REASSESS, REORGANIZE & REALIGN VISION FOR EFFECTIVE INOCULATION: A HOLISTIC REVIEW OF SARS COVID-19 VACCINATION DRIVE IN INDIA

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Abstract

With the advent of SARS-COVID 19 or coronavirus pandemic in 2020, vaccines have become the sword and might towards defeating and subduing the rage of the pandemic on the world population. India has followed the global outcry for vaccines and has a vaccination drive commenced from January 2021 with a certain priority attached to each section of the population. Effective implementation of Vaccine Drive essentially defines the global outlook and strength of the Indian Government towards protecting the population and promoting the economic activity to resolve back to pre-pandemic normalcy. India has integrated the vaccine drive in a COWIN portal allowing the Government to determine the coverage of vaccination, assess the drive efficacy, and plan out future strategies to overcome the challenges put forward in a dynamic COVID environment. Real-time analysis has helped to reassess the implemented plan of action, re-organize and realign the vision of effective inoculation. With the initiation of free inoculation of all above 18 years of age from May 1, 2021, the Indian Government has so far completely inoculated 3.5% of the population with the weekly average reaching above 3 million doses in June 2021, and has adopted a dynamic strategy towards inoculating other sections of society. This paper analyzes the adopted strategy of vaccination drive during the COVID pandemic, understands its complexities and dynamics. It focuses upon existing infrastructural and technological integration during the drive; its directives towards vaccinating socio-demographic and economic minorities, defining short and long-term goals, and keeping it in pace with the production supply. It aims to give a holistic view of the adopted tactics of the Indian Government for improving the efficacy of the vaccination drive.

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1. Introduction
With the advent of the SARS COVID-19 or the coronavirus pandemic in 2020, which started as an undefined endemic disease with pneumococcal characteristics in the last quarter of 2019 in the Wuhan province of China, the whole world has been caught in the web of isolations and quarantines to curb the spread of the virus and save as many lives as possible. Till June 2021, 182 million people worldwide have contracted coronavirus with about 3.96 million losing their lives with a lot of excess death going
unaccounted for. In India, about 30.5 million people have contracted the virus and about 0.4 million people have lost their lives with many states under-counting the excess death to a factor of 0.42 in Kerala to 23.8 in Madhya Pradesh.

The best policy to curb the spread as adopted by the GoI, and has been stressed on every occasion, appears to be to ensure that the infection is mild in most people, and that in those in whom the disease might be more severe, it can be pushed towards a milder form by vaccination. Therefore, it was an imperative to vaccinate as many as people as possible. Global Analysis for developing immunity and preventing more loss of life has necessitated the efficacious vaccines and their inoculation. Many institutes and organizations' efforts have resulted in multiple vaccines being developed and administered all over the world like Comirnaty by Pfizer and Vazzevria by AstraZeneca-Oxford. India has been administering the vaccines Covidshield and Covaxin since January 2021. Certain international variants of vaccines have also begun their inoculation in multiple parts of the country like Sputnik V in Bangalore and other vaccines are in process for obtaining EUA - Emergency Use Authorization by DCGI.

India utilizing its robust and dynamic vaccination program capabilities has promised to develop, donate and deliver a billion doses of the vaccines all over the world under its Maitri Initiative and mirrors the global objectives of donating such to developing countries like South Africa.

2. Available Vaccines in India
Utilizing its research and development capabilities, India had initiated researches into efficacious vaccine development on multiple fronts. SII had signed an agreement with the Oxford-AstraZeneca, Novavax and Codagenix to manufacture the international vaccines in India. It plans to manufacture about 2 million Vaccines a year for (ChAd0x1 - Original International name) Covidshield (developed by the AstraZeneca-Oxford and domestically manufactured by Serum Institute of India) and has applied for EUA with DCGI and ICMR.

Covaxin4 is India's first indigenous vaccine developed by “Bharat Biotech International Limited” in collaboration with “National Institute of Virology of ICMR”. It is one of the two domestic vaccines and has recently published the Phase III results highlighting 77.8% efficacy against symptomatic Covid-19 and 93.4% efficacy against the severe diseases. Production for Covaxin is planned to be increased to 7-fold during the July-August 2021 and follow-on to reaching nearly 10 Crore Vaccines a month in September.

ZyCoV-D5 by Cadila Healthcare (Zydus Cadila) is the other indigenous vaccine

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5 Economic Times. Updated: July 14 2021. Zydus Cadila seeks approval for its needle-free COVID vaccine ZyCOV-D; here's how it works. [Accessed: July 14 2021]
developed in India. It is based on plasmid DNA technology not licensed for public usage which delivers the DNA encoding to the target antigens in the recipient and is used as a vaccine vector to allow the antigens to be produced by the human cells. Compiling the phase two trial results, the company is focusing on executing the trial III examinations.

Corbevax\(^6\) by Biological E Limited is a protein subunit vaccine similar to the vaccines developed by the Novavax and Sanofi-GSK. The phase 2/3 trials began on June 7 2021 and even before the conclusive results, Government of India had signed an agreement for delivery of 300 million of Corbevax with Biological E.

### 3. COVID-19 Vaccination Strategy in India

Marking March 22 2021 as the Lockdown 1.0\(^7\) enforced by the Government of India, the society has witnessed the release of new guidelines and methods each week to protect personal life and curb the further spread of virus. The “Ministry of Health & Family Welfare (MOHFW)” and ICMR under the guidance of the PM of India had issued such guidelines and had been robust in structuring out the policies and process on saving the infected in hospitals as well.

The GoI has instituted a National Expert Group of Vaccine Administration of COVID-19 (NEGVAR)\(^8\) with the aim of guiding, providing advice & recommendations, and strategizing the vaccine administration all over India. The group, chaired by NITI Aayog, co-chaired by Secretary of Mohfw, India and Member (Health), had prioritized the sections of Indian society for vaccine inoculation. The priority list\(^9\) is as follows:

(a) health & front-line workers; (b) people above 60 years of age with essential inoculation of people with comorbidities in this section; (c) people below 60 years with comorbidities and people above 45 years of age; (d) people with age between 18-45 years.

Each of these sections had been inoculated in a progressive manner with each lower prioritized section getting a later date for the start than the higher-prioritized ones with priority (a) section getting vaccines from January 1. GoI had allowed the vaccination to be inoculated to all people above the 18 years of age from May 1 2021 to build upon the herd immunity and vaccinate as many people as possible. As per another expert group of doctors and medical scientists, people with comorbidities were prioritized in the clinic trials as well as in the program given the life-threatening situations arising if in case of Covid-19.

With the start of inoculation\(^10\) from January 16 2021, after 2 dry runs, majority of the health and front-line workers given the risk of contraction were vaccinated with both Covidshield and Covaxin. Covidshield and

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\(^7\) Economic Times Bureau. April 14 2020. Lockdown 1.0: Some success in flattening the curve. [Accessed: July 14 2021]


Covaxin had to be given in 2 doses as per the ICMR and Mohfw separated by a month apart and each person had been allowed a walk-in at the centers to get vaccinated if verified with a proof of work and Aadhaar card. ICMR and Mohfw had started the distribution of Vaccinated certificates being issued to the recipient's mobile number and the government had started the process of integration of the technology with the vaccination program to ease up the process and streamline the inoculation. Initially the government had policied for obtaining vaccines from the manufacturers at a subsidized rate and administering them to the whole population free of cost. The policies have been altered multiple times but future changes are yet to be seen. During the first drive, Covaxin could only be administered in the clinical mode as without the data of immunogenicity after the phase 2/3 trials. However, Bharat Biotech released the data of immunogenicity on March 3, 2021 and highlighted the 77.8%\textsuperscript{11} efficacy of Covaxin against the COVID-19.

Other international vaccine manufacturers like Pfizer and Moderna had initiated the request for its inoculation to the Indian citizens, but given the sensitivity of indemnity clause\textsuperscript{12} in the contract between Pfizer & Moderna and Government of India\textsuperscript{13}, the grant for EUA has been stalled for a certain amount of time. Sputnik V was the first imported vaccine given the restricted EUA by the DCGI on May 13 2021 and is being administered in private hospitals by Dr. Reddy’s Laboratories. As per the ‘New Drugs and Clinical Trial Rules 2019,’ each batch of the imported trial data showing ‘77.8% efficacy’ reviewed by expert panel. Over to DCGI. [Accessed: July 14 2021] \textsuperscript{11} Chandna, H. June 22 2021. Covaxin phase 3 trial India may grant indemnity to Pfizer, Moderna for their Covid vaccines. But what does it mean? [Accessed: July 14 2021]

India had faced a major challenge of logistics to transport and store the covid vaccines in the temperature ranges of 2-8 degree Celsius to rural and urban vaccination centers. These vaccines could only survive for about 4-5 hours once the vial had opened and the government had to fast-track the safe passage of each dose. Vaccine manufacturers airlifted the vials from the production site to four major depots - Kolkata, Chennai, Mumbai, and Karnal - where they were stored in the walk-in cold storages. These depots worked as the storage centers from where vaccines were transported to the designated 41 transport centers in neighboring 37 states and UTs. Further from these 41 centers, the vials are transported to the district level centers and further to distribution/inoculation centers. In all the logistics, they were transported in ice-packed cold storages to maintain the temperatures. There had been a real-time monitoring of each vial using the Co-WIN\textsuperscript{14} vaccine delivery Management System developed by the Government of India. The initial doses were administered using the “Universal Immunization Program

\textsuperscript{13} Ministry of Health and Family Welfare. Updated: Dec 28 2020. COVID-19 Vaccine Operational Guidelines: (45-59)

(UIP)” already operational in India and it was boosted with the recruitment of the Cold-storage operators.

Government of India had asked the states to train the frontline workers using the proper covid protocols for inoculating the recipients using the “Integrated Govt. Online training”(iGOT)15 portal on the Ministry of Human Resources and Development (HRD)’s Digital Infrastructure for Knowledge Sharing (DIKSHA)” platform for the capacity building of frontline workers on COVID-19. This has been influential in training the additional personnel for the inoculation drive and management using the COWIN portal. India had utilized the potential of the ASHA (Accredited Social Health Workers) and midwives (ANM), who have a far greater reach in the rural sector, for inoculating in such areas and were included as the front-line workers.

The initial inoculation had been highly effective under the strict management of the GoI where the state governments were closely following the steps followed. Each inoculation had been closely followed using the Co-WIN application which allowed the users to book their slots for vaccines citing the availability in their areas. When the COVID-19 vaccine was introduced twenty three ministries/departments and several developmental partners were involved. Their roles have been described in the operational guidelines issued by the Ministry of Health and Family Welfare, Government of India19.

Co-WIN system will be linked to existing UIP programs and it will meticulously monitor and follow upon the immunized individuals. Ever since the easing of rules beyond the May 1 2021 when all people above 18 years of age were allowed to vaccinate, the vaccination availability had been hit the most. Co-WIN portal had witnessed a major surge in numbers with people above 3 million being vaccinated each day but soon the number had crumbled down to 1-1.5 million a day. A certain reason had been substituted to the vaccination strategy by the GoI.

4. Reassessment & Reorganization and Realignment

With majority of people in the priority (a), (b) and (c) still in line for vaccination, the government notification for renewing the eligibility for vaccine inoculation to include citizens above 18 years16 of age increased the queue for the vaccination as people above 18 being a tech savvy swarmed the Co-win portals to register for vaccines, which resulted in the portal experiencing multiple crashes17. Certain sections of the society, especially the senior citizens in rural India were still wishing for the vaccine and this notification further shredded the desire to protect their lives. Each day, people had flooded to fill in the vaccination slots on the Co-WIN portal and technology advanced millennials utilized the ability of booking quickly than their aged counterparts in less advanced areas; this further widened the


16 Koshy, J. April 19 2021. Vaccines for all above 18 from May 1; States can buy directly. [Accessed: July 14 2021]

vaccination gap. GoI had extensively focused on the technological integration with the vaccination drive; though this made the process smooth and easy to management, a major section had been wanting to get the vaccination. These developments withstanding the complex and comprehensive stature of Indian society seems to contrast the practical challenges of mass vaccination in India.

In the purview of the priority list, there is a dire need to understand the socio-demographic impact of the COVID-19 and need for injection of the sub-priority list in the priority list (d) section. With majority of vaccination centers being located in the urban areas the rural section has been left to the market forces and on the god’s will for protecting the life; the increasing hesitancy among the population has further deteriorated the chances for the curbing the spread. In this section resides the major chunk of the Indian population. A recent change to include ASHA workers and midwives much higher in reaching the depth of such areas, reducing the hesitancy and increasing the reach of the vaccines is laudable. The ASHA workers and Midwives already having the experience for handling the vaccination drive of polio vaccines and other inoculation drives as well were trained using the iGOT portal and under the comprehensive guidelines had played an important role in reducing the vaccination gap between the rural and urban. The areas of Adivasi community, urban slums and poor people have been left out of the focus from the drive; given the unavailability of the proper primary health care, the inability to acquire the basic essentials for protecting themselves as required by the guidelines and high-risk nature for covid contraction, these sections need to prioritized in the 18-44 group. During each pandemic, there had been multiple accounts for under-counting of the affected and the dead people. Like during the smallpox pandemic in 1920, women accounted for about 60% of the deaths and yet, majority went under-counted. Similar is the case of every endemic, women constitute the majorly affected and dead population. GoI needs to reorganize the priority list of 18-44 to vaccinate the women, especially the pregnant ones (clinical trials are already being conducted under a close supervision) followed by the Adivasi communities and rural population and other people who constitute urban slums residing in the outskirts of the cities.

The whole vaccination drive had crumbled down during the second wave of COVID-19 when India had to brace the tantamount of deaths and cases which had exponentially risen too far greater heights in a short span of 1-2 weeks. India had reported about 3-4 Million cases daily during the second wave. Vaccine availability had decreased to a mere inoculation of 1-1.5 million doses a day and had caused nationwide outcry for vaccines with state governments requesting the central government for such; people aggressively booked the slots to protect the personal life and liberty granted a fundamental right by the Constitution of India. GoI had taken a comprehensive

19 Choudhury, S. R. May 07 2021. India reports over 400,000 daily cases for the third time in a week as second wave hammers country. [Accessed: July 14 2021]
20 One India. Coronavirus Cases: Statistics and Charts [Accessed: July 06 2021]
account of the current condition and understanding the shortfall in the vaccines accessibility, realigned the policy towards partial-privatization\textsuperscript{21} of the vaccine inoculations - allowed 25% of the vaccines to be captured by the private hospitals at a predetermined rate leaving room for further negotiations - and rest 25% to be gathered by states on their own expenses, dropping themselves the role of intermediary to provide vaccines to each section of strategy. Leaving the vaccination policy to market forces is neither ethical nor practical. The GoI had been robust in understanding the need of the situation and agreeability of the shortcomings and reverted back to the former policy for free vaccination to all. Reassessment of the guidelines had been the center policy for structing the response to the pandemic and vaccination drive by the GoI.

With a major focus on the development and research of the vaccines all over the world, each country has given them undue respect and had a standing ovation for their hard work. Major world initiatives had taken place at during such times to fund each initiative for vaccine and each country’s government did it for their population. However, even in such scenario, Indian Government had not issued any draft or policy for helping the Indian Vaccine Initiatives until November 2020. Given high investment in the R&D for the vaccine by private partners, the national funding could have necessitated the improvement in the supply chain, utilized it to advance the national supply chain for vaccines. GoI had to realign their thought process given the sensitivity of the nature of vaccines and dire need for it.\textsuperscript{22}

We are able to highlight the majority of points where the government, building upon a robust and dynamic program response mechanism, had proved to bridge the shortcomings of the vaccination program in the rail and aim to improve upon it while we could highlight the sections, where a certain involvement and huge investment could improve the current situation given the need for such. With each response to the change in the dynamics of the environment of coronavirus inoculation and increasing sensitivity of the topic, NEGVAC has been robust to release the new operation guidelines and each guideline catered to the demands of the Indian populace as well the increasing unrest of the state governments and judicial systems. The vaccination does play an important role with being the only weapon to protect the lives and more important is the role of the population to understand and follow the operational guidelines and measures to guard against the wrath of coronavirus.

5. Conclusion
In a country as complex and comprehensive as India, vaccine development and administration would be a major hurdle to conquer. The purpose of this perspective was to highlight the robust and dynamic nature of the vaccination program and strategies adopted and followed by the Indian Government highlighting some of the areas where a certain intervention could have a far-fetched response and improve the current

\textsuperscript{21} First Post Staff. April 19 2021. Centre allows states to buy COVID-19 vaccines directly from makers, opens direct import for private players; key changes from 1 May. [Accessed: July 14 2021]

\textsuperscript{22} Sharma, E. K. April 14 2021. Where did the govt’s Rs 900 crore R&D grant for COVID vaccine development go? [Accessed: July 14 2021]
conditions. The Indian government had adopted the strategy for reassessment, reorganization and realignment of the vision to understand the dynamics of the Indian Society and structure a response to the new changes after close consideration with the expert groups. The current COVID-19 pandemic has triggered emergency use authorization, unprecedented collaborative efforts from various stakeholders and rapid development. Questions are still raised although vaccination might be cost-effective strategy for survival and quality of life will be better for people as well as India’s economy will get a revival. Owing the barriers and gaps existing for the vaccine administering, our understanding about the effect of the vaccines and its utility in protecting the loss of life, it is imperative for the government to maintain a close follow-up on the recipients in the long term. The experience of India’s strategies in immunization for COVID-19 gives great tips for similar strategy preparation which is not only limited to countries with similar economic strength and health facilities but also on a global range.

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Published 2021 Feb 1. doi:10.3934/publichealh.2021011


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