

# Prioritizing COVID-19 Vaccination: Challenges and Dilemma

Vidya Jha<sup>1</sup>, Dinesh TA<sup>2</sup>, Prem Nair<sup>3</sup>

<sup>1</sup>Asst. Professor and Asst. Medical Administrator,

<sup>2</sup>Professor and HOD, <sup>3</sup>Professor, Department of Hospital Administration,  
Amrita Institute of Medical Sciences and Research Center, Amrita Vishwa Vidyapeetham University, Cochin,  
Kerala, India

Corresponding Author: Vidya Jha

## ABSTRACT

COVID-19 pandemic continues to disrupt global health system and economy. The whole mankind is eagerly anticipating coronavirus vaccine which is being developed at an accelerated rate. But for herd immunity to develop at least 60% of people should be immune. This means about 5.6 billion people globally and 0.82 billion Indians would need to be immune in order to end the COVID-19 pandemic. With these huge numbers, it may not be practically possible to achieve vaccination coverage over a short span of time. We need to find answers for the hard-hitting questions like do we need to prioritize our people? When will the vaccine be available for all? Will mandating COVID-19 vaccine be feasible in India? People's willingness to vaccination will also be affected by what is said about the COVID-19 vaccine in the coming months. Scientists and government health officials will have to take measures to provide evidence-based information that is convincing and persuasive. Therefore, even if the vaccine is safe and ready for use, we need to develop and design a policy strategy to ensure sufficient uptake of vaccine.

**Keywords:** COVID-19, Coronavirus vaccine, Prioritize, Strategy, Vaccination coverage

## INTRODUCTION

COVID-19 has been a global concern since December 2019. World Health Organization declared it a pandemic on 11th March 2020. [1] Worldwide the numbers have risen to 30,075,249 and 945,837 deaths as on 17<sup>th</sup> September, 2020

while in India 5,122,846 cases and 83,257 deaths have been reported. [2] It has affected the global economy as well. Entire scientific community and the world at large are eagerly waiting for a vaccine against coronavirus.

Vaccines help the body's immune system to train and prepare them to identify and fight pathogenic organisms like virus or bacteria. On exposure to these infectious pathogens, the body finds itself ready to destroy them and prevent infections. We have vaccines for more than 20 life threatening diseases. Administration of these vaccines has helped in preventing 2-3 million deaths annually from infectious diseases like influenza, measles and diphtheria. [3]

The usual timeline of a vaccine development is 3 to 9 years. [4] It is noteworthy to acknowledge the speed with which coronavirus vaccine (SARS-CoV-2 vaccine) is being developed. The factors that are helping in speeding up of coronavirus vaccine development are that we already know the role of spike (S) protein in pathogenesis of coronavirus and that neutralizing antibody against these spike proteins is critical for immunity to develop. [5,6] A domain present in the S protein of SARS-CoV-2 interacts with the human receptor angiotensin-converting enzyme 2 (ACE2) which in turn facilitates the uptake of coronavirus into the body's cells. [7] The primary antigen for vaccine development against coronavirus is the S

protein where the aim is to develop an immune response that prevents its interaction with ACE2. Advancements in technology has provided nucleic acid vaccine platforms that has led to manufacturing of thousands of vaccine doses rapidly and other development activities to be conducted simultaneously in a parallel fashion and not sequential with no increase in risk to study participants.

As per World Health Organization (WHO) there are currently more than 169 coronavirus vaccine candidates under development and 26 of these are in the human trial phase. WHO has collaborated with a number of scientists, business groups and other global health organizations through an initiative the Access to COVID-19 Tools (Act Accelerator) to fasten up the pandemic response. After the development of a safe and effective coronavirus vaccine, WHO intends to distribute these vaccines to all the countries through COVAX (led by WHO, GAVI and CEPI).<sup>[8]</sup>

On June 30, 2020, Food and Drug Administration (FDA) released a guideline for the industry regarding development and licensure of vaccines to prevent COVID-19. The guidelines appear to be scientifically sound and clearly state that there will be no compromise or relaxation in evaluating safety and efficacy of these coronavirus vaccines.<sup>[9]</sup>

As per the reports from antibody testing, 90% of people are susceptible to coronavirus.<sup>[10]</sup> In case of COVID-19, the percentage of population that needs to be immune to reverse epidemic growth and prevent future waves is 60-70% (or the Herd immunity threshold). This immunity can occur either by vaccination or by people being infected with the disease.<sup>[11]</sup> This means about 5.6 billion people globally and 0.82 billion (82 crore) Indians would need to be immune in order to end the pandemic. With these huge numbers, it may not be practically possible to achieve vaccination coverage over a short span of time. It may take few years to achieve. Therefore, even if the vaccine is safe and ready for use, we

need to develop and design a policy strategy to ensure uptake of vaccine. We need to find answers for the hard-hitting questions like how do we make it accessible to all people and thereby protect them? Do we need to prioritize our people? When will the vaccine be available for all?

Should priority be given to people who are at greatest risk for disease like our health care professional, the geriatric population, people with comorbidities and people from low-income communities who don't have access to basic healthcare facilities? Conversely, should we aim to reduce transmission and prioritize our working class, school and college students and the general public who may be asymptomatic and more likely to propagate infection? Mandating COVID-19 vaccine for all or in particular groups may not be feasible in India or other nations. An unsuccessful attempt was made in New York State to mandate H1N1 vaccination for healthcare professionals.<sup>[12]</sup> In India, under the Universal Immunization Programme, children and pregnant women are covered. It will be difficult to mandate COVID-19 vaccine in adult age group. However, efforts should be made to increase voluntary uptake.

In India as well as globally, it is only in case of Polio vaccine that huge investments and efforts have been put to increase awareness and uptake. COVID-19 being a global pandemic and huge threat to human life and economy, also warrants great efforts in communication and advocacy. In a recent survey, the acceptance level of COVID-19 vaccine in Americans was found to be only about 50%.<sup>[13]</sup> Therefore, one can understand that active engagement of all stakeholders is the key to increase vaccine uptake. Healthcare professionals and general public should be targeted with proper COVID-19 vaccine educational resources and information. Clinicians should have adequate knowledge related to vaccine as they are the ones who will educate their patients about vaccination. There should be a safety assessment system

wherein the clinicians and hospitals report any adverse effects of vaccination. This will help us in continually improving our knowledge related to vaccine and will further help in taking better decisions. Healthcare professionals play a key role as educators and endorsers of COVID-19 vaccine particularly in Indian subcontinent which is culturally and ethnically a diverse nation. We must keep it in mind that people's willingness to vaccination will be affected by what is said about the COVID-19 vaccine in the coming months. People get influenced by what others say. Scientists and government health officials will have to take measures to provide evidence-based information that is convincing as well as persuasive. Communication modes should be transparent and should linguistically and culturally fit the Indian population. Even in the prioritized group for example geriatric population, not everybody may be ready to undergo vaccination. Endorsement by public figures like sportsman, religious leaders, eminent social workers may be an effective tool to increase awareness and persuade people.

Just like our experience with social distancing practices and wearing masks in public is varied across country, one may assume vaccination acceptance level to also be different. "Platform technology" in the vaccine industry is showing a right trend in developing a universal vaccine system where new antigens can be rapidly integrated to serve as a vaccine in the advent of any new epidemic threat. The world will face pandemics like COVID-19 in future also because viruses will keep emerging and re-emerging. Often vaccines will be our only solution. Vaccine development not only involves investment of huge financial resources and worldwide integrated efforts but also significant financial risks. The authors believe that now is the right time to strategize our COVID-19 vaccination to protect our people. May we soon see the development of a safe and effective coronavirus vaccine and the world gets back to its normalcy.

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