-19 VACCINE ?

At present, people of 18 years and above are advised to take vaccines and clinical trials are going on to test covid 19 vaccines for children.

Children and young people have low risk of severe disease or death due to SARS-CoV-2 compared to adults.

## HOW LONG I WILL REMAIN PROTECTED AFTER VACCINATION ?

Longevity of the immune response in vaccinated individuals is yet to be determined. Hence, continuing the use of mask, handwashing, physical distancing and other covid-19 appropriate behaviors is strongly recommended.

## DOES VACCINATION PROTECT AGAINST NEWER STRAINS / MUTATED VIRUS OF SARS-CoV-2 ?

The body responds to vaccination by making more than one type of antibodies to virus parts including spike protein. Therefore, all vaccines are expected to provide a reasonable amount of protection against the mutated virus also. Based on the available data the mutations as reported are unlikely to make the vaccine ineffective.

## VARIOUS CONCERNS REGARDING COVID-19 VACCINES.

Myth no.1: Vaccines contain harmful heavy metals eg: mercury, aluminium etc.

Fact: Aluminium salt used in some vaccines as adjuvant to boost the immune response and Covid - 19 vaccine does not contain mercury (thiomersal).

Myth no. 2: Vaccines contain pig, monkey and human fetal tissues.

Fact: No vaccines do not contain these fetal tissues.

Myth no. 3: Covid vaccines are not safe because they are developed very fast.

Fact: Strict protocols have been followed to test vaccine efficacy and safety so they are safe.

Myth no. 4: Covid-19 vaccines will alter my DNA.

Fact: mRNA is found in all living cells. mRNA isn't the same as DNA and it can't combine with our DNA to change our genetic code.

Myth no. 5: Covid-19 vaccines were developed to control the population through microchip tracking or nano transducers in the human brain.

Fact: There is no vaccine microchip and vaccines will not track people or gather personal information into a database.

Myth no. 6: More people will die as a result of a negative side effect to the covid - 19 vaccine than would die from the virus

Fact: While no vaccine is 100% effective, getting vaccinated is far more better than not getting vaccinated. The benefits outweigh the risks in healthy people.

Myth no. 7: Women and girls should not get vaccines while on or nearing their menstruation as their immunity is low around that time.

Fact: Vaccines can be taken during or nearing their menstruation.

Myth no. 8: I should take this particular vaccine only.

Fact: Can take any of the vaccines available in their city.

Myth no. 9: I can take the first dose of covaxin and the second dose of covishield.

Fact: There isn't enough data yet to recommend this type of combination and it is advisable to take the same in both the doses.

Myth no.10: The covid-19 vaccine can affect women's fertility.

Fact: It will not affect fertility because vaccines only encourage the body to create copies of the spike protein found on the surface of corona virus. This teaches the body's immune system to fight the virus that has specific spike protein on it.

Myth no.11: If I've already had COVID-19, I don't need a vaccine.

Fact: People who have gotten sick with COVID-19 still get benefits from getting vaccinated as reinfection with covid-19 is possible so people may be advised to get a covid-19 vaccine .

Myth no.12: Getting covid-19 vaccine means I can stop wearing my mask and taking precautions.

Fact: Individuals who get the covid-19 vaccine still need to practice infection prevention precautions.

Myth no.13: Getting the covid-19 vaccine gives you covid-19.

Fact: The vaccine for COVID-19 cannot and will not give you COVID-19.

Myth no.14: I am not at risk for severe complications of COVID-19 so I don't need a vaccine.

Fact: Regardless of your risk, you can still contract the infection and spread it to others so it's important you get vaccinated.

Myth no.15: Certain blood types have less severe COVID-19 infections, so getting a vaccine isn't necessary.

Fact: Research has shown that there is no reason to believe being a certain blood type will lead to increased severity of COVID-19.

Myth no.16: I should wait for the vaccine that is more effective.

Fact: All COVID-19 vaccines are safe and effective options.

Myth no.17: Can you donate blood ? If not, then after how much duration?

Fact: People can definitely donate blood 14 days after each/both doses of vaccination as long as they are feeling fit and are showing no symptoms of illness.

FOR REGISTRATION OF COVID-19 VACCINE

Now it's time to get your vaccine shot .For that you need to register on the COWIN app.

## Results

From above survey following results were obtained:

Out of 230 people, 44.3% were not vaccinated and 55.7% were vaccinated.

Out of the above 44.3% people, 32.6% want to get vaccinated as soon as possible, 8.3% were not sure to get vaccinated and 3.9% would delay vaccination.

85.7% of people think that they were not at high risk for vaccination.

14.3% of people thinks were at high risk for vaccination.

From above 14.3% people, 5.7% people think that they have health risk due to old age, 1.3% people think they have risk due to respiratory problems, 3.5% people think that they have risk due to diabetes, hypertension and kidney disease etc and 3.5% people think that they have other health risks.

14.8% of people have concerns about vaccine side effects, 9.1% of people plans to wait and see if vaccines are safe or not, 2.2% of people don't think that vaccination is a solution, 1.7% of people don't trust government for vaccination and 0.4% of people are avoiding due to religious reason.

44.8% of people think that vaccination will prevent from getting infected against covid- 19, 61.7% of people think that covid 19 vaccination is safer way to help build protection for themselves and others, 51.7% of people think that Covid – 19 vaccination is an important tool to help stop the pandemic.

60.4% of people think that vaccination will provide herd immunity, 29.6% of people are not sure about it and 10% of people don't think that vaccination will provide herd immunity.

68.3% of people think that vaccination should be made compulsory, 22.2% of people were not sure about it and 9.6% of people think that vaccination should not be made compulsory.

95.2%people think that awareness should be made about vaccination,3.9% of people are not sure about it and 0.9% of people think that awareness is not required.

# Conclusion

From this survey we conclude that many people wish to get vaccinated when it is available to them and few people due to health risks and other concerns want to delay or avoid getting vaccinated. Many people are concerned regarding safety and efficacy of vaccine. Most of the people who are vaccinated believe that more awareness is required to people who are deprived of knowledge and who avoid getting vaccine.

# Declarations

**Competing interests:** The authors declare no competing interests.

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## Figures



**Figure 1**

Vaccine and COVID-19

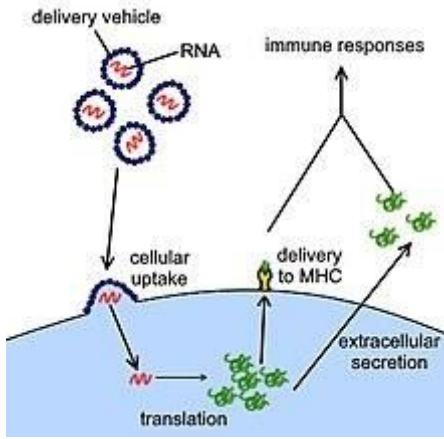


Figure 2

RNA Vaccine

# More

## Vaccine safety poster

### Video: Safety of COVID-19 vaccines - what we need to know

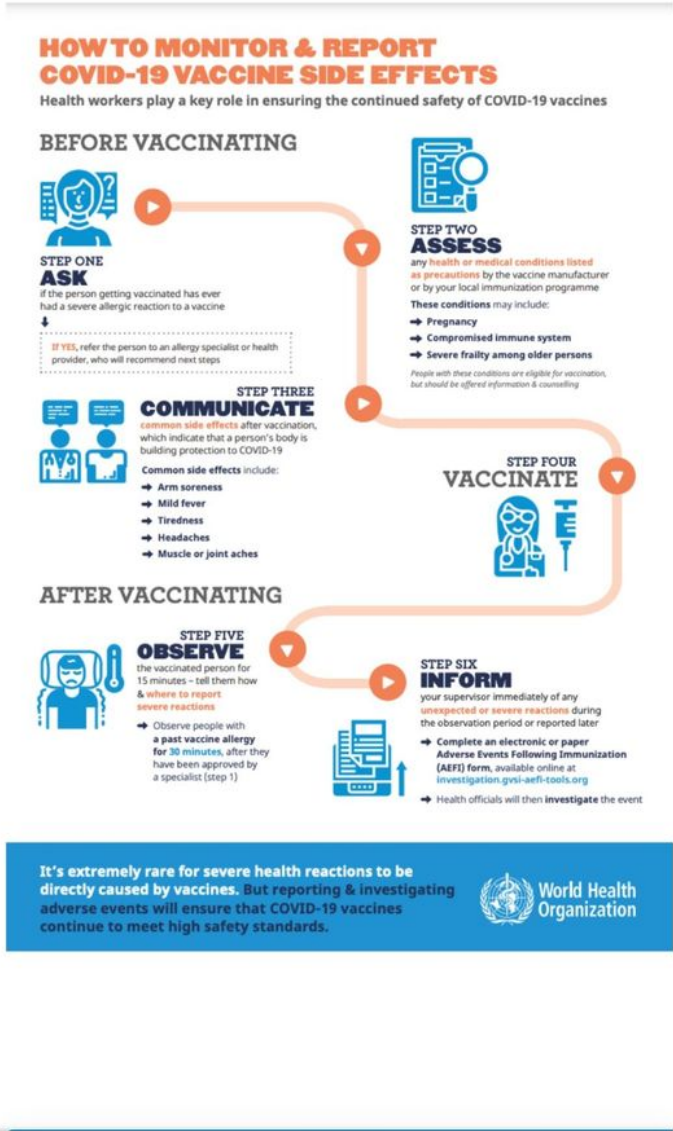


Figure 3

Vaccine safety poster

# Precautions For Coronavirus



Stay at home.



Wash your hands frequently with soap and clean, potable water.



In the absence of a tissue/handkerchief, cough or sneeze into your elbow.



Avoid touching your face.



Clean and disinfect surfaces regularly.



Practice social distancing.



Wear a mask.



Eat healthy.

Figure 4

Precautions for Coronavirus