IFC | INSTITUTE for COMPETITIVENESS

India's

COVID-19 Vaccination Administration Journey

An Overview

Note: This is an effort towards documenting covid response by Government of India. It is not a comparative statement or an endorsement of efforts by any of the entities mentioned in the report. The report cannot be construed as a Harvard or Stanford study

IFC | INSTITUTE *for* COMPETITIVENESS

India's COVID-19 Vaccination Administration Journey

An Overview

Authors

Amit Kapoor
Visiting Fellow and Lecturer,
Stanford University

Sandeep Goyal
Fellow,
Institute for Competitiveness

Designed By

Iitmus.ink

Table of Contents

Abbreviations

ABBRV	DETAILS
30-DTR	30-day Temperature Recorder/ Logger
AD	Auto-disable
AEFI	Adverse Events Following Immunization
AHPI	Association of Health Care Providers of India,
AIIMS	All India Institute of Medical Sciences
AMA	Ayush Medical Association
AMTZ	Andhra Pradesh Med Tech Zone
ANM	Auxiliary Nurse Midwife
API	Application Programming Interface
ASHA	Accredited Social Health Activist
AVD	Alternate Vaccine Delivery
AWW	Anganwadi Worker
AYUSH	Ayurveda, Yoga, Naturopathy, Unani, Siddha, Sowa-Rigpa and Homoeopathy
BBIL	Bharat Biotech International Limited
BCR	Block Control Room
BDO	Block Development Officer
BDS	Bachelor of Dental Surgery
BMGF	Bill and Melinda Gates Foundation
BTF	Block Task Force
CAB	COVID Appropriate Behaviour
CBO	Community Based Organisation
CCE	Cold Chain Equipment
CDBO	Child Development Block Officer
CDSCO	Central Drugs Standard Control Organisation
CDC	Centres for Disease Control and Prevention

CEO	Chief Executive Officer
CHAI	Clinton Health Access Initiative
CHC	Community Health Centre
CMO	Chief Medical Officer
CoV	Coronaviruses
COVID	Coronavirus Disease
Co-WIN	COVID-19 Vaccine Intelligence Network
CPCB	Central Pollution Control Board
CSC	Common Services Centres
CSO	Civil Society Organization
CSR	Corporate Social Responsibility
CSS	COVID-19 Symptom Survey
CSC	Common Service Centres
CVC	Covid Vaccination Centre
DAY NRLM	Deendayal Antyodaya Yojana – National Rural Livelihood Mission
DBT	Department of Biotechnology
DC	District Collector
DCR	District Control Room
DCGI	Drug Controller General of India
DGHS	Director General Health Services
DHR	Department of Health Research
DIKSHA	Digital Infrastructure for Knowledge Sharing
DIO	District Immunization Officer
DM	District Magistrate
DoP	Department of Pharmaceuticals
DPIIT	Department for Promotion of Industry and Internal Trade
DRDO	Department of Defense Research
DTF	District Task Force
DTFI	District Task Force for Immunization

DVS	District Vaccine Store
EDUSAT	Education Satellite
EUA	Emergency Use Authorization
eVIN	Electronic Vaccine Intelligence Network
FLW	Front-Line Worker
FOGSI	Federation of Obstetricians and Gynecologists of India,
GMSDS	Government Medical Supplies Depots
GoI	Government of India
HCW	Healthcare Worker
HIV	Human Immunodeficiency Virus
I&B	Information and Broadcasting
IAP	Indian Academy of Paediatricians
IAPSM	Indian Association of Preventive and Social Medicine
ICDS	Integrated Child Development Services
ICHA	Indian Confederation for Healthcare Accreditation,
ICT	Information and Communication Technology
ICU	Intensive Care Unit
IDSP	Integrated Disease Surveillance Programme
IEC	Information, Education and Communication
iGOT	Integrated Government Online Training Portal
ILI	Influenza-Like Illness
ILR	Ice-Lined Refrigerator
IMA	Indian Medical Association
INR	Indian Rupee
IPE Global	Infrastructure Professionals Enterprise Private Limited
IPHA	Indian Public Health Association
ISC	Immunization Supply Chain
IT	Information Technology
ITSU	Immunization Technical Support Unit

JSI	John Snow Inc.
KFA	Key Focus Area
LCCP	Last Cold Chain Point
LWE	Left Wing Extremist
MAS	Mahila Arogya Samitis
MBBS	Bachelor of Medicine and Bachelor of Surgery
MEA	Ministry of External Affairs
MCR	Municipal Control Room
MEITY	Ministry of Electronics and Information Technology
MHA	Ministry of Home Affairs
MHRD	Ministry of Human Resource Development
MoD	Ministry of Defence
MoHFW	Ministry of Health and Family Welfare
MoHUA	Ministry of Housing and Urban Affairs
NABHHP	National Accreditation Board for Hospitals & Healthcare Providers
NABL	National Accreditation Board for Testing and Calibration Laboratories
NARI	National AIDS Research Institute
NCC	National Cadet Corps
NCCMIS	National Cold Chain and Vaccine Management Resource Centre
NCCVMRC	National Cold Chain & Vaccine Management Resource Centre
nCoV	novel Coronavirus
NEGVAC	National Expert Group on Vaccine Administration
NGO	Non-Government Organization
NHM	National Health Mission
NIC	National Informatics Centre
NIHFW	National Institute of Health and Family Welfare
NITI Aayog	National Institution for Transforming India
NMRRC	National Media Rapid Response Cell

NPSP	National Polio Surveillance Project
NSS	National Service Scheme
NTAGI	National Technical Advisory Group on Immunization
NUHM	National Urban Health Mission
NYKS	Nehru Yuva Kendra Sangathan
OTP	One Time Password
PHC	Public Health Centre
PPE	Personal Protective Equipment
PRIs	Panchayati Raj Institutions
PWD	Public Works Department
R&D	Research and Development
RISE	Rapid Immunization Skills Enhancement
RTM	Remote Temperature Monitoring
RT-PCR	Real-Time Reverse Transcription – Polymerase Chain
RRT	Rapid Response Team
RVS	Regional Vaccine Store
RWA	Residence Welfare Association
SAFEVAC	Surveillance and action for events following vaccination
SARI	Severe Acute Respiratory Illness
SCR	State Control Room
SDM	Sub-Divisional Magistrate
SEPIO	State Expanded Programme on Immunization Officer
SHC	Sub-Health Centre
SHG	Self-Help Group
SII	Serum Institute of India
SIO	State Immunization Officer
SMO	Surveillance Medical Officers
SOP	Standard Operating Procedure
SSC	State Steering Committee

STF	State Task Force
SVS	State Vaccine Store
ToT	Training of Trainers
UCR	Urban Control Room
UHC	Urban Health Centre
UIP	Universal Immunization Programme
UNDP	United Nations Development Project
UNICEF	United Nations International Children's Emergency Fund
UPI	Unified Payment Interface
UTF	Urban Task Force
UT	Union Territory
VCCH	Vaccine and Cold Chain Handlers
VE	Vaccine Eagerness
VH	Vaccine Hesitancy
VSR	Vaccine Stock Register
VSS	Vaccine Storage Site
VVM	Vaccine Vial Monitor
WCD	Women and Child Development
WHO	World Health Organization
WIC	Walk-in Coolers
WIF	Walk-in Freezers
WMF	Wastage Multiplication Factor

Executive Summary

While India took strong measures to curtail the transmission of COVID-19 infection, it was soon realised that measures such as diagnostic and treatment were only effective up to an extent. The long-term solution to the pandemic lay not in curative measures such as tracking, testing, and treating but in preventive steps, i.e., enhancing immunity through vaccination and thereby containing the spread of the virus.

After the successful journey of developing two vaccines - the indigenously developed COVAXIN and AstraZeneca, COVISHIELD by technology transfer - India set out to venture into another herculean task of vaccine distribution. For the same purpose, Government of India (GoI) formulated the National Expert Group on Vaccine Administration (NEGVAC) for COVID-19 on the 7th of August, 2020, under the chairpersonship of Member (Health) NITI Aayog and co-chairpersonship of Secretary, Ministry of Health and Family Welfare (MoHFW). The primary responsibility of NEGVAC was to guide all phases of COVID-19 vaccination drive in India.

NEGVAC facilitated the high level of coordination at national, state, and district levels that was prerequisite for setting up efficacious levels of coordination between pivotal departments. The said departments comprised 19 ministries at the national level, 23 departments at state and district levels, and multiple development partners at the regional level. The multi-disciplinary and multi-stakeholder committee operationalised the vaccine roll-out strategy and managed the end-to-end lifecycle of vaccine administration.

The first and foremost preparatory step that was imperative prior to the launch of the vaccination drive was training and capacity building of skilled resource personnel. The success of the vaccination initiative was highly dependent upon the quality of training being provided to say; the enumerators tasked with the listing of beneficiaries, or the health functionaries responsible for vaccination initiatives, or to the social mobilisers and last-mile enablers accountable for bringing about behavioural change towards vaccination through communication and mass mobilisation initiatives. Hence, extensive training and

skill-building programs were conducted for different vaccination officers. To adhere to the social distancing norms, the MoHFW and other development partners involved in the preparation of training modules had to adapt the training program for a virtual platform. A hybrid training and capacity building approach was taken to overcome hindrances in the virtual training process, comprising videos, reading material, and live web-based interactions. In select cases, face-to-face training was also conducted in accordance with the guidelines laid out for the same.

The design and subsequent implementation of protocols & processes responsible for the safe administration of vaccines played the significant role in the success of India's COVID-19 vaccine delivery initiative. Therefore, to ensure a hassle-free inoculation drive, it was decided to vaccinate the population in a phased manner, with beneficiaries divided into priority segments. In accordance with NEGVAC's guidelines, the first phase of the inoculation drive covered individuals belonging to the following three-priority groups - healthcare workers, front-line workers, and population having higher health risk; the second phase covered all adults above the age of 60 and persons aged 45 and above who are suffering from one or more comorbidities in the specified list provided by MoHFW. The third phase, launched on 1st May in response to the second wave of infection, covered all citizens aged 18 and above.

The COVID-19 Vaccine Intelligence Network (Co-WIN) digital platform was utilised in track the registered beneficiaries in parallel and disseminating COVID-19 vaccines on the real-time basis.

The Co-WIN platform was at the heart of the vaccination drive.

The software performed the functions of registration of beneficiaries, listing of facilities/planning unit and session sites, planning and scheduling of vaccine sessions with real-time status on booked and available booking slots on different dates and at different sites, end-to-end implementation of vaccine process, traceability of beneficiaries, vaccine sessions, registrations, etc. at national, state, district and block levels, and monitoring of vaccine doses and wastages at national and regional levels. The software solution was designed as an end-to-end mobile app platform comprising the following major modules

– User Administration, Inventory and Logistics, Registration, Vaccination module, Beneficiary Acknowledgment and Reporting. Since the pandemic was restricting the mobility required for implementing the inoculation drive, Co-WIN took on a lot of functions that would otherwise have to be done in person.

Session site planning and management was the next important step for managing the demand and supply of vaccines, upkeeping logistics/ inventory and maintaining crowd control. Vaccination sites were planned and set up based on the number of registered beneficiaries.

The private health sector was also roped in at the state and district levels to facilitate the COVID-19 vaccine roll-out.

Gradually the need for vaccinating citizens spread across the urban, semi-urban, and rural areas in conjunction with the need for transportation and storage of the vaccines at sub-optimal temperatures ranging between 2-8 degrees centigrade. Efforts were made to scale up the network of cold-chain and logistics infrastructure on the war footing till the end of 2020. MoHFW issued comprehensive cold-chain management and logistics guidelines and conducted numerous State Steering Committee (SSC), State Task Force (STF), and District Task Force (DTF) meetings in the run-up to the launch to ensure that all states and Union Territories (UTs) understood the guidelines. Detailed guidelines were also issued for vaccine management at campaign session sites to ensure safe storage and use of vaccine vials.

An effective communication strategy played an instrumental role in the GoI's vaccination drive, as lack of scientific knowledge coupled with pockets of VH and VE could trigger misinformation and fake news that could derail the course of the programme. Hence, a comprehensive communication strategy was developed to guide stakeholders in managing the information flow regarding vaccines. Development partners like United Nations International Children's Emergency Fund (UNICEF), Bill & Melinda Gates Foundation (BMGF), and John Snow Inc. (JSI) played a significant role in the conceptualisation as well as on-ground implementation of the communication strategy, while last-mile partners like Non-governmental organizations (NGOs), Civil Society Organizations (CSOs), Accredited Social Health Activist (ASHA) workers and volunteers were engaged and trained to mobilise the masses to get vaccinated. The overall communication strategy was designed around four pillars – VH, VE,

Adverse Events Following Immunization (AEFI), and COVID-Appropriate Behaviour.

A five-point strategic action framework was utilised to draw up the guidelines – Advocacy; Capacity Building; Media Engagement and social media; Social Mobilization and Community Engagement; and Crisis Communication using AEFI.

To deliver on these strategic actions, following individual and institutional stakeholders were involved in the overall action plan: Policy and Healthcare Experts, National Media Rapid Response Cell Establishment and community mobilisers and front-line workers trained to engage with the community. Since absorption of information varied depending on factors like type of residence, age, socio-economic background, and so on, care was also taken to adapt and customise the content, messaging, and communication media from state to state, district to district, village to village, and community to community.

Ultimately the success of the programme can only be ascertained if a robust monitoring and evaluation system is in place to measure the outcomes. The monitoring process for the vaccine drive looked into aspects such as the quality of vaccination sessions, the performance of cold-chain infrastructure & logistics, and feedback sharing at both national and sub-national levels. Hence forward necessary actions were undertaken to fill the gap. Data was leveraged as a valuable tool to improve the management of the inoculation drive and maintain transparency around the vaccination situation across the country.

In conclusion, despite the country-specific challenges and the pandemic-related challenges thrown at the vaccination efforts, GoI's determination and resilience enabled it to assemble key stakeholders and resources against time constraints and carry out the world's largest vaccination drive. The multi-partner approach complemented with the meticulous yet flexible strategy helped in the successful launch of the programme across the country. The obstacles faced along the journey made way for greater learnings and opportunities, which further improved the drive. Inarguably, the vaccination drive continues to evolve and improve over time.

01

Introduction

India rolled out the Phase-I inoculation drive of COVID-19 vaccine on 16th January 2021. This was highlighted as one of the world's largest roll-out with the focus on giving vaccine jab to around 30 million frontline healthcare professionals including doctors, nurses, para-medical staff, and support teams on the ground. This roll-out involved two major vaccines – Covishield and Covaxin, which received Emergency Use Authorization (EUA) from Central Drugs Standard Control Organisation (CDSCO) on 1st and 2nd January respectively. Thereby, 16th January 2021 vaccine roll-out marked the beginning of a potential campaign to safeguard against the ongoing pandemic as well as beginning of the end to the one-year period of fear and uncertainty as well as psychological, social and economic doom caused by COVID-19.

COVID-19 crisis acted as a litmus test for Governments, scientists, and people globally, especially the test of their resilience and preparedness against the unexpected and unannounced pandemic crisis. Few countries did well during this pandemic phase, the reason for which can be accredited to their strong e-governance and public health policy. The population of these countries displayed self-discipline and a sense of resilience besides complying with government measures during the pandemic, thereby minimizing the social, economic and personal losses to COVID-19. Few other countries, especially developed ones, leveraged their public health infrastructure, institutional R&D capabilities, and availability of R&D-driven large healthcare companies to ensure the appropriate preventive measures as well as timely action for the infected people, thereby controlling the spread and transmission to a manageable limit. Developed countries, particularly the USA and European nations, leveraged the R&D capabilities of their home-grown healthcare companies to ensure the large-scale availability of COVID-19 vaccine at the time of roll-out. Therefore, getting an edge over other nations lacking indigenous vaccine development capabilities

How was India placed in this scenario is a question, that comes to mind. India was one of the few countries that acted very proactively to the COVID-19 pandemic.

India stood out as a resilient nation having a government with strong will-power and focus on "Aatmanirbhar Bharat".

The resilience can be attributed to the spirited pool of healthcare workers, doctors, and nurses, along with India being recognized the world over as a well-established pharmaceutical industry. Nevertheless, equally challenging were the shortcomings in the form of weak public healthcare infrastructure, under-staffed pool of doctors and healthcare workers, non-availability of uniform transportation logistics, cold-chain industry capable of transporting time-critical products like vaccines in controlled temperature environment and lax attitude of the people even during pandemic posing a challenge at the time of e-governance and community mobilization. Other challenges included high population density and numbers, increasing the risk of mass transmission and lack of harmony, and conflicting

priorities and motives among the different political parties and state governments at the cost of social welfare.

Being aware of the challenges highlighted above,

India realized very early the significance of indigenous vaccine development, licensing and inoculation roll-out as a long-term solution in a fight against the deadly pandemic.

GoI's leading course of action in response to the emerging pandemic involved, keeping in tune with the whole government approach, i.e. allotting relevant officers from other MoHFW. The MoHFW pulled out Additional Joint Secretaries and Directors from other ministeries and involved them in the COVID-19 fightback. The second manoeuvre of the government was to constitute empowered groups. These were cross-cutting groups, all designed to help the MoHFW counter the challenge posed by the COVID-19 pandemic. Accordingly, there were empowered groups on logistics, vaccination, and hospital preparedness. Then there were empowered groups whose responsibilities involved doing the future forecast for the number of COVID-19 cases and corresponding infrastructure requirement. There were also empowered groups looking at the need for medical oxygen and how to arrange medical oxygen through oxygen cylinders, PSA plants and cryogenic tankers. Therefore, the entire government was mobilized and everyone was on their toes.

The Secretary, MoHFW said,

"All the required help was provided to the MoHFW. It otherwise wouldn't have been possible for the ministry alone to tackle a crisis of this magnitude."

During the first wave, when there was the issue of hydroxychloroquine, the Department of Pharmaceuticals (DoP) mobilized all its resources and came forward to help. During the second wave when it was a question of supply of Tocilizumab and other drugs, it was again the DoP that mobilized all its resources and came to help. Similarly, during the second wave when it was a question of adequate supply of medical oxygen, Department for Promotion of Industry and Internal Trade (DPIIT) and the Ministry of Road Transport and Highways mobilised their resources and came to help. Therefore as suitably quoted by Secretary MOHFW,

"While there were daily battles to be won, there was also comfort in the thought that there are other ministries standing side by side with you."

India's National COVID-19 Vaccination Strategy was driven by scientific and epidemiological evidences and focused on systemic end-to-end planning and roll-out.

The strategy was formulated after looking at the Global best practices, World Health Organization's (WHO's) Standard Operating Procedures (SOPs) as well as expert recommendations from the constituent members of the NEGVAC (MoHFW, 21 April 2021). The primary thought behind the National Vaccination Strategy involved a focus on indigenous research and development (R&D) and manufacturing of COVID-19 vaccine, as well as systematic pan-India roll-out to safeguard India's healthcare system, and people, in the priority order from most vulnerable to others.

The first choice involved setting up the NEGVAC committee to oversee the vaccine roll-out strategy with participation of key stakeholders from all major departments. This was done to ensure quick decision-making and collective efforts towards setting up of the priorities and action plan without any inter-organizational conflicts. The second choice involved setting up the comprehensive operational guidelines to address the challenges related to resource sufficiency, vaccination booking, administration approach, logistics and cold chain management, and minimizing vaccine wastage. The third choice involved designing the comprehensive communication guidelines to bring out the systemic behaviour change orientation among the masses towards the benefits of vaccination as well as to keep all the stakeholders and partners aligned with timely exchange of information on real-time basis.
The following sections in this report will disseminate the details regarding the strategic choices adopted by the GoI for vaccine administration and roll-out at pan-India level.

02

NEGVAC Overview

During April 2020 -May 2020, when no other country was even talking about a vaccine for COVID-19, the Prime Minister constituted a task force on COVID-19 vaccine, drugs and diagnostics. This task force was headed by the principal scientific adviser to the Government, and it had all the domain knowledge experts. The taskforce-initiated engagement with vaccine manufacturers, drug manufacturers, diagnostic kits manufacturers, encouraging them to manufacture vaccine, drugs or repurpose drugs and diagnostic kits, RT-PCR kits, rapid antigen kits, etc. It was also trying to encourage vaccine R&D in the face of the unfolding pandemic.

Subsequently in the August of 2020, GoI again acted proactively and set up another expert group i.e., NEGVAC which was chaired by member NITI Aayog and co-chaired by Secretary, Health and Family Welfare.

The group had domain knowledge experts, and it also had state governments on board. The role of NEGVAC was to complement the work of taskforce on vaccine drugs and diagnostics. While the taskforce on drugs, diagnostics and vaccine was trying to encourage domestic manufacturers of these three elements. NEGVAC's role constituted deliberating on; if and when the vaccine becomes available, how would it be rolled out? If initial supplies are limited, who would be our priority target?

The constitution of NEGVAC is considered to be one of the key milestones in the direction of vaccine administration and roll-out.

This ensured the highest level of administrative and political ownership, commitment and support to the successful implementation of COVID-19 vaccine roll out in India. This multi-disciplinary and multi-stakeholder committee was constituted to operationalize the vaccine roll-out strategy across the country covering all of its 1.39 billion citizens. With the constitution of NEGVAC, high-level vertical and horizontal coordination at the centre, state and district level was formalized. This comprised of 19 ministries at the national level, 23 departments at the state and district levels, and multiple development partners at the regional level. Clear roles and responsibilities were formulated for the participant bodies to enable smooth cooperation and coordination during the pan-India roll-out of COVID-19 vaccine.

HIGH-LEVEL LAYOUT - NATIONAL, STATE, DISTRICT AND BLOCK LEVEL

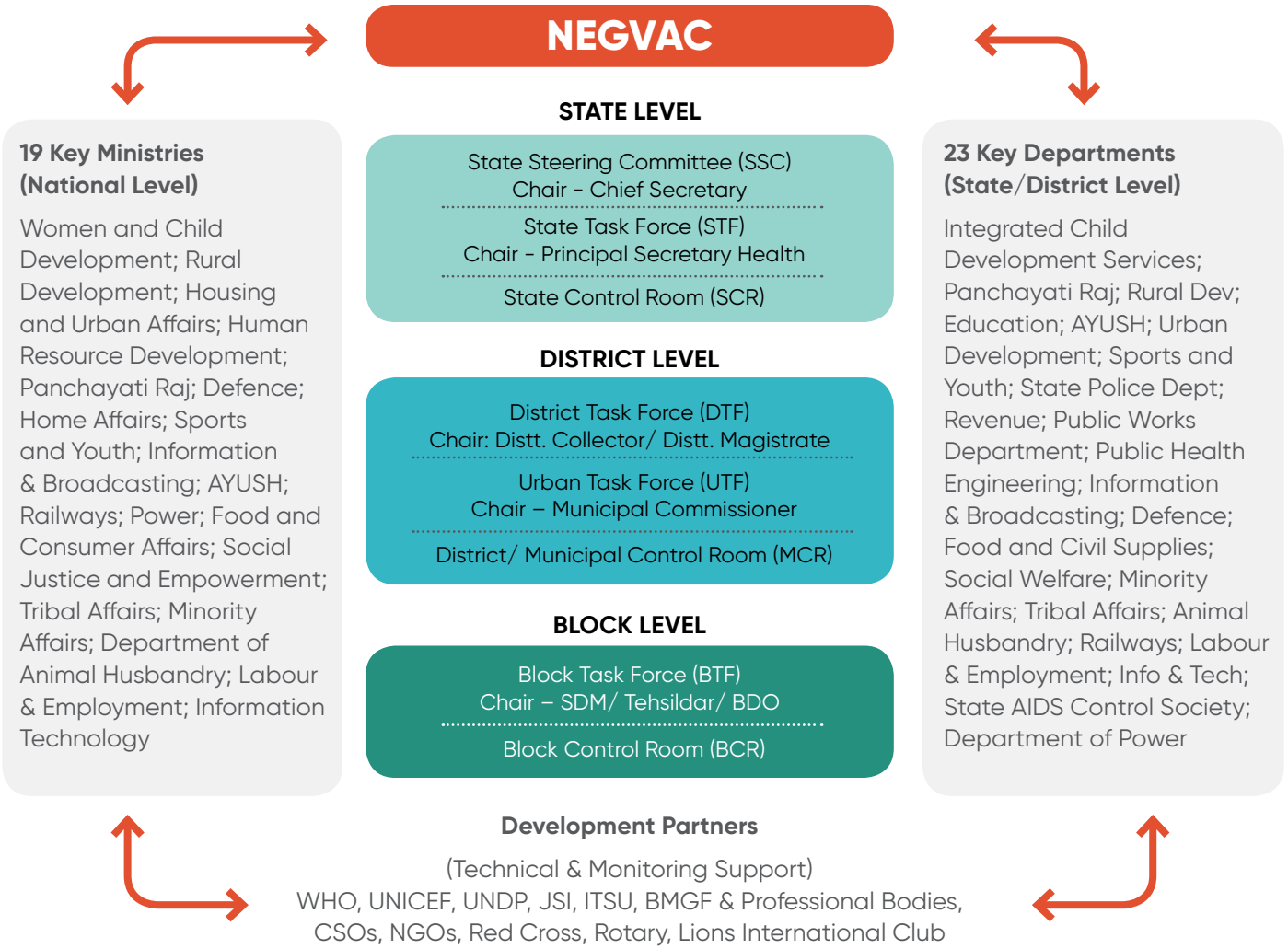
The integrated setup and overall mechanism regarding governance structure of NEGVAC can be understood as follows.

NATIONAL LEVEL STRUCTURE

On 7th August 2021, NEGVAC was constituted under the chairpersonship of Member (Health) NITI Aayog and co-chairpersonship of Secretary, MoHFW. In addition, NEGVAC comprised representatives – Secretaries from Ministry of External Affairs (MEA), Department of Biotechnology (DBT), Department of Health Research (DHR), Department of Pharmaceuticals (DoP), Ministry of Electronics and Information Technology (MEITY) as well as Director General Health Services (DGHS), and Directors from All India Institute of Medical Sciences (AIIMS, Delhi), Director, National AIDS Research Institute (NARI) and representatives from National Technical Advisory Group on Immunization (NTAGI), and finally five State Governments representing all the regions of India (MoHFW, 28 December 2020).

NEGVAC focused on managing the end-to-end lifecycle for vaccine administration in India including regulatory aspect of vaccine trials; basis for selection of vaccine; planning and distribution of vaccine across different sites at pan-India level; procurement, delivery and storage of vaccines at different sites; handling the training and availability of skilled resources for handling and injecting the vaccine; financing the supplies; segmentation and prioritization of population groups; traceability of vaccinated population; vaccine safety surveillance; providing support and assistance to the neighbouring countries; developing and launching awareness building, systemic behaviour change orientation communication and media strategy.

Figure 1: *NEGVAC Structure and Governance Mechanism*



Source: Adapted from Krishnan (December 2020), MoHFW (December 2020)

Annexure I highlight the key focus areas for the different committees and task force units at the State, District and Block levels.

STATE LEVEL

SSC, STF and State Control Room (SCR) were constituted to ensure the appropriate focus, readiness and actions for vaccine administration across the states, districts and blocks across India. All these committees were mapped with specific roles and responsibilities during the preparation and implementation phases. SSC led the vaccine administration activities across the states in India with active support from the STF and SCR committees.

SSC was chaired by the Chief Secretary and convened by the Principal Secretary, Health.

NEGVAC comprised more than 19 government departments in the team including railways, defence and para-military establishments. The team also included more than ten development partners including WHO, UNICEF, United Nations Development Project (UNDP), BMGF, JSI, Clinton Health Access Initiative (CHAI), Infrastructure Professionals Enterprise Private Limited (IPE) Global, besides other NGOs, and CSOs.

SSC was primarily responsible for planning and coordinating the end-to-end vaccine administration activities at the State level through database management of HCWs and beneficiaries; cold-chain logistics, transportation, and delivery across the districts and blocks; resource training and mobilization for operational, vaccination, and Information, Education and Communication (IEC) support; financial planning and Corporate Social Responsibility (CSR) budget utilization; use of CSCs and public infrastructure for administering vaccine; social media tracing for misinformation; and community engagement initiatives. Besides these roles and responsibilities, SSC focused on the following coordination and control activities with different constituents of NEGVAC at the State and District levels: First, SSC reviewed and ensured that regular meetings were held by the task forces at State and District levels (STF and DTF) as per the schedule. Second, it ensured that AEFI committees at the State and District levels were expanded, and regular meetings were being held to ensure the timely surveillance of AEFI. Third, it guided the STF for corrective actions in case of any shortcomings or shortfalls in the statistics regarding COVID-19 vaccination. Fourth, it ensured active engagement of all the line departments and stakeholders with a periodic two-way communication.

Each State set up the STF for immunization under Additional Chief Secretary or Commissioner or Principal Secretary, Health. STF was convened by State Immunization Officer (SIO). The team comprised members like Mission Director of National Health Mission, state level officers from different state departments including health, railways hospitals, defence forces representatives, central armed forces personnel, etc. The development partners included WHO, UNICEF, UNDP, BMGF, JSI, CHAI, IPE Global, NGOs, and CSOs. The STF team ensured the state-level implementation of all the activities within the scope of SSC, and monitored the progress of the same.

It took care of all the operational bottlenecks related to logistics, transportation and delivery of vaccination; availability of skilled resources for inoculation; monitoring the progress of Co-WIN database in terms of beneficiaries and Healthcare Workers (HCWs); mapping of vaccination sessions as per the inoculation guidelines for priority groups and HCWs/ Front-Line Worker (FLWs); identifying the vaccinators to prevent the disruption in supplies; media planning to address rumour-mongering; engaging youth organizations and NGOs for social mobilization of the beneficiaries; and operational funding.

In terms of coordination and control, the team maintained communication with the District Magistrates (DM) to conduct meeting of the DTF for Immunization as well as keeps track of AEFI surveillance committees and activities at the district level. Also, it deployed senior state-level health officials in each district for appropriate monitoring and control. The team aligned with districts and urban local bodies to review, discuss and resolve all sort of vaccine procurement, delivery and administration-related operational issues as well as funding requirement-related bottlenecks.

Alongside SCR and STF, SCR was set up to provide 24*7 support channel in day-to-day operations at the state level. SCR comprised participation of key officials responsible for cold-chain logistics as well as IEC and social mobilization. The development partners include WHO, UNICEF and UNDP. The team focused on real-time mobilization of the manpower and other resources during logistics, transportation, delivery and administration of vaccines. The team was driven by the clear chain of command, communication system, and accountability framework to ensure quick decision-making and action for any operational issues. The team was responsible for sharing regular feedback with SSC and STFI.

DISTRICT LEVEL

DTF, UTF and MCR were constituted at the district level to ensure the focused implementation efforts and tracking of vaccine administration across the districts at each state level. DTF led the on-ground vaccine administration activities at the district level with active support from the UTF and MCR committees.

DTF was headed by the District Magistrate and supported by District Immunization Officer (DIO) and Chief Medical Officer (CMO), along with the support of more than 19 government departments including Women and Child Development (WCD), Panchayati Raj Institutions (PRIs), Energy/Power ministries, central government ministries, defence and paramilitary establishments. The development partners included institutions like WHO, UNICEF, UNDP, BMGF, JSI, CHAI, Rotary Club, Lions International as well as representatives from NGOs, and CSOs having presence at the district level. The DTF team ensured the district-level implementation of all the activities within the scope of SSC, and monitored the progress of the same. DTF team replicated the STF team at the district level and focused on all the STF activities at the district level related to resources, infrastructure, tracking of Co-WIN database, communication planning, logistics, transportation, and delivery of vaccination. In terms of coordination and control, the team identified the senior officers in the urban areas and blocks and made them accountable for the day-to-day operations at the vaccine sites. Also, it ensured the timely disbursement

of funds for ASHA and Alternate Vaccine Delivery (AVD) persons. The team shared regular feedback at the State level for review.

Alongside DTF, UTF was constituted on similar lines in the urban areas where Municipal Corporations had been responsible for the health services. UTF was chaired by Municipal Commissioner who was supported by Municipal Health Officer or CMO of the Municipal Corporation.

Alongside DTF/UTF, District Control Room (DCR)/Urban Control Room (UCR) had been set up to provide 24*7 support channel in day-to-day operations at the district/urban level. DCR/UCR comprised participation of district program manager, nodal officer, National Urban Health Mission (NUHM), district cold chain officers and representatives of key departments and development partners having presence at district/urban level. DCR ensured participation of Mahila Arogya Samitis (MAS), Residence Welfare Associations (RWAs), religious leaders, CSOs, NGOs, and private practitioners operating at local level, in building acceptance towards vaccination among the beneficiaries. In Municipal areas, UCRwas chaired by Medical Officer of the Municipal Corporation. The team focused on the readiness of blocks/ Public Heath Centres (PHCs)/urban areas on day-to-day basis, vaccine roll-out operations, and team was responsible for sharing regular feedback with SCR and District Task Force for Immunization (DTFI). It was driven by the clear chain of command, communication system, and accountability framework to ensure quick decision-making and action for any operational issues.

BLOCK LEVEL

Finally, BTF and BCR were constituted to enable the vaccine delivery and administration activities across the blocks within districts.

BTF was headed by the Sub-Divisional Magistrate (SDM) or Tehsildar or Block Development Officer (BDO) and convened by Block Medical Officer in-charge. BTF comprised many block-level government departments like BDO, Child Development Block Officer (CDBO), National Service Scheme (NSS), National Cadet Corps (NCC), representatives from Public Works Department (PWD), Animal Husbandry, etc. along with NGOs and CSOs. The team replicated all the preparatory and implementation activities of the DTF at the block level. The team shared regular feedback at the district level for review.

Alongside BTF, BCR was set up to provide 24*7 support channel in day-to-day operations at the block level. Headed by Medical Officer in charge, BCR involved participation of block program officers, Integrated Child Development Services (ICDS) representatives, as well as education and other departmental focal points. It worked to ensure preparedness of blocks/PHCs/urban areas on day-to-day basis, and monitors vaccine roll-out operations. The team shared regular feedback with the DCR on periodic basis.

DEVELOPMENT PARTNERS AT NATIONAL, STATE, DISTRICT AND BLOCK LEVELS

During the planning, launch and pan-India execution of COVID-19 vaccination drive, Indian and Global development partners played a significant role in providing the technical and monitoring support across a range of activities in vaccine administration.

Since the launch of Universal Immunization Programme (UIP), Government developed long-term relationship and collaboration with these development organizations. Most of these development organizations gradually strengthened their pan-India presence over the years subsequent to their involvement in UIP. During COVID-19, MoHFW leveraged the skills, expertise and grassroot network of these development partners in capacity building, training of the resources, mobilization of the people for vaccination, planning as well as executing the customized awareness campaigns for different regions, setting up the monitoring and control metrics, enhancing the logistic set up and so on.

UNICEF

UNICEF acted as the key development partner in COVID-19 vaccine administration initiative by focusing on multi-dimensional range of procurement, technical and monitoring activities across the complete value chain. The overall contribution of UNICEF can be looked upon as follows.

First

UNICEF worked with WHO and the GoI to make a significant contribution in the development of vaccination operational guidelines covering the operational processes, stakeholders, and check-points at national, state, district and block levels The operational guidelines constituted the comprehensive document available in the public domain, which outlined the roll-out and monitoring strategy for the COVID-19 vaccination programme.

Second

UNICEF along with UNDP, played an essential part in development of the Co-WIN platform, the digital portal for managing end-to-end vaccination programme. UNICEF provided technical and operational support during the development and launch of the software.

Third

UNICEF provided technical support for ramping up the cold-chain infrastructure required for the delivery, storage and transportation of vaccines across India during the vaccination drive. It worked with National Cold Chain & Vaccine Management Resource Centre (NCCVMRC) for ensuring the cold-chain infrastructure readiness as per the demand-supply projections during COVID-19 vaccination. NCCVMRC, a part of National Institute of Health and Family Welfare (NIHFW), was mainly involved in providing technical support for all cold chain and vaccine logistics management initiatives at the national level as per the directives of the Immunization Division at MoHFW. A detailed planning excercise was facilitated by UNICEF regarding cold-chain infrastructure readiness during September- October 2020 based upon the anticipated number of vaccinations, demand levels, supply projections, controlled temperature requirements, targeted numbers of people, split at state, district and block levels, and so on. The whole exercise continued during the months of Sept – Nov 2020.

Fourth

UNICEF contributed towards vaccine procurement by procuring 10 million doses of COVID-19 vaccine through COVAX during the initial period of the COVID-19 vaccine administration in January 2021.

JSI

JSI categorized their engagement in COVID-19 vaccination initiative into three verticals –

Communication team

Programme Implementation or Technical team,

AEFI team

Each team was headed by a leader who acted as a SPOC for the ministry and other key stakeholders engaged in the COVID-19 vaccine administration activities.

During the pre-launch phase, all three teams contributed to the formulation of SOPs for vaccine roll-out. The Program Implementation or Technical team, also known as Immunization Technical Support Unit (ITSU) worked closely with the WHO and BMGF in the development of the operational guidelines for vaccine roll-out. ITSU was also involved in developing the capacity building modules to be used for training and skill-building of the diverse group of people at all levels. Simultaneously, AEFI team of JSI helped in developing the AEFI SOPs for COVID-19 vaccine and also helped in designed a framework for classifying AEFI events into different severity levels. Finally, the communication team from JSI worked as a part of the larger communication group that was set up under MoHFW. JSI communication team helped in detailing out the communication strategy to be implemented for targeting the VH and VE groups as well as for ensuring the COVID appropriate behaviour (CAB). In fact, COVID-19 communication strategy launched by India at the time of the vaccine roll-out was one of a kind globally. No other nation had designed such a comprehensive communication strategy for vaccine roll-out.

Post vaccine roll-out, ITSU was responsible for collecting the COVID-19 vaccination data points and doing the analysis of the same at center, state, district and block levels before sharing the data with the MoHFW at periodic intervals. ITSU also recorded the data in Google Sheets to create a backup for Co-WIN system-based vaccination tracking. ITSU was also involved in interacting with the on-ground vaccination teams across different states to identify the operational challenges and facilitate the resolution with the Government and the Ministry. At the same time, the AEFI team dealt with the causality assessment and monitoring, and interacted with the vaccination teams across the states regularly for analysing the cause of adverse events reported by the vaccinated people. Based upon the causal analysis, the team shared the recommendations with the Ministry. The communication team also worked on improving the capacity-building training materials, enabling the mass-mobilization of beneficiaries towards vaccination, as well as contributed in rolling out social campaigns for the masses.

BMGF

BMGF assisted the collective efforts as a donor partner, by supporting multiple initiatives and efforts. BMGF's role in immunization had been significant, from ensuring the resumption of routine immunization in the midst of the pandemic to supporting the roll-***out of vaccines against COVID-19, with priority on Bihar and Uttar Pradesh, which were the focus states for BMGF.*** These efforts were executed through BMGF state partners at the state level as well as through ITSU, JSI and all the other immunization partners at the national level. In its immunization-related efforts, BMGF worked closely with the immunization division and in the communication aspect of the inoculation drive, it worked closely with WHO, JSI and UNICEF.

WHO

WHO played the proactive role in managing the pandemic, and worked very closely with the GoI in responding to the crisis. WHO's National Polio Surveillance Project (NPSP) team extended technical support, supported in development of the operational guidelines and training. WHO's work also focused on AEFI, capacity building activities, monitoring and evaluation, and more.

In April 2020, WHO and MoHFW initiated the systematic engagement of WHO's NPSP team with the field staff, to assist in COVID-19 response. NPSP was the project that was born in 1997 as a collaboration between the GoI and WHO for polio eradication. It started with

53 SURVEILLANCE MEDICAL OFFICERS (SMOs) in 1997

AND GREW TO **372 SMOS** at the peak of polio eradication in 2010.

After polio eradication, the project was renamed as National Public Health Surveillance Project, and continued to support the number of public health emergency responses.

For instance supporting immunization system strengthening, measles-rubella elimination in India, Ebola elimination in Africa, new vaccine introduction, and more. Thus, WHO-NPSP team came with the wealth of experience and expertise to support India's COVID-19 response, leveraging their combined strength in surveillance, data management, monitoring and supervision, and responding to local situations and challenges. The team was roped in to also support in sharing information and best practices and to help the states and districts in calibrating their response depending on the situation and local capacities (WHO, April 2020).

Initially, NPSP helped in surveillance regarding COVID-19 and capacity building within the government. At the state- and district-level, the team worked with Integrated Disease Surveillance Programme (IDSP) on capacity building for various activities as required by state governments. The SMOs deployed in different parts of the country also worked closely with state governments in assisting them in various areas of COVID-19 response and addressing any special needs. For example, Government of Assam required training of their healthcare workers on doing surveillance for Severe Acute Respiratory Illness (SARI) and Influenza-Like Illness (ILI) cases.

Similarly, U.P. And Bihar sought SMOs' help in assessing the facilities where migrants were housed. In the later stages, SMOs also undertook assessment of dedicated COVID-19 hospitals.

On the vaccination front, NPSP's work began in the second half of 2020. In normal circumstances, when a vaccine is being launched, a basic knowledge about the vaccine is known, including the vaccine platform used, its storage requirements, its dosage and side effects. What set the COVID-19 apart was that preparation for vaccine delivery had to begin even before the vaccine was developed, so a major challenge was the numerous unknowns to work around. NPSP helped MoHFW with vaccine preparedness in various ways, including training, tracking of activities and dry run. NPSP's support to the vaccination programme initiated with the development of concept notes and white papers for the MoHFW, in April. At the time, there was no experience of inoculation involving such big numbers wherein the entire population of the country had to be covered. So, WHO-NPSP started gathering evidence on the experience or capacity within the government and within partners in terms of supporting adult vaccinations or large-scale vaccination, and started identifying probable strategies. NPSP shared global evidences and experience on the regular basis with the Ministry and other decision-making bodies in the government like NTAGI and NEGVAC, to guide them in decision-making.

From May 2020 onwards, work on preparing the operational guidelines began. WHO was the lead partner

in development of the operational guidelines, which involved coordinating with the MoHFW as well as with other partners in putting together the document. At the time, the world started realising that vaccine could be around the corner by the last quarter of 2020, so there was no such document available globally. So, NPSP, along with others involved, started working on the guidelines documentation on the basis of their prior knowledge and experience in the vaccination area.Since there were a lot of unknowns, there was a challenge in preparing broad and generic guidelines. As more information was received, such as which vaccines were going to be introduced, it had to be ensured that all changes required in the operational guidelines were incorporated within a short time. Since vaccination programme has been an iterative process involving a lot of course correction, the operational guidelines underwent many changes during the process.

During the vaccination phase, NPSP team conducted monitoring and evaluation exercises for the programme and engaged Rapid Response Teams (RRTs) in regions where there were greater challenges in vaccination.

Vaccine Administration

The Government and Ministry played the significant role during planning and execution of vaccine administration. Considering the population and geographic landscape of India, immunization of the masses with two doses of COVID-19 vaccine was considered to be one of the exception scenarios requiring elaborate planning, coordination, monitoring and control.

Multiple questions were raised and discussed during the planning phase for vaccine administration – doses availability and schedule, storage temperature requirement, logistics planning, manpower requirement, locations identification and scheduling, tackling VH among the masses, and so on.

Strong focus was maintained during the design and implementation of protocols and processes for the safe delivery, storage, distribution, and administration of vaccination to the masses as well as managing the contradictions and rumours regarding AEFIs.

Following key success factors led to the robust setup for vaccine administration in India with effect from 16th January 2021.

First
India had a strong background in UIP, which involved pan-India administration of 12-13 antigens. These vaccinations were stored at less than 10-degree centigrade temperature and were administered on periodic basis across the villages via Anganwadis and civil centers. A network of Government Medical Supplies Depots (GMSDS) as well as more than 30,000 cold-chain points was set up and leveraged for the UIP. This experience enabled India to plan the similar network for COVID-19 vaccine administration across India.

Second
Both Covaxin and Covishield had the storage temperature requirement of 2 – 8 degrees centigrade, which was similar to the one being required by the vaccinations already administered as a part of UIP.

Third
Government created a strong collaboration with global development organizations like WHO, UNICEF, BMGF etc. and the same partners got involved for setting up the COVID-19 vaccine administration network.

Fourth
An early insight and proactive engagement of key stakeholders including development partners in the mapping of required and available infrastructure led to the operational readiness before the launch of vaccination on 16th Jan 2021.

Fifth
There was a strong focus on ensuring the availability of trained manpower both for vaccine administration as well as tackling the VH among the people. GoI in collaboration with the development partners designed and launched the comprehensive training program (online and offline) for the nurses, Auxiliary Nurse Midwife (ANMs), ASHA workers, doctors, support staff, volunteers, and NGOs depending upon their specific roles and responsibilities.

For example, ASHA workers were trained and involved as mobilizers to tackle the VH as well as mobilizing the masses to go for COVID-19 vaccination, especially those living in villages. Statistically, besides ASHA and NGO representatives, around 3.5 lakhs of ANMs, staff nurses, doctors and community health officers were systematically trained as per their specific roles and responsibilities during the vaccine administration phase.

It is also necessary to provide a mention of an entity called National Technical Advisory Group on Immunization (NTAGI). NTAGI was constituted much before COVID-19 outbreak to look into the 12 vaccine preventable diseases for which GoI had rolled out vaccines across the country. There were multiple vaccines for these 12 diseases and it was the responsibility of the technical body to decide which vaccine is to be rolled out, what should be the SOPs for rolling out of a vaccine, what would be the adverse event capturing mechanism. On similar grounds NTAGI set up a standing group on COVID-19 vaccination. The group was headed by the domain knowledge expert with huge and rich experience of having handled vaccination and issues related to vaccine rollouts. The standing group on COVID-19 advised MOHFW from time to time on how to address certain specific issues of COVID-19 vaccination.

Following were the major questions that the vaccine administration layout set out to answer: What will be the criteria for phase-wise vaccination of the masses? How will the Government undertake the vaccine session site planning and management at the State and District levels? What will be the level of engagement for the private sector in vaccine administration? What kind of SOPs will be implemented to prevent the pilferage of COVID-19 vaccines?

SEGMENTATION AND PRIORITIZATION OF BENEFICIARIES

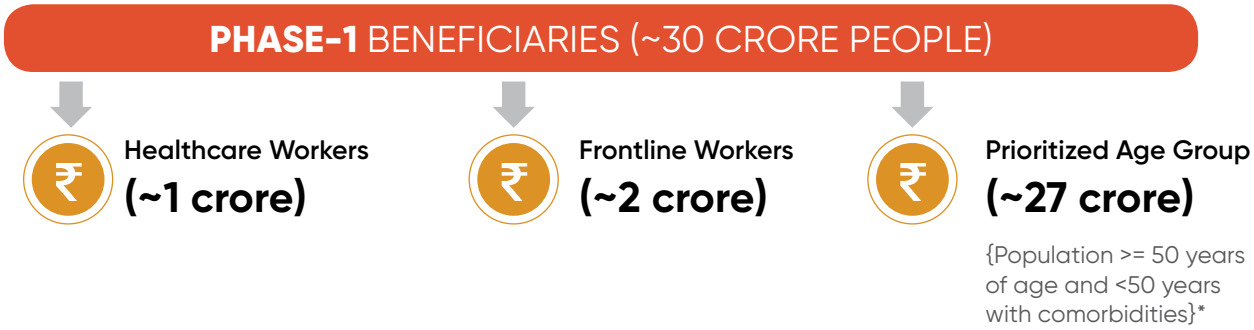
At the time of launch of vaccine in January 2021, NEGVAC issued the guidelines regarding the multi-phase approach towards vaccine administration. For effective implementation, this involved segmenting the beneficiaries into priority segments for vaccine administration on the basis of two parameters. The first parameter involved individual attributes like occupation, age, associated health status. The second parameter involved factors like vaccine availability, disease incidence and prevailing pandemic situation.

NEGVAC met multiple times in a week, at times almost on a daily basis in order to crystallize its recommendations to the government on this particular issue. In their research they referred to certain guidance documents which were prepared by WHO. They also looked at certain international experiences. They then looked at our own country's population and in the scenario of an extended pandemic, tried to answer questions such as; how would we ensure that our health system actually works and does not collapse? Such were the thought which went into multiple deliberations and finally, the committee came up with the recommendation that the first priority should be our HCWs, which is our doctors, our paramedics, our ambulance drivers, our hospital staff because they have to be protected if our health system is to work in an efficient manner and if it has to be strengthened to deal with a pandemic that may be there for two years, three years. Hence on 16th of January, COVID-19 vaccination was rolled out for the HCWs. The subsequent second phase involved vaccinating FLWs. These were municipality staff; these were revenue staff in our villages and Panchayati Raj people in our villages. They were our armed forces and police forces and paramilitary forces. Then came the third phase which involved the elderly because they were vulnerable in terms of suffering from various comorbidities and in terms of there being a large number of immunocompromised people in that population age group, hence they needed to be saved. This is how in a graded manner, the vaccination program evolved.

PHASE -1 – PRIORITY GROUPS AND BENEFICIARIES

Phase-1 of vaccination drive was launched on 16th January 2021. In Phase-1, Government focused on vaccinating the individuals belonging to the following three priority groups - healthcare workers, front-line workers, and population aged 50 years and above as well as those aged below 50 years who had higher health risk. The overall number of eligible beneficiaries in Phase-1 was around 30 crores (Figure 2).

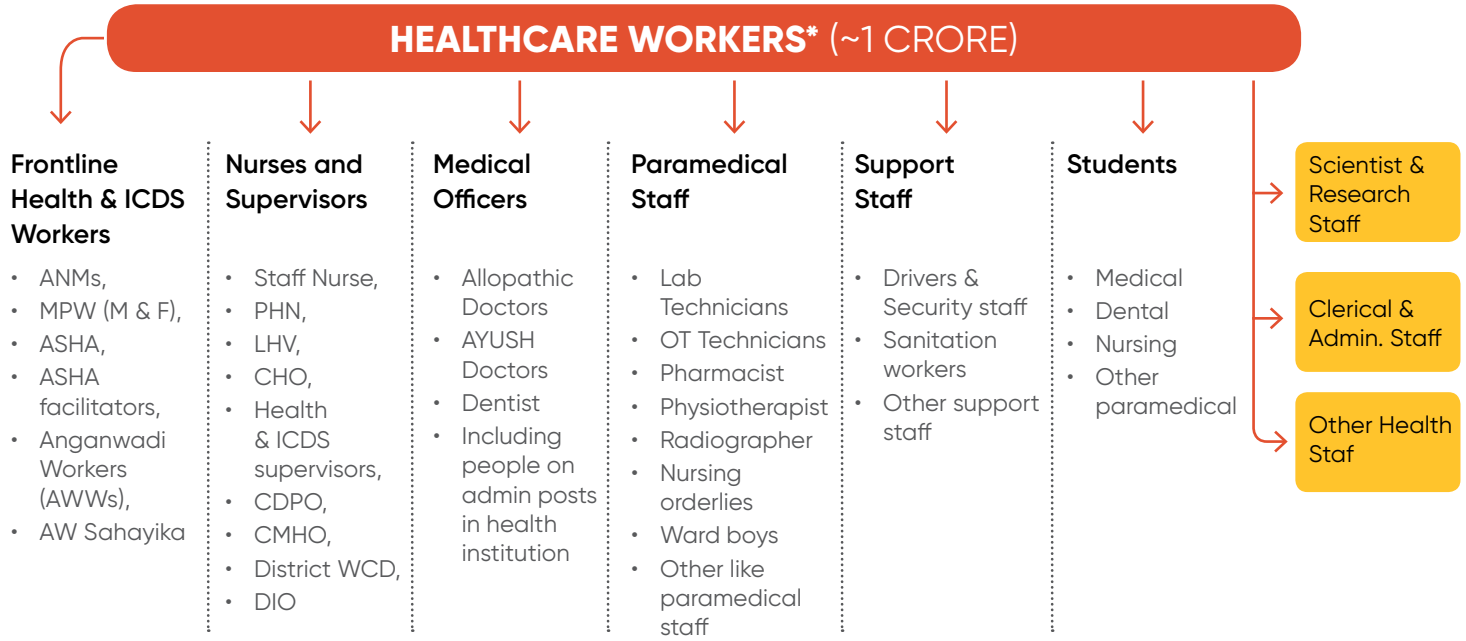
Figure 2: *COVID-19 Phase-1 Vaccine Roll-out - Beneficiaries*



*Age calculation as on 1 January 2021 & as per electoral roll for Lok Sabha and Legislative Assembly elections

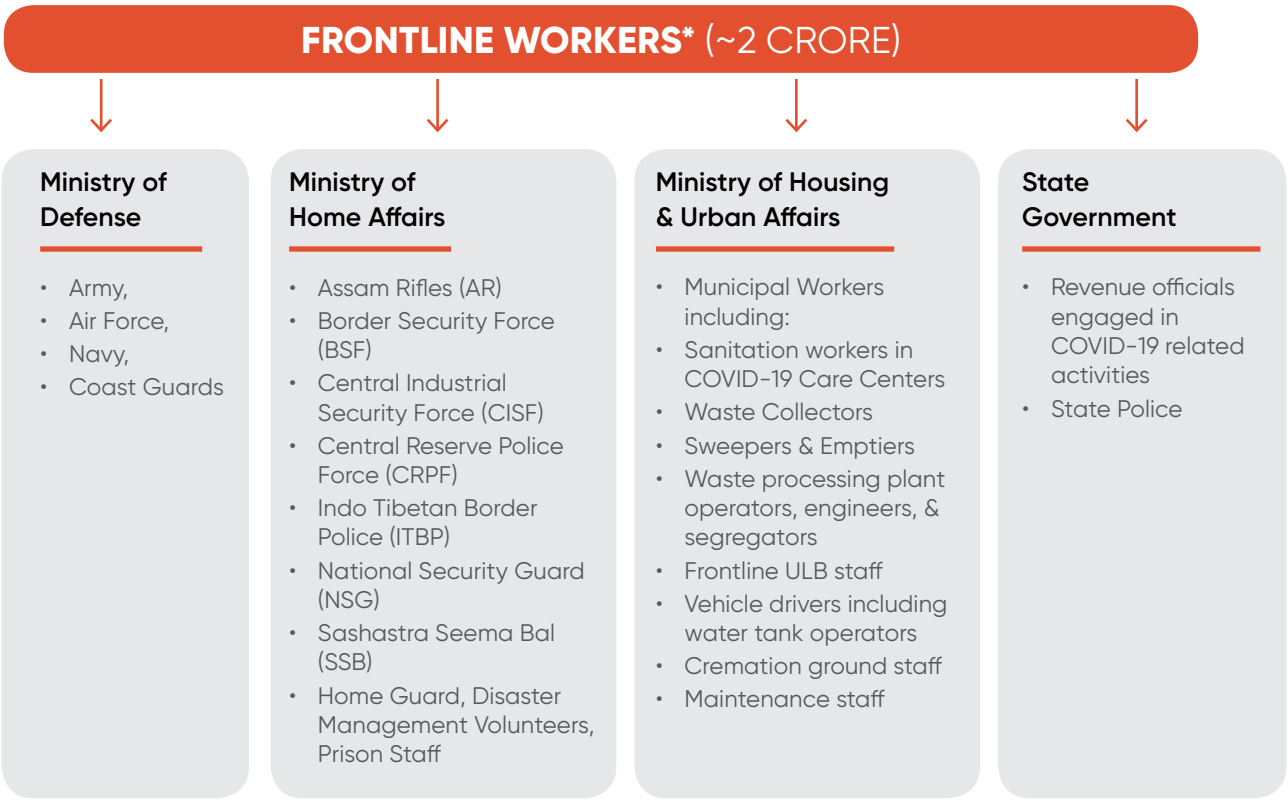
Figures 3 and 4 highlights the composition of eligible beneficiaries categorized as HCWs and FLWs.

Figure 3: *COVID-19 Vaccination Administration – Healthcare Workers Categories*



*defined as healthcare service providers both in government and private sector including ICDS workers

Figure 4: *COVID-19 Vaccination Administration – Frontline Workers Categories*



*Includes police staff, defense and municipal workers engaged in delivery of essential public support and safety services

PHASE-2 AND PHASE-3 – PRIORITY GROUPS AND BENEFICIARIES

Subsequently, Phase-2 of vaccination drive was launched on 1st March 2021 after approximately six weeks of Phase-1. The intent was to expand the coverage of beneficiaries without making it a full-scale launch. Phase-2 primarily allowed all the adults above the age of 60 years as well persons above the age of 45 years suffering from one or more comorbidities in the specified list provided by MoHFW. The specified list of twenty comorbidities declared by MoHFW included health issues related to heart, blood pressure, diabetes, kidney diseases, liver cirrhosis, leukaemia, cancer, HIV infection, bone marrow, and other disabilities including intellectual and physical. The beneficiaries received vaccine free of cost at government facilities, and the market price was capped at INR 250 per dose at private medical facilities.

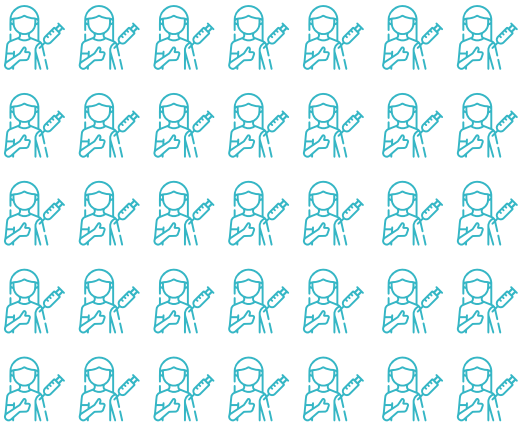
On 1st April 2021, Phase-2 was relaxed further by making every citizen of India above the age of 45 years eligible for vaccination.

On 1st May 2021, GoI launched Phase-3 as part of 'Liberalised Pricing and Accelerated National COVID-19 Vaccination Strategy'. As per the strategy, every Indian citizen of age 18 years and above became eligible for vaccination.

Alongside, all beneficiaries from Phase-1 and Phase-2 who became eligible for second dose of vaccine were given the priority during Phase-3. Figure 5 highlights the division of beneficiaries in Phase-2 and Phase-3

Figure 5: *COVID-19 Phase-2 and Phase-3 Vaccine Roll-out - Beneficiaries*

VACCINATION SESSION – SITE PLANNING AND MANAGEMENT



OVER THE COURSE OF THE PANDEMIC MORE THAN **300,000** COVID-19 VACCINATION CENTERS WERE OPERATIONALIZED IN THE COUNTRY.

The 300,000 figure also ínclded number of private hospitals that acted as COVID-19 vaccination centers. COVID-19 vaccine was administered free to everyone coming to the government COVID-19 vaccination centers, whereas those who could pay were given the option of going to the private centers.

Appropriate session site planning and management played a key role in managing the demand and supply along with the logistics, inventory and crowd control during vaccination sessions held at the district and block levels. Following process was followed for vaccine site session planning and management after the upload of eligible beneficiaries by the Central and State Ministries/ Departments in the Co-WIN system.

IDENTIFYING THE SESSION SITES

This is a key step, which was undertaken by the District Collector (DC)/ District Magistrate (DM) before linking the beneficiaries to the session site. DC/ DM identified the sites for the eligible groups within the district, while BTF/ UTF were responsible for performing the due diligence and detailed verification of all the proposed session sites in terms of space, security and other infrastructure requirements. Finally, DTF had the prerogative to finalize the session site after carrying out a check on all the sample session sites from the proposed list.

Once site was selected, a final check of the selected session site and concerned cold chain point was carried out by

the DTF one day prior to the scheduled session. Different types of session sites (Fixed, Outreach, and Mobile Teams) were identified for the beneficiaries depending upon their occupation, age group, and location (Figure 6).

Fixed Session Site involved government and private health facilities having a medical officer/doctor. This involved Government health facilities at or above the level of Primary Health Centres (PHCs)/ Urban Health Centres (UHC) as well as private health facilities having 100 or more Healthcare Workers. Sub-Health Centres (SHCs) were also clubbed together at the level of PHC/UHC to be used as a vaccine session site, if required. Outreach Session Site involved non-healthcare facilities like schools, colleges, community halls, municipal offices, panchayat bhawan as well as Frontline Workers offices like cantonment hospitals, clinics and railway hospitals.

Special Mobile teams were created to cover the hard-to-reach areas comprising underserved population, migratory people, international borders, left-wing extremists (LWEs), etc.

Figure 6: *Session Sites – Types for Different Priority Groups*

HEALTHCARE WORKERS

Fixed Session Sites at health facilities (Government or Private)

Government Health Facility at PHC level and above
Private Health Facility having HCWs >=100

FRONTLINE WORKERS

Fixed Session Sites at health facilities (Government or Private)

Outreach Session Sites like Offices of FLWs, Schools, Colleges, Community Halls, Municipal Offices etc. in their residential areas.

OTHERS - PRIORITIZED AGE GROUP, ALL ADULTS

Fixed Session Sites at health facilities (Government or Private)

Outreach Session Sites like Private Offices, Schools, Colleges, Community Halls, Municipal Offices etc. in their residential areas.

Special Mobile Teams for the people living in hard-to-reach areas.

Notes:
1/ Facilities having <100 beneficiaries were clubbed together to make an injection load of 100 and minimize vaccine wastage.
2/ Election polling booth list was used for identifying outreach session sites.
3/ DTF finalized the session sites as per available resources.

LINKING UP VACCINATORS AND BENEFICIARIES TO THE SESSION SITE

The next step after finalizing the session sites involved going ahead with the planning of the support team for conducting the vaccination session based upon the number of vaccinators, mobilizers, security people, support team, and supervisors. DC/DM along with DIO linked the session sites, vaccinators, supervisors, and beneficiaries to finalize the date and time for conducting the sessions at different sites. All the support teams formed were specific to each session. Before specific vaccine session, detailed scheduling with clear roles and responsibilities was outlined, and automated email notifications were sent to the beneficiaries, vaccinators, mobilizers and supervisors regarding the date, time and place of the session. To avoid crowding and ensure the staggered approach, self-registration was mandatory for the beneficiaries and staggered time-slots were allocated to the registered beneficiaries on the Co-WIN platform. All the sessions were planned with the limit of 100 beneficiaries per day. For the sites at locations having sufficient logistics and space availability for waiting and observation area, sessions were planned for around 200 beneficiaries per day. In remote or sparsely populated areas, sessions were conducted for lesser beneficiaries per day. Mobile vans were also used in scarcely populated areas.

LOGISTIC PLANNING FOR VACCINES ON SESSION SITE

After linking up the vaccinators and beneficiaries to the session site, the next important step involved planning out the adequate availability of vaccines, as well as logistic arrangements as per the number of registered beneficiaries for the specific session site. The planning also took into consideration the number of beneficiaries for first dose or second dose. The same vaccine type was planned for the sessions held on the single day to minimize the wastage and to ensure the similar vaccine for the beneficiaries coming for the second dose. Vaccines were transported and delivered to the session site on the day of vaccination from the respective cold-chain store.

Arrangements were made to deliver one extra vaccine carrier with conditioned ice-packs for alternative scenario or situation. Sanitization of the session site was done and the support team was given the details of beneficiaries registered for the specific session site on the particular day. BTF team was given the responsibility to undertake the physical inspection of the session sites one day before the scheduled vaccination to reaffirm the logistic arrangements and team readiness. In parallel, DTF picked up the sample session sites and undertook physical inspection of those sampling units one day before the vaccination.

VACCINATION SESSION SITE LAYOUT AND FLOW OF BENEFICIARIES

The final step before conducting the vaccination session involved undertaking the detailed session planning in terms of layout plan for entry point, waiting room, vaccination room, observation room, and exit point for the beneficiaries. This flow of beneficiaries from the time of entry to making an exit involved the following steps:

Step 1

Pre-registered beneficiary (Co-WIN platform) visited the session site as per the allocated time-slot.

Step 2

Vaccination Officer-1 checked the Photo-ID and verified the pre-registration status of the beneficiary before allowing him/her to the waiting area. Un-registered beneficiary was declined access to the waiting area and was referred to the support staff for further directions.

Step 3

Vaccination Officer-2 authenticated the registration documents of the beneficiary in the Co-WIN system along with the Aadhaar details before allowing him/her to the vaccination area. Non-authenticated beneficiary was referred to the support staff for further guidance.

Step 4

Vaccination Officer vaccinated the beneficiary and updated the beneficiary vaccination status as 'vaccinated' on the Co-WIN platform. Besides vaccinating the beneficiaries, Vaccination Officer was responsible for ensuring the availability of anaphylactic kits with injection Adrenaline; checking the expiry date on Injection Adrenaline; marking date and timing of opening the vaccine on each vial; delivering the key message related to COVID-19 vaccine to the beneficiary; and following the guidelines of infection prevention and control, injection safety, and bio-medical waste management.

Step 5

Beneficiary was moved to the observation room/ area and asked to stay there for 30 minutes before leaving

Step 6

Vaccination Officers 3 and 4 were responsible for managing the crowd at the session site; monitoring the vaccinated beneficiary for any adverse event during observation; ensuring that vaccinated beneficiary stayed in the observation area for 30 minutes after the vaccination; supporting the Vaccination Officer during vaccination; ensuring compliance of the social distancing guidelines by all the stakeholders at the vaccine session site; and counselling the unregistered beneficiaries for next step towards vaccination.

Step 7

After vaccination status of the beneficiary is updated in Co-WIN by the vaccination team, automated SMS notification was delivered to the beneficiary containing the link for downloading the vaccination certificate and information regarding the subsequent dose.

GRIEVANCE REDRESSAL MECHANISM AT SESSION SITE

The National help-line number '1075' was advertised and communicated to the people for reaching out if they had any queries or need any guidance regarding COVID-19 vaccination and Co-WIN registration. Also, Technical help-line number was established to handle Co-WIN platform related queries, especially technical or usage-specific queries. Any technical issue requiring further resolution was forwarded from National help-line to the technical help-line. Then, State level help-line number '104' was set up for providing timely medical assistance in case of any illnesses, ailments or mental distress during COVID-19 before or after vaccination. State help-line number was also used to create awareness among the people regarding available health schemes. During COVID-19, capacity of the State help-line number was enhanced to address grievance redressal related to the vaccination process as well as any AEFI. Grievance Redressal was reviewed at periodic intervals by the STF, DTF, UTF and BTF for any gaps or improvements.

MANAGING AEFI AT SESSION SITE

There were two situations labelled as adverse events by the people or media and required appropriate action.

First involved the allergic reaction on the session site after vaccination. Also known as anaphylactic reaction, this AEFI was tackled by the vaccination team as per SOPs.

Second situation involved getting fever or some specific health issue when vaccinated person went home.

One of the Key Focus Areas (KFAs) during vaccine administration involved addressing the unexpected situations including rumours regarding adverse effects of COVID-19 vaccination. AEFI involved unfavourable or unintended signs, which required appropriate monitoring, response and action by the task force depending upon the severity levels. AEFIs were categorized into three severity levels – minor, severe, and serious. Minor AEFIs involved minor reactions to COVID-19 vaccination like pain and swelling in the injection area, fever, irritability etc. Severe AEFIs were related to symptoms with more severity like anaphylaxis, high fever, sepsis etc. Serious AEFIs included exceptional cases like deaths, hospitalization in critical care, disability, etc. These were untoward medical occurrences after COVID-19 immunization and did not necessarily have a causal relationship with the vaccination.

Anaphylaxis kit were primarily used for managing adverse events at outreach vaccination sites by the trained ANM or vaccinator. AEFI kit was used primarily at fixed vaccination session sites located at the health facility (PHC/CHC/sub-district or district hospitals etc.) or at AEFI management centres, by the trained doctors instated primarily for serious or severe AEFI cases.

The existing AEFI surveillance system was also utilized to monitor AEFI and understand the safety profile of the vaccines. To ensure confidence in the vaccine and the immunization programme during the vaccination drive, States/UTs were directed to rapidly detect and respond to all AEFIs. For streamlining the monitoring of AEFI cases, the SAFEVAC application used for reporting AEFI was integrated with Co-WIN portal, so that all the adverse events could be reported and captured by the program officers to ensure that they are timely investigated, monitored and tracked.

On the AEFI front, clarity of communication and engagement of the local NGOs, CSOs, Community-Based Organizations (CBOs) and doctors also played a significant role in managing the fears and rumours, which tend to spread in case of any adverse event faced by the vaccinated person at home. Region-specific NGOs, CSOs, CBOs and doctors were engaged, trained and involved to reach out to the people having any such doubts or issues and clear their misconceptions. For instance, if somebody developed fever after vaccination, last-mile and on-ground partners counselled that person and informed them that fever was a minor-reaction for a day or so after vaccination. During the course of treatment for adverse events post-vaccination, emergency contact details of the DIO, medical officers of PHC/CHC/ AEFI management centre and local ambulance services were made available to the vaccinators and site supervisors.

MANAGING WASTE AND UNUSED SUPPLIES

During the COVID-19 vaccine administration phase, initially there were instances of vaccine wastage due to storage and transportation issues like vaccines not being stored at right temperature or vaccine vials getting broken during transportation. However, these instances had been minimal due to the robustness of our cold-chain system, which had been in existence due to UIP. Majority of the HCWs involved in COVID-19 vaccine delivery and distribution were well-trained and experienced due to their exposure to UIP. Also, millions of HCWs underwent comprehensive training on the virtual platform before the launch of COVID-19 immunization in Jan 2021. Another instance of vaccine wastage involved unused vaccine doses in the multi-dose vials during vaccination camps. This mainly happened during the initial phase of vaccination when VH was high but gradually as vaccine supply along with awareness and willingness of the people for taking vaccine has increased, this wastage type was also controlled to a certain extent. Besides vaccine wastage, there was lot of waste material generated in the form of syringes, vaccine vials, gloves and other consumables during the vaccination. The detailed operational plan was laid down for the COVID-19 vaccination program. The operational plan highlighted aspects like reducing, segregating, and managing the waste as much as possible. All these guidelines were part of training programmes imparted to the HCWs, FLWs, doctors and other on-ground staff.

Keeping safety at the core, detailed guidelines for safety during vaccine administration, disposal and waste management, as well as for returning the unused supplies, were laid down and communicated to all the stakeholders. All these performance indicators were reviewed and monitored regularly by the task forces at the state, district, urban, and block levels. Safe injection guidelines emphasized upon the safety of the beneficiary as well as healthcare worker and ensuring that no waste was generated, which could be considered

hazardous for the community. Specific safe injection guidelines were laid down and communicated to the HCWs and vaccination team, like pre-washing; avoiding cuts on the skin of recipient during injection; making use of Auto-disable (AD) syringes; avoiding pre-fill of syringes; doing immediate destruction (using hub cutter) and disposal of injection waste in red bag; returning unused vaccine vials to the cold-chain point as per AEFI guidelines for proper disposal; handing over the segregated immunization waste to the PHC for further disposal, and washing hub-cutters properly with sodium hydrochlorite before reuse.

All the used, unused, partially used and damaged vaccine vials were returned along with the completed tally forms through the AVD to the vaccine distribution or Ice-Lined Refrigerator (ILR) or cold-chain point. The unopened vials were marked appropriately and immediately stored at the required temperature. These marked vials were supplied and used first on the next day or during the next vaccine session. Empty vaccine vials, which were returned from the field were stored in the separate zip lock bag at the ILR or cold-chain point for safe disposal.

ENGAGING THE PRIVATE HEALTH SECTOR

Recognition must also be given to the private sector for their constructive role and support during the COVID-19 crises.

At the time of COVID-19 vaccination launch (Nov 2020 – Jan 2021), Government held the series of consultations with domestic syringe manufacturers to ensure the adequate supply of AD syringes. This is one area where India has traditionally been very strong. But the private industry had to be given an indication of what would the demand be, what would government be procuring in the next six-eight months so that they could at their risk, invest their time and money into strengthening their production capacities. The process went underway, and the private players met the challenge. India produced enough AD syringes to deliver one billion doses in 2021.

Thus, private health sector was engaged as the key stakeholder at the state and district levels during the COVID-19 vaccine roll-out. Private sector response was channelized through the agency of private medical colleges, hospitals, professional associations (allopathic and allied sciences), NGOs, CSOs, trust hospitals, and representatives of the non-profit associations like Rotary Club etc. Several key steps were taken to ensure the alignment of the private health sector and development organizations during the COVID-19 vaccination drive. One such step included nominating representatives of the private hospitals, and professional medical associations as key members in state, district, block and urban task forces. Another step constituted of national hospitals and healthcare institutions (with NABL and NABHHP certification) being tasked with preparing a list of private healthcare facilities required to perform the enumeration process during vaccination roll-out. Private healthcare facilities were also utilized as vaccination sites. The private healthcare facilities having a staff strength of 100 and above, were identified as session sites and tagged in the Co-WIN platform. This was an important step by the Government to ensure the wide coverage of beneficiaries during the vaccination drive. All these Co-WIN registered private sites were listed in the communication material and were required to comply with the following COVID-19 immunization protocols:

- Allocation of the separate area for COVID-19 vaccination from the routine healthcare services with clear directions and availability of waiting, vaccination, and observation rooms.
- Ensuring the pre-sanitization of vaccination site one day before the day of vaccine session.
- Having adequate provisions to manage any AEFI as per national guidelines.
- Having a clearly identifiable nodal officer as a point of contact for the district health administration and vaccination team.

All the private vaccination sites needed an arrangement for delivery, logistics and storage arrangement for the vaccines needed during the sessions. The primary guidelines favored the delivery of vaccines as and when needed for the session on daily or need basis thereby avoiding the need for storage infrastructure. However, for large private facilities conducting multiple sessions, alternative arrangements of logistics, delivery and storage were preferred with clear guidelines for vaccine storage, immunization waste disposal, and return of unused vaccine vials to the cold-storage points. Vaccine storage facilities at private health provider site need to exhibit strong compliance with Central Pollution Control Board (CPCB) guidelines for immunization waste disposal as well as cold chain management practice and adverse event prevention guidelines of the Government. A detailed readiness and compliance assessment of the private healthcare provider as vaccine session or storage site was undertaken prior to the session by the district authorities. Therefore the private sector played an important role in ensuring the coverage and accessibility. However there is no denying the fact that public health ecosystem played the dominant role in vaccination drive. For instance: from 1st May to 22nd November 2021, 96.3% vaccinations were administered at government health facilities while only 3.7% were administered at private health facilities.

ENGAGE PRIVATE HEALTH SECTOR AND LEVERAGE THEIR OUTREACH

State and district level administration engaged the private health sector medical colleges, hospitals, professional associations (allopathic and allied sciences), NGOs, CSOs, trust hospitals, and representatives of the non-profit associations like Rotary Club etc. for their participation and support during the vaccination campaign. Besides medical professionals, other staff members of professional associations, NGOs, and CSOs were also engaged as influencers, volunteers, verifiers, and other support staff in the vaccination teams. Engagement of NGOs, CSOs, and trust hospitals enabled the ease of access and delivery in the rural hinterlands of India.

ENGAGE PROFESSIONAL ASSOCIATIONS FOR VH AND VE GROUPS

In order to address the concerns of the people categorized in the VH or VE groups, state and district vaccination teams leveraged the strength and expertise of the professional associations like Indian Association of Preventive and Social Medicine (IAPSM), Indian Academy of Paediatricians (IAP), Indian Medical Association (IMA), Indian Public Health Association (IPHA) and so on.

ROLE OF PRIVATE HEALTH SECTOR IN TASK FORCES

Representatives of the private hospitals, and professional medical associations were nominated as key members in state, district, block and urban task forces.

PRIVATE HEALTH PROFESSIONALS AS CHAMPIONS AND INFLUENCERS

Well-known and respected health professionals were engaged in the vaccination campaign as brand ambassadors, champions and influencers.

ENUMERATION OF CENTRALIZED INSTITUTIONS

Centralized institutions including National Accreditation Board for Testing and Calibration Laboratories (NABL) and National Accreditation Board for Hospitals & Healthcare Providers (NABHHP) certified national hospitals and healthcare institutions were engaged to list the private healthcare facilities, which were needed to facilitate the enumeration process during vaccination roll-out.

PRIVATE HEALTHCARE PROVIDERS AS TRAINERS AND VACCINATORS

Eminent healthcare providers were identified and trained as master trainers during state and district level trainings. Vaccinators from private healthcare providers were engaged as second vaccinators at the beneficiary sites having a load of more than 100 registered beneficiaries. For each vaccination session, the lead vaccinator was identified from the public healthcare system. Adequate screening mechanism was followed to ensure that backup vaccinator from private healthcare system was competent and qualified.

JOINT MEDIA BRIEFINGS

The joint media briefings were undertaken on regular basis by the state and district administration along with IMA and other associations.

PRIVATE HEALTHCARE FACILITIES AS VACCINATION SITES

Those private healthcare facilities having a staff strength of 100 and above, were identified as session sites and tagged in the Co-WIN platform. This was an important step by the Government to ensure the wide coverage of beneficiaries during the vaccination drive. All these Co-WIN registered private sites were listed in the communication material and were required to comply with the following COVID-19 immunization protocols:

- Allocation of the separate area for COVID-19 vaccination from the routine healthcare services with clear directions and availability of waiting, vaccination, and observation rooms.
- Ensuring the pre-sanitization of vaccination site one day before the day of vaccine session.
- Having adequate provisions to manage any AEFI as per national guidelines.
- Having a clearly identifiable nodal officer as a point of contact for the district health administration and vaccination team.

All the private vaccination sites needed an arrangement for delivery, logistics and storage arrangement for the vaccines needed during the sessions. The primary guidelines favoured the delivery of vaccines as and when needed for the session on daily or need basis thereby avoiding the need for storage infrastructure. However, for large private facilities conducting multiple sessions, alternative arrangements of logistics, delivery and storage were preferred with clear guidelines for vaccine storage, immunization waste disposal, and return of unused vaccine vials to the cold-storage points. Vaccine storage facilities at private health provider site need to exhibit strong compliance with Central Pollution Control Board (CPCB) guidelines for immunization waste disposal as well as cold chain management practice and adverse event prevention guidelines of the Government. A detailed readiness and compliance assessment of the private healthcare provider as vaccine session or storage site was undertaken prior to the session by the district authorities.

PREVENTING COVID-19 VACCINES PILFERAGE - GUIDELINES

GoI issued the comprehensive guidelines regarding the prevention of pilferage, theft, misuse and wastage of COVID-19 vaccine. This was one of the KFAs considering the challenge of vaccinating more than one billion people in India amidst limited supplies, especially in the semi-urban, peri-urban and rural areas, despite the huge demand levels.

INDIA'S DRUGS AND COSMETICS ACT 1940

COVID-19 vaccination programme was categorised under the purview of The Drugs and Cosmetics Act 1940 and the Rules, 1945 thereby making any act of unauthorized storage or distribution or purchase or sale of COVID-19 vaccine meant for Government supply as a punishable offence. Compliance and monitoring checks were incorporated in the vaccine administration process to prevent the pilferage of the vaccine. First, a representation from the office of State Drugs Controller was included in the STF, DTF as well as BTF. Second, community awareness was planned at all levels and community-based reporting system was set up to get a notification about any such event from the people and raise an alert for the State Drugs Controller and District Drug Inspectors to undertake immediate verification and required action. Third, nodal person was identified at the State and District levels to monitor and report any such pilferage event, get it actioned by the respective authorities at State and District levels and take the issue to closure.

COVID-19 VACCINE TRACKING

Co-WIN platform also enabled the last-mile tracking of vaccine pre and post administration across the vaccination sites in India. In Co-WIN system, each and every vaccine dose was linked to the individual beneficiary. The designated vaccine officers had the responsibility to update the administered vaccine details (name of vaccine, batch, manufacturing date) in the Co-WIN system after administering the same to the individual. This ensured the real-time track-and trace mechanism for all the vaccine vials being administered during the vaccine sessions across the sites in India. Additionally, following guidelines were

issued to the states and districts to ensure the strict track-and-trace mechanism. The first guideline mandated physical verification of all the vaccine vials at the time of receiving or issuing stock. The counting was reconciled with the details available in Co-WIN system. Any mismatch between physical and Co-WIN system figures warranted an immediate action by the State Immunization Officer (SIO) and DIO. The second guideline mandated the immediate reporting of any broken or damaged vaccine vial to the Medical Officer and Store In-charge. Any such vial breakage or damage was also updated in the Co-WIN system. Any damage of ten or more vaccine vials at a specific session site was also reported to the SIO and DIO. The third guidelines mandated safe storage and packaging of vaccine vials in cold boxes as per SOPs while transporting them to the vaccine sites. The accountability for damage of vaccine vials during transportation resided with the supply store in-charge.

COVID-19 VACCINE VIALS – EMPTY OR PARTIALLY USED

According to the Safe Disposal guidelines by the GoI, all the empty and partially used vaccine vials required the proper return mechanism from the vaccine session site to the issuing cold-chain point. Reconciliation was done at both session site and cold-chain point to ensure the match between usage, left-overs and number of people vaccinated.

The disposal of empty or partially used vaccine vials followed the Central Pollution Control Board (CPCB) guidelines. The facility in-charge of the cold chain point was responsible for supervising and ensuring the safe disposal of returned vaccine vials (empty and partially used) immediately after receiving those from vaccine session sites.

COVID-19 VACCINE SECURITY

Detailed guidelines were issued by the Government for the State and District administration to ensure the safety and security of COVID-19 vaccine at storage sites, during transportation, and at vaccine session sites. Guidelines required 24*7 security of cold-chain sites and proper security arrangements during vaccine transportation. Access to cold-chain sites was limited to authorized personnel. During transportation, it was mandated to seal the carrier van before leaving the cold-chain point and unseal the same only at the session site in front of the facility in-charge. Logbook was maintained at all storage sites for all visits by the authorized personnel.

Vaccine Roll Out -
Training and Capacity Building of Skilled Resources

04

One of the key drivers in the success of vaccination programme was the availability of skilled resources for taking care of a diverse set of activities involved in the vaccine administration life-cycle. The diverse set of stakeholders who were required during the vaccination drive involved enumerators[1] for listing the beneficiaries; health functionaries (HCWs, FLWs) for taking care of vaccination activities; social mobilizers and last-mile enablers for managing the flow of information and communicating in a time-sensitive manner to effect behavioural change and mobilize the beneficiaries to proceed with vaccination.

Training played a critical role in capacity building and overall success of the COVID-19 vaccination drive.

First, the Government prepared the detailed communication and operational guidelines for impart training and skill-building to the resources involved in the vaccination drive at state, district, and block levels across all over India. Second, virtual training program was designed and modules were prepared specific to the different roles and responsibilities of the trainees. The trainees included administrators, program officers, HCWs, FLWs, doctors, nurses, volunteers, development organizations and other individual as well as institutional partners. Vaccination teams were created for each vaccination camp comprising the minimum of five people taking care of end-to-end activities at the camp. Trainings were designed to enable the people work in teams with team spirit and camaraderie. Specific training modules were designed for the vaccination teams regarding handling the AEFIs, media mis-information and other negative news on social media, which was promoting VH among the individuals. Moreover, considering the COVID-19 lockdown, training programmes were launched on the online platform with technology playing the significant role. Statistically, more than one million people were trained in different roles and responsibilities for their involvement in the COVID-19 vaccination.

As a part of capacity building initiative, GoI launched the national level training and skill-building program mapping the resources at the National, State, District, Urban and Block levels using a mix of face-to-face and virtual trainings. WHO-NPSP led the training division of the ministry, wherein it helped in planning the roll-out of the training programme. Virtual trainings were a new concept for the country, so questions like, at what level the virtual training will work and beyond what level will a face-to-face training be required needed to be thought through well in advance. Anticipating the scenarios that could unfold in the process, NPSP also prepared guidelines for face-to-face trainings and shared with the ministry for further dissemination among other stakeholders.

MoHFW created an extensive list of ongoing web-based trainings along with the resource training kit comprising links for videos and best practices documentation (MoHFW

[1]Enumerators are persons involved in taking a census of the population

Training Calendar, 2020). All these details were shared with the resources as per their role and responsibility in vaccine administration. For example, AWWs, ANMs, and ASHA workers were engaged in the role of field surveillance and creating awareness among the vaccine beneficiaries. Hence, a resource kit wasdeveloped comprising the videos, posters, and documents covering such topics like role of FLWs, information on health and hygiene, personal safety measures, community surveillance, transporting a suspected case of COVID-19, home quarantine, environmental sanitation, steps to deal with social stigma and discrimination, and so on (MoHFW Training Calendar, 2020). A hybrid training and capacity building approach comprising a blend of videos, reading material and live web-based interactions was also implemented across the states, districts, and blocks to maximize the possible impact on the ground during vaccine administration.

Ongoing virtual trainings were planned using Government platforms like National Informatics Center (NIC), ECHO, Integrated Government Online Training (iGOT) portal on Digital Infrastructure for Knowledge Sharing (DIKSHA) platform of Ministry of Human Resource Development (MHRD), educational satellite (EDUSAT) (used in Madhya Pradesh), and other widely accepted online training platforms. Development partners were engaged in organizing and managing the virtual trainings at state and district levels.

In 2020, ECHO India and MoHFW collaborated for conducting the virtual training sessions as a part of the capacity building strategy for vaccine administration. During 2020, more than 306 virtual sessions were conducted by National Health Mission (NHM), Maharashtra on ECHO India platform (ECHO-India Website, 2020). These sessions trained more than 2,00,000 participants. Simultaneously, ECHO India mobilized its network to support the ECHO community towards conduct of COVID-19-ECHO sessions across the nation.

Regarding online virtual trainings at the state, district and block levels, following options were primarily used for conducting the resource capacity building sessions – NIC, ECHO, state-

[2]Project ECHO began in 2003 as a healthcare initiative under the leadership of Sanjeev Arora, MD, a liver diseases specialist at Mexico Health Sciences Center in USA. It started as a global movement for democratizing the knowledge with the aim on capacity building towards delivery of equitable healthcare and other critical resources to the most vulnerable population globally. It has been implemented by 400 partners involved in democratizing the knowledge building on more than 70 key focus areas across 38 countries. Details available at: https://www.echoindia.in/about/ opulation

specific platforms like EDUSAT (Madhya Pradesh) as well as private web-based platforms like WebEx, Microsoft TEAMS, Google Meet, etc.

In the areas at the district and block levels having poor internet connectivity, face-to-face training sessions were scheduled for the resources, in compliance with all COVID-19 related appropriate precautions like having a small batch size, well-ventilated venue, hand hygiene, use of mask, and proper physical distancing between the participants.

Regarding self-learning modules, GoI launched iGOT portal on MHRD's DIKSHA platform for the capacity building of front-line workers on different aspects of COVID-19. The portal hosted training material, which could be accessed by the health staff who are unable to participate in web-based training sessions or want to revisit the training material. Rapid Immunization Skill Enhancement (RISE) (https://risemohfw.in/), a blended-learning, knowledge and skill-building package for India's UIP was developed by JSI[3] (https://www.jsi.com/project/rapid-immunization-skill-enhancement-rise-in-india/) under the guidance of MoHFW. RISE platform was used for providing complementary access to knowledge resources online.

Different types and categories of training modules were planned for different types of vaccination officers based on their respective roles and responsibilities. One category of key resources who needed scale-up and capacity building included healthcare providers (FLWs and HCWs) like MBBS, BDS, and AYUSH doctors, Staff Nurses, ANMs, Pharmacists, ASHA workers, and MAS. The second category of key resources included individuals having a grassroot network and ability to undertake social mobilization like AWWs, NGOs, CSOs and other local volunteers in each region. The third category of key resources included delivery, logistics and operational coordination experts like IEC officers, cold-chain, supervisors and data managers. All these resources were engaged in cascaded training and skill-building programmes during the launch of vaccination drive in India.

[3]JSI is a public health care and health systems consultants and researchers who are driven by the passion to build stronger health systems and healthier communities thereby improving health services and outcomes for all. https://www.jsi.com/about-jsi/ (last accessed 5 June 2021)

05

The Technology Phenomenon - Co-WIN Digital Platform for Registration and Tracking of Beneficiaries

One of the key challenges in the success of vaccination drive involved the need for a robust registration and tracking mechanism for the beneficiaries. Each vaccination session allowed limited number of beneficiaries and social distancing too was the utmost priority during vaccination sessions. So, there was a need for an online registration mechanism, which could provide the option of allotting different dates and vaccination sites to the people in each region and allow them to book their slot as per their convenience and as per the slot availability. Also, since vaccination involved two jabs in an interval of 6-8 weeks, there was a need for robust tracking mechanism to ensure timely administration of second jab and tracking of unique vaccination dose serial number, which was required in case of any adverse effects on the beneficiary.

Mindful of all the challenges listed above, MoHFW designed the Co-WIN as a comprehensive cloud-based IT platform for planning, implementation, monitoring, and evaluation of COVID-19 vaccination in India.

The Honorable Prime Minister, Narendra Modi activated the Co-WIN platform on 16th January 2021, thereby formally signing-off the world's largest vaccination drive in India (News18, January 2021).

Co-WIN was designed as a mobile app to monitor real-time COVID-19 vaccine delivery across the states, districts and blocks. The app also involved functionalities like recording the real-time data of users and beneficiaries as well as enabling the beneficiaries to register themselves online for vaccination, with the option of choosing a vaccination site, date and time slot for vaccination.

The primary purpose of launching the Co-WIN platform was to ensure the smooth administration of vaccine to the beneficiaries across India.

Online self-registration was made mandatory for the Indians who wanted to get inoculated. This was being done for the following reasons. First, this helped in saving time for the beneficiaries and eliminated the uncertainty of not being able to get vaccinated when they went for vaccination. Second, this helped in knowing beforehand how many vaccines would be needed on a particular day at a specific vaccination site or session. Accordingly, vaccine doses were made available and resources were aligned on each vaccine site every day. Third, this helped in minimizing the vaccine wastage as demand-supply mismatch would have led to wastage of vaccines made available at a particular site.

The design of this end-to-end IT platform involved a set of features and functionalities to facilitate the vaccine administration drive at national, state, district and block levels. This system was designed with a User Administration module and depending upon the registration type, each user was allowed access to the specific features on Co-WIN platform.

The end-to-end platform included the following key value offerings:

- Creation of different user types (administrators, supervisors, vaccinators)
- Registration of beneficiaries (individual registration and bulk upload)
- Listing of Facilities/ Planning Unit and Session Sites
- Planning and Scheduling of Vaccine Sessions with real-time status on booked and available booking slots on different dates and at different sites
- End to end Implementation of vaccination process
- Traceability of beneficiaries, vaccine sessions, registrations, etc. at national, state, district and block levels
- Monitoring of vaccine doses (available and administered) and wastages at national and regional levels

CO-WIN PLATFORM DEVELOPMENT

Co-WIN platform was designed as an end-to-end mobile app platform comprising the following major modules – User Administration, Inventory and Logistics, Registration, Vaccination module, Beneficiary Acknowledgment and Reporting. Using these modules, vaccine administration team created sessions, and notified vaccinators and managers, while beneficiaries did the self-registration for specific vaccination slot in a particular scheduled session.

User Management module involved user registration and access features for national, state, and district level administration. This module enabled different levels of access to different users as per their roles and responsibilities, thereby ensuring the security, privacy and control of the application. Few end users of Co-WIN platform operated at the district level and only need to access the functional modules with respect to district-level activities.

Inventory Management and Temperature Monitoring modules provided the functionality related to logistics and cold chain management, material allocation, inventory management of available supplies at national, state and district levels as well as temperature monitoring and real-time stock visibility.

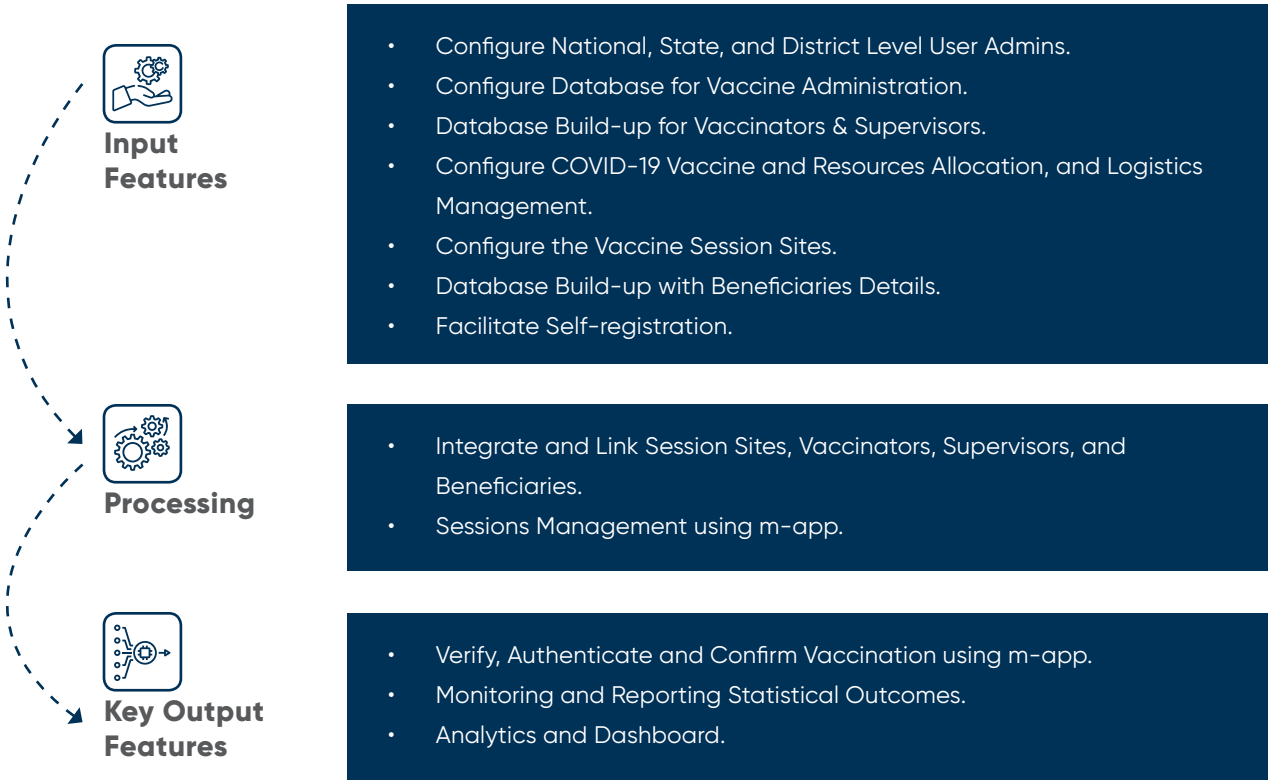
Beneficiary Registration module provided separate access and control at the national, state, district and block levels. This enabled the vaccination team to keep track of scheduled sessions list as well as corresponding beneficiaries list for different dates in different regions (districts, blocks). It also enabled access to the beneficiaries for self-registration towards vaccination slot-booking as well as for tracking their booking and vaccination status.

Session Planning module involved scheduling and managing the vaccination session sites. Based upon the allocation of vaccination sessions to different vaccine sites, beneficiary registrations were allowed on different dates. This module involved district-level administration setup.

Vaccination module involved two primary user types – supervisor and vaccinator. The module enabled the vaccination team to undertake the beneficiary verification, go ahead with the inoculation, as well as enabled the reporting of AEFI events. The SAFEVAC software used for routine immunization was integrated with Co-WIN to enable the reporting of AEFI on the Co-WIN app. Analytics or Dashboard was designed as the final module in the Co-WIN application for ensuring the monitoring, tracking and reporting of vaccination statistics like beneficiaries covered, beneficiaries drop rate, sessions planned versus session held, vaccine wastage and utilization, etc. Co-WIN dashboard was used by the Government authorities to get the real-time snapshot of the vaccines administered in a day, gender of beneficiaries, and so on, at both national and sub-national levels.. It also provided an overview of the vaccination programme at the district and block levels to the government authorities and administrators. Besides these essential data-points, Co-WIN also helped the authorities to track and report AEFI cases.

Refer to **Figure 2** for understanding the process flow of Co-WIN platform

Figure 7: *Co-WIN Platform – Process Flow*



CO-WIN PLATFORM - TECHNOLOGY PHENOMENON

Co-WIN was designed as a highly scalable and robust platform having the ability to handle large number of hits at any point in time during the day.

Mr. R S Sharma, Chairman of Empowered Group on Vaccine Administration and CEO of National Health Authority was given the responsibility on 8th January 2021 to transform the under-development application into an end-to-end robust and scalable vaccination administration platform (FE Bureau, April 2021). Since that point in time, Mr. Sharma and his team undertook several strategic and tactical decisions to smoothen out the world's largest vaccination drive. The learnings from Aadhaar platform helped while designing the technology architecture and security administration in Co-WIN platform (FE Bureau, April 2021). Following are some key challenges that further shaped the Co-WIN app-based technology platform since its launch on 16th January 2021.

CHALLENGE 1: TECHNICAL GLITCHES IN CO-WIN PLATFORM DURING JANUARY 2021 – FEBRUARY 2021

During early launch period in January 2021 – February 2021, many glitches were reported by the users of Co-WIN platform. This led to multiple delays in administering the vaccines. For many users, the One Time Password (OTP) required for completing the slot booking on Co-WIN platform was not getting delivered to the beneficiaries. For others, there were issues like application not being accessible or slow performance or server being down multiple times, and so on. One of the main reasons for the initial glitches was related to software of the Co-WIN platform. This platform was designed as an extension of the Government's Electronic Vaccine Intelligence Network (eVIN) (News18, January 2021). There was very less time for the Co-WIN development team to re-engineer or overhaul the base platform while doing the enhancements for Co-WIN application. This led to the initial set of issues post-launch of Co-WIN application. All the software related issues were resolved on top priority and a stable version of the Co-WIN app was released by 20th January 2021.

However, data quality was another problem area, which resulted in multiple issues for the users of Co-WIN platform during the initial post-launch period. For example, Phase-1 of vaccination drive involved FLWs and HCWs. When their

details were uploaded via excel sheet in the app using the bulk-upload feature, the different format of personal details like mobile numbers caused many FLWs and HCWs to not receive OTP and other details. This was reported as more of a data entry and upload issue than a software-related problem. The user groups were trained in undertaking the prior checks while doing the bulk upload of the beneficiaries' details in the app.

Integration of SAFEVAC with the Co-WIN app was another challenge. WHO had helped GoI develop SAFEVAC in 2019, to capture all the AEFIs from all across the country.

A few days before the launch of COVID-19 vaccination drive, WHO was asked to integrate SAFEVAC with Co-WIN. These were two different software solutions developed by different organizations in different time-periods. WHO itself had approached another organization to develop SAFEVAC, and now in 2021, WHO was faced with the challenge of tracking down the SAFEVAC developer and bringing them on board to complete integration task with Co-WIN within 15 days, which would normally take four to six months. It was undoubtedly a herculean task to link the two software tools. The next challenge was to train everyone to use it, but all these challenges were overcome due to dedication and commitment of the leadership as well as all those involved in the development and launch of Co-WIN platform.

CHALLENGE 2: SUPPLY-DRIVEN OR DEMAND-DRIVEN APPROACH

During Phase-1 vaccination (16 January 2021 – 1 February 2021), when FLWs and HCWs were getting vaccinated, the Co-WIN team collected the details of FLWs and HCWs across the states and slotted these health professionals for vaccination on different dates at different sites as per the vaccine availability and operational capacity. Messages were sent across to these health professionals (beneficiaries) with their vaccine slot/ registration details (date, time and vaccine site) for coming to the assigned site and getting themselves vaccinated. This supply-driven approach did not go well due to two reasons. One, many beneficiaries or registered health professionals did not receive the vaccine notification due to input data errors like wrong phone numbers or other such errors. Second, many professionals had prior commitments on the day of their vaccine appointment, which let them to miss the vaccination. This supply-driven approach led to under-utilization of resources and vaccines as well as higher wastage of unused vaccine doses. After analysing these details, the vaccine administration team decided to opt for the demand-driven approach. Demand-driven approach required the beneficiaries to do their own booking for a specific vaccination site and slot.

CHALLENGE 3: ECOSYSTEM CHALLENGES

Introducing a digital platform like Co-WIN was a challenge in a country like India where access to technology and

digital literacy has been limited. Hence, at the outset itself, one could guess that a significant proportion of the population would be deprived of its access or find it difficult to manoeuvre the Co-WIN application. Nonetheless, it was the only viable option of tracking individuals who received the vaccine in real time or at least, as close to real time as was possible. The issue related to using Co-WIN was not limited to the beneficiaries. Even the people who were part of the vaccine delivery system like FLWs and cold chain handlers also needed to be trained for and oriented with the platform. Essentially, there was both a supply component and a demand component to the issue of using Co-WIN.

On the one hand, with the digital divide within the country and the lack of an enabling ecosystem, the introduction of a platform like Co-WIN was bound to entail challenges, but on the other, the nature of the pandemic and the time-sensitivity that the vaccine administration process required necessitated operationalization of such a digital platform. Taking into consideration all these factors, the GoI's decision to go ahead with Co-WIN was a tough but nonetheless sound decision. Keeping with its tradition of leveraging information technology in implementing its programmes across sectors, GoI, in its vaccine roll-out planning, recognized the importance of the role that information technology could play. On weighing the pros and cons of leveraging information technology in a country like India, one can see that using digital platform technologies judiciously can help overcome a lot of implementation challenges instead of holding it off until India's ecosystem allows for it.

In order to lessen the difficulties for the beneficiaries, the national 1075 and state 104 Helpline capacity was strengthened prior to the roll-out in order to facilitate redressal of queries on COVID-19 vaccination and Co-WIN portal related queries (MoHFW Notification, Dec 2020). Secondly, the Co-WIN 2.0 portal,which began operationalisation from second phase of vaccination drive, allowed for four beneficiary registrations from one phone number, so that even if a household owned only one smartphone, all members could get registered. As most smartphones now have slots for two SIM cards, one person with a smartphone could get at most seven more people registered on the portal. As another alternative for people with lack of digital access, the GoI also allowed for registration on Co-WIN at Common Service Centres (CSC). Also, once registered, the beneficiaries do not have to go through the ordeal of registration for the second dose as the appointment for the same is automatically scheduled by the system.

To further expand vaccination, Government also permitted on-site registration, such that the beneficiaries can walk into any Government Covid Vaccination Centre (CVC) without prior registration on Co-WIN and get a same day vaccine appointment directly at the CVC. However, the final decision of allowing on-site registration lies in the hands of respective State/ UT Government, who also decide the proportion of such slots (MoHFW, Feb 2021). From 24th May 2021 onwards,

the provision was also extended to the beneficiaries of third phase of vaccination drive, the 18-44 years age group (MoHFW Notification, May 2021). These were the measures taken to overcome the digital divide as much as possible, and were especially beneficial for residents in urban slums and rural areas, where health workers and ASHAs were also deployed to mobilize beneficiaries for on-site registration.

CHALLENGE 4: NEED FOR COMPLIANCE WITH SOCIAL DISTANCING AND CROWD MANAGEMENT

As vaccination drive gained momentum, more and more people started visiting the vaccination site without prior registration or appointment on the Co-WIN platform. This posed a great challenge for the people as well the vaccine administration team on vaccination sites. Crowd control became a challenge as social distancing norms were getting compromised. Risk of confrontation among the people coming for vaccination started increasing. There was also an increase in wait-time for the beneficiaries due to overcrowding of people at vaccine sites. This remained a challenge despite repeated vaccine administration guidelines issued by the Government in mass media. The challenge was minimized to a large extent through continuous communication regarding the online pre-registration and booking.

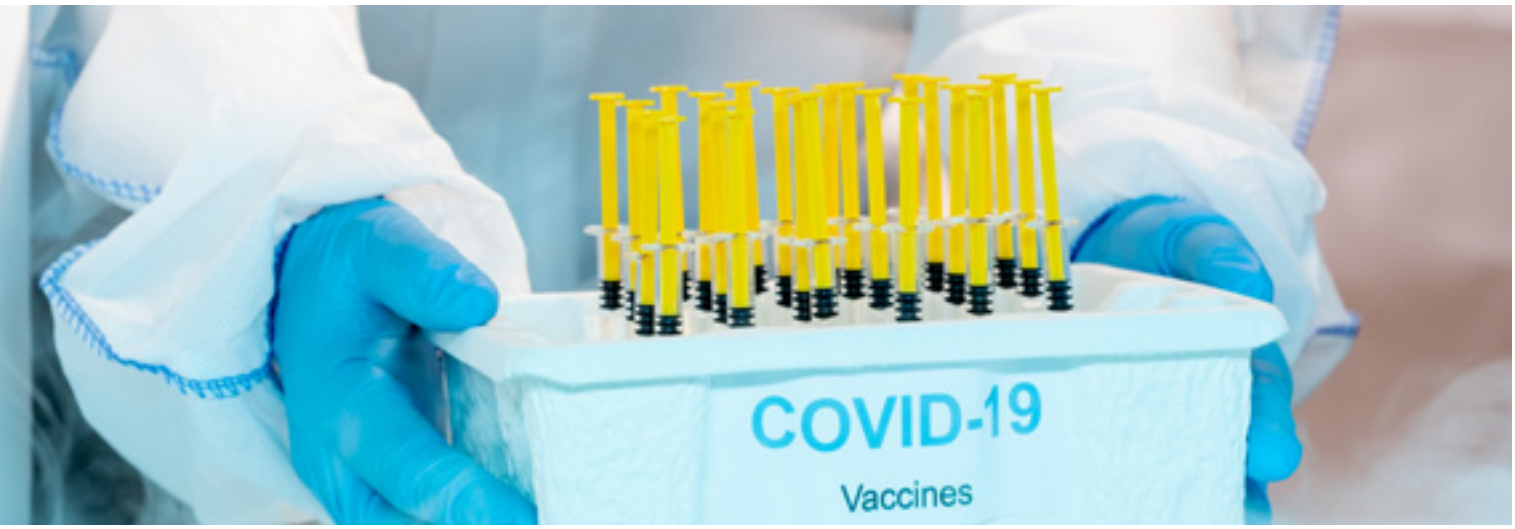
CHALLENGE 5: NEED FOR FLEXIBILITY IN BOOKING FOR SECOND DOSE AT DIFFERENT LOCATION

During the vaccination drive, Co-WIN team received concerns from the beneficiaries regarding the mandatory requirement of getting the second vaccination dose at the same place as the first one.

This became a limitation for the people who had been travelling to different locations in India for one reason or another, and had no means of going back to the same location for getting the second dose of vaccine. This feature was implemented initially just to ensure that people do not get two doses of different vaccines. However, looking at the concerns raised, Co-WIN implemented a change in the software to provide more flexibility in booking the second appointment at any center in any location within India. Following the change, whenever beneficiaries wanted to choose a different center for 2nd dose, they were able to view only those centers on Co-WIN platform that were delivering the same vaccine type which they took as the first dose.

CHALLENGE 6: NEED FOR RAPID SCALE-UP AND CONCURRENCY

As the number of beneficiaries increased in the successive phases, it became imperative for the Co-WIN app to perform at a higher level of scalability and responsiveness. At the time of launch, India had opted for a phased vaccination programme on the basis of age-group, and occupation-based vulnerability to infection.



During Phase 1 (16 Jan - 31 March 2021), 10 million HCWs and 20 million FLWs were targeted for vaccination accounting for around 60 million doses. This was followed by Phase 2 (1st March 2021 onwards) when vaccination was allowed for everybody above the age of 60+ years. On 1st April 2021, everybody above the age of 45 years became eligible for getting vaccinated. Finally, Phase 3 (1st May 2021 onwards) was launched when every adult in India above the age of 18 years became eligible for vaccination following the rapid surge in COVID-19 cases across the country.

During Phase 1 to 3, this consistent increase in the size of target population for vaccine administration scaled the performance expectations from the Co-WIN app besides posing a big challenge for the vaccine manufacturers, central and state government authorities and bodies involved in the end-to-end administration of vaccine supplies. India's had an expected population of 800-900 million in the age group of 18 years and above (Koshy, April 2021). The launch of Phase 3 increased the scope by more than 1.2 billion doses for vaccinating majority of the adults in India (HBL, May 2021).

Anticipating the potential volume of millions of transactions, Co-WIN development team designed an extremely scalable platform by taking an end-to-end ownership of all the technical and functional building blocks. The security policies in Co-WIN app were on par with the global standards. The technology backbone was developed to be safe, scalable and secure on the basis of the learnings derived from the ten years of experience with other successful government initiatives like Aadhaar and Unified Payment interface (UPI). The system was designed for handling more than 10,000 concurrent users per second (FT Bureau, April 2021).

The opening of the Co-WIN Application Programming Interfaces (APIs) also helped in reducing traffic on the Co-WIN portal. Ahead of the third phase of vaccination drive when the portal was opened for registration for the 18-44 age group, the Co-WIN team partially opened the portal's API for

third party applications. This means that a software developer could use some of the functionality of Co-WIN to aid the functions in their applications. The functionalities involved search for vaccine slots and downloading certificates of vaccinations. Hence, various stakeholders such as States/UT Governments, private service providers, software developers and any other agency started developing software solution that notified users about vaccine slots and/or download certificates of vaccinations without needing to open the Co-WIN portal. This helped in diverting the traffic away from Co-WIN platform where people would otherwise go to check for vaccine slots, having to constantly refresh the page as there was no particular time period for updating vaccine slots on the portal. On 24th May, the GoI published new Co-WIN API guidelines, which allowed third parties to also enable registration, scheduling of appointment, and management of vaccination through their apps (MoHFW, May 2021).

CHALLENGE 7: NEED FOR ENSURING ALIGNMENT WITH WHO STANDARDS FOR DIGITAL CERTIFICATION OF VACCINATION

In many countries, digital vaccination certificate became the pre-requisite for allowing or screening the people coming from other nations. Co-WIN issued the digital QR Code-based vaccination certificate to the beneficiaries - provisional (on receiving the first dose) and final (on receiving the second dose). Subsequently, It planned to align itself with the WHO standards for issuing interoperable digital certification of vaccination to the beneficiaries.

To summarize, Co-WIN platform played a significant role in the success of India's vaccination journey despite facing numerous challenges on the way. Nevertheless, each challenge was overcome or mitigated to make the best use of the portal. The hiccups encountered and the constant efforts to resolve each issue improved the platform over time. So, instead of perfecting a technology and then introducing it to the populace, the GoI, owing to lack of time, took the step to introduce the Co-WIN as early as possible and then improvise the same iteratively based upon the on-field learnings and outcomes.

Therefore, while some of the criticism that surrounded the technological tool are valid, it should be seen in conjunction with the ground realities of the pandemic- that there was little time to spare for launching the Co-WIN platform. Moreover, it was being implemented in an unprecedented crisis that threw up challenges of its own. In light of this information, it can be deduced that there were bound to be gaps and oversights in the Co-WIN portal. Amidst such challenges, it is commendable that the platform was able to function in an ecosystem that was not yet prepared for it.

In fact, the way Co-WIN evolved in real time by adapting to the current realities, it has now much potential for being used in other immunization programmes. With a sound administrative and political backing, Co-WIN can progress further to serve India's healthcare sector post the pandemic.

Vaccine Delivery - Logistics and Cold-Chain Management

06

One of the key challenges or stimuli, which played a central role in India's vaccine administration drive, involved Cold-Chain Management and Logistics Strategy. On 16th January 2021, when India started its COVID-19 vaccination drive, many people and experts in India raised the concern about how the government would facilitate transport and storage of millions of vaccines across different regions in India, and that too at a controlled temperature of 2 to 8 degrees centigrade (IANS, January 2021). The need for immunizing more than 800-900 million people spread across the urban, semi-urban, peri-urban, and rural areas in India, with two doses each in a time span of 6-12 weeks, posed a massive challenge for the GoI. Additionally, the need for transportation and storage of the COVID-19 vaccines at sub-optimal temperatures ranging between 2-8 degrees centigrade required a robust cold-chain management and logistics infrastructure across India. At one end, primary COVID-19 vaccines in India like Covishield and Covaxin did well between 2-8 degrees centigrade temperature and were manageable as per India's cold-chain management infrastructure. However, at the other end, approved vaccines like Russian Sputnik V posed a challenge in transportation and storage as it required a temperature range of -18 to -22 degrees centigrade to remain stable (Chitravanshi, May 2021; Pandey, January 2021). The medical refrigerators were used for storing the COVID-19 vaccine vials (small glass containers holding vaccine doses) to ensure the last-mile storage at an optimum temperature at vaccination distribution and administration centres (IANS, January 2021). A medical refrigerator with a capacity of 225 litres was able to store around 40,000 to 60,000 vials of the COVID-19 vaccine.

In January 2021, Mr. Harshal Salve (Associate Professor at Centre for Community Medicine, AIIMS, New Delhi) stated, "For rolling out the vaccination campaign, cold chain equipment such as walk-in coolers, walk-in freezers, refrigerators, and deep freezers are already procured and distributed to the states" (IANS, January 2021). Moreover, India's prior experience with the mass immunization outreach programs as well as its decentralized delivery of public services in each and every district of India enabled GoI to launch the world's largest COVID-19 vaccination program on 16th January 2021.

COVID-19 vaccine delivery setup was mounted on the UIP, which had been in existence in India since 1985.

According to government data, the Indian government led UIP had been targeting around 26.7 million newborns and 29 million pregnant women annually.

Over the years, UIP had been successfully set up as a well-structured pan-India immunization program having well-defined processes for delivery, monitoring and control. The existence of UIP gave the solid foundation for COVID-19 vaccine delivery pan-India. NEGVAC played a significant role in bringing all the stakeholders together for the end-to-end readiness of vaccine delivery and distribution set-up.

The use of Information and Communication Technology (ICT) was crucial in the successful launch of the inoculation drive.

The Co-WIN platform played a vital role as a technology handler for real-time tracking of the vaccine stocks, storage information and vaccinated people count at state, district and block levels (IANS, January 2021; PTI, December 2020).

Moreover, the segmentation strategy adopted by the GoI for vaccinating the people played a major role in the gradual scale-up of the COVID-19 vaccine delivery logistics and infrastructure. Gradually, Government enhanced the logistics infrastructure to more than 29,000 cold-chain points across India.

Regarding end-to-end logistics readiness, continuous coordination, information sharing and updates between the key stakeholders by NEGVAC and DCGI helped a lot in timely preparation and readiness. Timely inputs were shared with the key stakeholders like storage temperature requirement of the approved/ licensed COVID-19 vaccines during launch, how many doses were available and when and where. Accordingly, cold-chain points, carriers, and storage planning were done pan-India, resulting in the vaccine implementation program's success.

As highlighted in the report above, UNICEF was one of the key development partners who played a significant role in strengthening the cold-chain infrastructure of India before and during the launch of vaccination drive. In fact, the contribution and efforts made by UNICEF in enhancing the cold-chain infrastructure to manage the vaccine supply chain was well-recognized by the GoI. UNICEF started working on cold-chain infrastructure with other partners much before the launch of vaccination drive. With no visibility into the actual launch and specific requirements for transportation, storage and delivery of vaccines, UNICEF adopted the mathematical modelling and multiple scenario analysis-based approach to get ready for any situation during vaccination drive. Multiple scenarios were created with different range of temperature, beneficiaries, supplies while assessing the cold-chain infrastructure readiness levels and getting ready for vaccine administration. Accordingly, actions were taken for cold-chain site selection and setup, as well as procurement of cold-chain equipment and other supporting requirements. A multi-pronged contingency model was adopted to ensure cold-chain infrastructure readiness before the launch of vaccine administration. During cold-chain planning, UNICEF anticipated and facilitated the cold-chain infrastructure expansion keeping in mind that more than 944 million people (including HCWs/ FLWs, and all Indians 18 and above) would be vaccinated twice, along with a vaccine wastage percentage of 10-15%. Accordingly, cold-chain planning included the scenario where infrastructure needed to support more than billion doses within six months. To expand the existing cold-chain infrastructure used for immunization programmes, UNICEF

also roped in the private sector like philanthropic organizations, and large corporates having pan-India cold-chain setup, for leveraging their cold-chain infrastructure. BMGF provided the pillar support in collaborating with philanthropic organizations for scaling the cold-chain network.

As per the MoHFW updates in mid-December 2020, there was a ready cold-chain management and logistics infrastructure for rolling out the vaccination campaign. By the end of December 2020, GoI had already procured the cold-chain equipment like walk-in coolers, walk-in freezers, refrigerators, and deep freezers as per the demand and supply estimates and distributed the same to the states for onward allocation to the districts and blocks as applicable. Mr. Rajesh Bhushan, Union Health Secretary, Health Ministry, stated that the below mentioned cold-chain storage infrastructure was set up for the storing of COVID-19 vaccine across the States before the launch of the vaccine administration programme–29,000 cold chain points, 240 walk-in coolers (WIC), 70 walk-in freezers (WIF), 45,000 ice-lined refrigerators (ILR), 41,000 deep freezers and 300 solar refrigerators (IANS, January 2021; PTI, December 2020). At the time of launch in January 2021, India's private cold chain storage sector also had a total vaccine storage capacity equivalent to 250-300 million doses.

By end of December 2021, a comprehensive communication and orientation plan at state and district levels was laid down to ensure operational readiness concerning the transportation, storage and management of COVID-19 vaccines till the last mile. Detailed guidelines regarding cold-chain management at last cold-chain points and vaccine session sites were issued. All the 36 States and Union Territories (UTs) were invited to participate in the SSC and STF meetings in order to discuss and ensure the readiness and support. Similarly, more than 633 districts across India participated in the District Task Force meetings in the context of cold-chain management and operational readiness for vaccine administration (PTI, December 2020). As a part of operational readiness before the launch of the

vaccination drive, twenty-three ministries and departments in the Centre and States were identified as part of NEGVAC and assigned roles related to planning, implementation, social mobilization, awareness building, systemic behaviour change orientation, and operational trouble-shooting during vaccine roll-out and administration. Training and skill-building modules were developed for key stakeholders (operations and supervision) like vaccinator officers, cold chain handlers, data managers, medical officers, HCWs, FLWs, ASHA coordinators, NGOs, CSOs, individual volunteers, and security officers. The trainings were conducted on an ongoing basis via physical as well as virtual mode. National and State level Training of Trainers (ToT) workshops were carried out to widen the availability of skilled trainers for training the large number of resources at state, district and block levels.

As discussed above, the Health Ministry laid down the cold-chain management and logistics guidelines, and shared the detailed understanding regarding those with the 36 States and UTs during numerous SSC, STF, and DTF meetings held before and after the launch of vaccination drive. These guidelines asked the States and UTs to ensure their readiness and put emphasis on two KFAs – Vaccine Introduction Planning Phase and Vaccination Operational Management Including Special Circumstances.

VACCINE DELIVERY - INTRODUCTORY PLANNING

In the planning stage, following were the focus areas for which estimations were made at the State level and corresponding District and Block levels: -

- How many doses of vaccines are required?
- What kind of and how much electrical cold-chain equipment is needed?
- How many cold boxes and vaccine carriers are needed for the campaign? How many WICs and WIFs are needed at State and District levels?
- How to assess the immunization supply chain system preparedness and update the Cold Chain Equipment (CCE) inventory details in National Cold Chain and Vaccine Management Resource Centre (NCCMIS)?

VACCINE ESTIMATION

Co-WIN platform (beneficiary module) was used to understand the requirement at State, District and Block level depending upon the planned number of vaccination sessions as well as number of beneficiaries registered for each session. Depending upon the phase of vaccination (Phase 1, 2 or 3), eligible population in a particular area as well as number of beneficiaries registered for the 1st or 2nd

dose, the weekly and monthly demand was calculated at State, District, and Block levels. While estimating the required quantity of different vaccine types, Waste Multiplication Factor (WMF) of 10% was incorporated assuming an allowable programmatic wastage of 10%.

ELECTRICAL COLD-CHAIN EQUIPMENT (CCE)

CCE requirement at State and District level was determined on the basis of vaccine sessions, estimated doses of vaccines, vaccine types, and recommended storage temperature for the allocated COVID-19 vaccines. For vaccines like Covaxin and Covishield, which have recommended storage temperature of 2 to 8 degree centigrade, WICs were recommended for storage at State/Regional Vaccine Stores (SVSs/ RVSs), and ILRs were recommended at the District Vaccine Stores (DVSs) and Last Cold Chain Points. However, for vaccines like Sputnik V, which had recommended storage temperature of -15 to -25 degree centigrade, WIFs were recommended for storage at SVS/ RVS, DFs at DVSs, and ILRs at the last Cold Chain Points.

NON-ELECTRICAL COLD-CHAIN EQUIPMENT

In addition to the Electrical CCEs, there was a need for adequate supply of passive CCEs like cold boxes and vaccine carriers for vaccine transportation and storage to ensure the controlled temperature setting for the vaccines during sessions and campaigns. Cold boxes were deployed by the States at every cold chain point depending on the vaccination session and campaign scheduling. Similarly, vaccine carriers (smaller size insulated containers lined with coolant packs) were used for vaccine transport to the additional vaccine session sites for COVID-19 campaign. Vaccine Carriers offered a storage space of 1.7 litres, thereby accommodating 16-20 COVID-19 vaccine vials.

COLD-CHAIN SYSTEM – MATCHING DEMAND AND SUPPLY OF CCES

The scale of vaccination increased multi-fold with the launch of Phase 3 in May 2021, wherein everybody above the age of 18 years in India became eligible for COVID-19 vaccination.

Looking at an approximate demand of

1.8 to 2 billion

COVID -19 vaccines

(2 doses per person) for

800-900 million

people along with the supply

[4]Cold boxes are insulated containers having coolant pack lining to preserve the vaccines at low temperature during transportation or interim storage requirement. They have a storage capacity between 5 to 25 litres (UNICEF Cold Chain Guidelines, January 2021).

[5]Vaccine Carriers are insulated containers lined with coolant packs to keep vaccine cold during transportation. These are smaller than cold boxes and easier to carry while walking. The storage capacity is between 0.8 to 3.4 litres (UNICEF Cold Chain Guidelines, January 2021).

of different vaccine types having different temperature requirement, there was a continuous need for CCE demand and supply assessment by the State Governments at State, District and Block levels. The State Governments were required to ensure periodic monitoring of the Cold-Chain infrastructure in terms of WICs and WIFs (needed versus available) and log the entries of available as well as new CCEs in National Cold Chain and Vaccine Management Resource Centre (NCCMIS) database. The State Authorities were responsible for monitoring and raising the request for extra CCEs as well as identifying the new sites for installation of WICs/ WIFs depending upon the increasing number pf vaccination session sites for the COVID-19 campaign.

IMMUNIZATION SUPPLY CHAIN SYSTEM

Realizing the scale of vaccination campaign to inoculate all the adults above the age of 18 years by the end of 2021, extensive State level assessment was carried out to identify the demand-supply gap regarding CCEs. All available CCE details regarding functional / working WIFs and WICs were uploaded in the NCCMIS database to ensure accurate estimations and calculations at National, State, District and Block levels before the launch of vaccination campaign in January 2021.

During the CCE estimation, the key direction given to the States was that they should plan separate CCEs for COVID-19 vaccine from other routine immunization vaccines. Alongside, alternative Vaccine Storage Sites (VSSs) were identified at the District and Block levels to compensate for the shortfalls and delays in arrivals of new WIFs/ WICs, and detailed contingency plans for vaccine storage at regional levels was drawn out. On-ground resources were trained in preventive and corrective repairs of the CCEs as needed. Further, all the States were required to allocate Vaccine Stock Registers (VSRs) at all cold-chain points, arrange functional mobile phone with Co-WIN mobile app for all Vaccine and Cold Chain Handlers (VCCHs), as well as ensure remote temperature monitoring of all vaccine sites for the COVID-19 campaign.

VACCINE DELIVERY - OPERATIONAL MANAGEMENT INCLUDING SPECIAL CIRCUMSTANCES

The focus area in operational management included managing the demand and supply as well as movement of vaccines during the vaccine campaign at session sites, cold-chain points, state and district levels.

AT CAMPAIGN SESSION SITES

For vaccine management at campaign session sites, detailed guidelines were issued regarding the storage and use of vaccine vials without exposing them to heat during the vaccine sessions. It included steps on how to take out the vaccine vial outside the vaccine carrier, maintain the temperature for vaccine vial outside the vaccine carrier using ice-pack and how to place the unused vaccine vial in the vaccine carrier such that those could be used before the unopened ones in the next session. For special circumstances or situations, vaccination teams needed to maintain an extra vaccine carrier with conditioned ice packs for immediate replenishment while conducting the vaccine session.

To ensure the segregation of unusable vaccine vials, VCCH team held the responsibility of reviewing the temperature records of administered and left-over vaccines at the session sites and segregation of the ones that could not be preserved in the specific temperature range during transportation or use. The team monitored temperature details in the Remote Temperature Monitoring system (RTM) system of eVIN and standard stock registers. Finally, VCCH team was responsible for conducting the weekly vaccine stock reviews as well as preventive maintenance of the Cold-Chain equipment on an ongoing basis. For special circumstances like malfunctioning of cold-chain equipment or controlled temperature breach for vaccine vials, VCCH team needed to ensure availability of alternate site in ready state for short-term storage of vaccines as well as availability of support team for repair of the faulty cold-chain equipment on priority basis.

AT DISTRICT AND STATE LEVELS

As discussed above, one of the key focus areas for the smooth running of vaccine campaign session sites involved logistics, transportation and storage of vaccine vials at the sub-district or block levels in controlled temperature settings. Vaccine distribution was planned in small quantities (on weekly basis to cold-chain points) to minimize the risk of temperature excursions during transportation. Cold boxes used for transportation had 30-DTR limit. For any issue related to temperature excursion during transportation, protocols were laid down regarding separate storage of affected vaccines at the receiving location and notification to DIO.

Insulated vaccine vans were used for transporting vaccines to sub-district stores, and vaccine stock records were updated in real-time on eVIN platform as well as standard stock registers during the time of transaction (dispatch) to vaccine session sites.

District Vaccine Store (DVS) officer was required to monitor the DVS equipment temperature through eVIN RTM or available manual temperature recordings. At district level, District Immunization Officer (DIO) was responsible for undertaking the weekly review of the vaccine stock position and adequacy of vaccine availability across the DVS in the coming week, temperature monitoring of the equipments in the district, presenting a breakdown of event details for the CCEs, and ensuring

availability of VCCH at all Last cold-chain points (LCCPs) in the district. Similar activities were undertaken at the State level with respect to vaccine transportation, temperature monitoring and tracking of vaccine stock.

SVS or RVS keeper was responsible for monitoring the temperature of SVS/RVS equipment through eVIN RTM or manual recordings periodically. State Expanded Programme on Immunization Officer (SEPIO), along with the State team, conducted weekly/bi-weekly/ monthly review meetings of the Immunization Supply Chain (ISC) to review the vaccine stock position, temperature monitoring and equipment performance statistics, financial expenditure (performance) of ISC during vaccine campaign, and skilled resource status

To take care of exceptional circumstances with respect to the vaccine storage and temperature control issues at allocated sites, alternate vaccine storage sites were identified well in advance of vaccine arrivals including site inspections and contractual agreements. State level monitors undertook the continuous supervision of vaccine arrival and distribution cycle, and ensured quality orientation in vaccine receipt and distribution.

07

Communication Strategy and Social Mobilization

The success of the world's largest vaccine administration programme required comprehensive communication (print, TV, display boards, social media) strategy for awareness building and facilitating access to real-time information for the citizens of India.

GoI designed the 360-degree advocacy communication and social mobilization strategy to encourage the eligible citizens to come forward and register themselves for the vaccination.

Last-mile partners like NGOs, CSOs, ASHA workers and volunteers were engaged and trained to connect with the masses and encourage them to come forward for the COVID-19 vaccination. Development partners like UNICEF, BMGF, and JSI played a significant role in the conceptualization as well as on-ground implementation of COVID-19 communication strategy during the launch of vaccination.

At the time of vaccination launch, the overall communication strategy was designed to address the four-fold challenges – VH, VE, AEFI, and CAB. Evidence based scientific approach, custom communication and connect strategies were designed to tackle these challenges. During the initial phase of vaccination, VE posed the great challenge as many people questioned the logic of segmenting and prioritizing the vaccination for older age groups as well as people with comorbidities versus younger population. In the words of Secretary at MOHFW, the phenomenon of VE was a strange one. For example, people came up with the argument that if a young 30-year-old doctor or a young nurse is getting vaccinated in January, why is it our parents are not getting vaccinated? Hence the whole vaccine administration process had to be defended, had to be explained on a scientific basis; that these young doctors and young nurses are exposed on a daily basis to the pandemic, they're dealing with COVID-19 patients. Therefore, they are far more vulnerable compared to the elderly who during the initial lockdown period, were confined to their homes. Then subsequently came the question, when the lockdown was gradually lifted and activities were opened, that why the youth were not getting vaccinated? Again, scientifically it had to be explained that if we look at the COVID-19 mortality figures in our country, who are the people who are dying because of COVID-19 or who are at greater risk of mortality because of COVID-19. For the same reason age-wise disaggregated data had to be prepared, had to be analyzed, and had to be put in the public domain.

All such decisions were based on scientific evidences, and since majority of these decisions also involved the large number of stakeholders including the state governments, the MOHFW was able to take everyone along in the vaccine administration process. This required the well-planned communication aimed at bringing out the systemic behaviour change orientation among the people and making them sensitive towards the approach being taken.

Regarding VH, there are regions in India as well as specific demographic segments (elderly in few places, younger ones in other places, tribal population, village people etc.) which required deeper level engagement and counselling via grassroot partners like Panchayati Raj institutions, local influencers and leaders for coming forward to get vaccinated. To bring out the systemic behaviour change orientation, volunteers were specifically trained to address the queries and doubts while bringing out the systemic behaviour change orientation among the VH and VE groups. For example,

elderly population in one of the states of India showed VH whereas younger people in that state displayed VE. The Government requested the younger people to come for vaccination with their parents thereby leverage the VE among the younger people to counter the VH among the older age-group. Sooner, the state achieved the vaccine coverage above the national average. The second communication strategy involved sharing as much knowledge and information as possible via regional media (print, TV, radio) as well as door-to-door connect to counter the doubts and queries among the VH groups in specific states, and districts. The third strategy involved bringing the role models and charismatic leaders forward to motivate the VH groups. For example,

Prime Minister Modi got vaccinated with Covaxin to build the confidence among the masses towards the efficacy of indigenous vaccine as well as important of going ahead with COVID-19 vaccination.

Following is the detailed overview of the COVID-19 communication strategy. During vaccine roll-out, targeted communication strategy was adopted, which aligned with the segmented vaccination approach adopted by the GoI. The first phase of communication strategy (digital, print, media, and electronic) focused on the HCWs and FLWs followed by the elderly population above 60 years, and then people above 45 years of age. Simultaneously, back and forth proactive and reactive communication was created and

disseminated to the major segment of people between 18 to 45 years of age who were not given the go-ahead for vaccination till 1st May 2021. At the same time, there was a continuous pressure on Centre to inform and manage the expectations of two distinct sections of the population- the people demonstrating VE, and the people demonstrating VH.

Another key point of consideration, which the Government and its allied partners realized during the on-field experience was that the success, impact and acceptance of the communication strategy relied the most on the adaptability and customization of the content, messaging and communication media from state to state, district to district, village to village, and community to community. Moreover, Government and UNICEF's experience with polio eradication program (creating awareness and grassroot implementation) in India also played a significant role in designing and adopting the appropriate communication strategy for COVID-19 vaccine administration pan-India.

For example, VH was higher during the initial phase of COVID-19 vaccine roll-out in January 2021. The first approved lot of beneficiaries included HCWs and FLWs. These health workers initially felt that they were part of the Government-extended testing of COVID-19 vaccines, and were rather guinea pigs than priority groups. Since COVID-19 vaccines were getting launched for the first time post approval by Drug Controller General of India (DCGI), lot of doubts were present in the mind of HCWs and FLWs regarding the efficacy or side-effects of those vaccines. To address the doubts of health workers, frequent meetings were scheduled by UNICEF and BMGF with health workers along with the involvement of District Collectors. This gradually brought the positive change and mindset towards COVID-19 vaccines among the health workers, and things started taking shape for the better.

Communication Plan was designed on the lines of "Jan Andolan" movement with strong focus on local engagement of NGOs, CSOs, ASHA and grassroot volunteers as well as social

embeddedness. Last-mile collaboration and engagement of local partners was done to establish trust and transparency with the beneficiaries. The support of influencers also played a significant role in enhancing the trust and willingness among the masses. Celebrities like movie stars or sports stars, tribal leaders, local doctors, HCWs, FLWs, heads of the local Panchayati Raj institutions as well as local community leaders and other influential citizens went ahead with vaccination and showcased themselves as examples, thereby enhancing trust among the people in semi-urban and rural areas towards vaccination. Another key communication approach, which led to the mass mobilization of resources was volunteerism. Volunteerism especially by the youths, NGOs, CSOs, Anganwadis, ANMs, and local leaders played a significant role in mass mobilization of the people towards vaccination while addressing their VH.

CLARITY ON COMMUNICATION OBJECTIVES

Following were the key objectives of the COVID-19 Communication Strategy:

One

Target entire population with periodic, frequent, simple and focused communication regarding vaccine availability, registration, safety, social distancing, dos and don'ts.

Two

Target hesitant people with detailed communication regarding the efficacy and safety of COVID-19 vaccines to promote a systemic behaviour change orientation and enhance public confidence.

Three

Target eager people by highlighting the significance of phased and prioritized

approach rather than launching the vaccination drive as a big-bang approach to quell their concerns regarding wait-time.

Four

Spread awareness about the on-ground statistics regarding the vaccination sessions being held, number of people getting vaccinated per day or per week, approval of new vaccines, as well as vaccines under development, testing figures, etc.

Five

Make people aware and conscious about the need to maintain and sustain preventive behaviour of taking self-directed steps like following social distancing norms, wearing mask, frequent hand-washing with soap, and going for testing in case of any symptoms.

STRATEGIC CHOICES AND ACTIONS

FIVE POINT FRAMEWORK

GoI designed the communication strategy using a five-point strategic action framework – Advocacy; Communication Capacity Building; Media Engagement and social media; Social Mobilization and Community Engagement; Crisis Communication using AEFI.

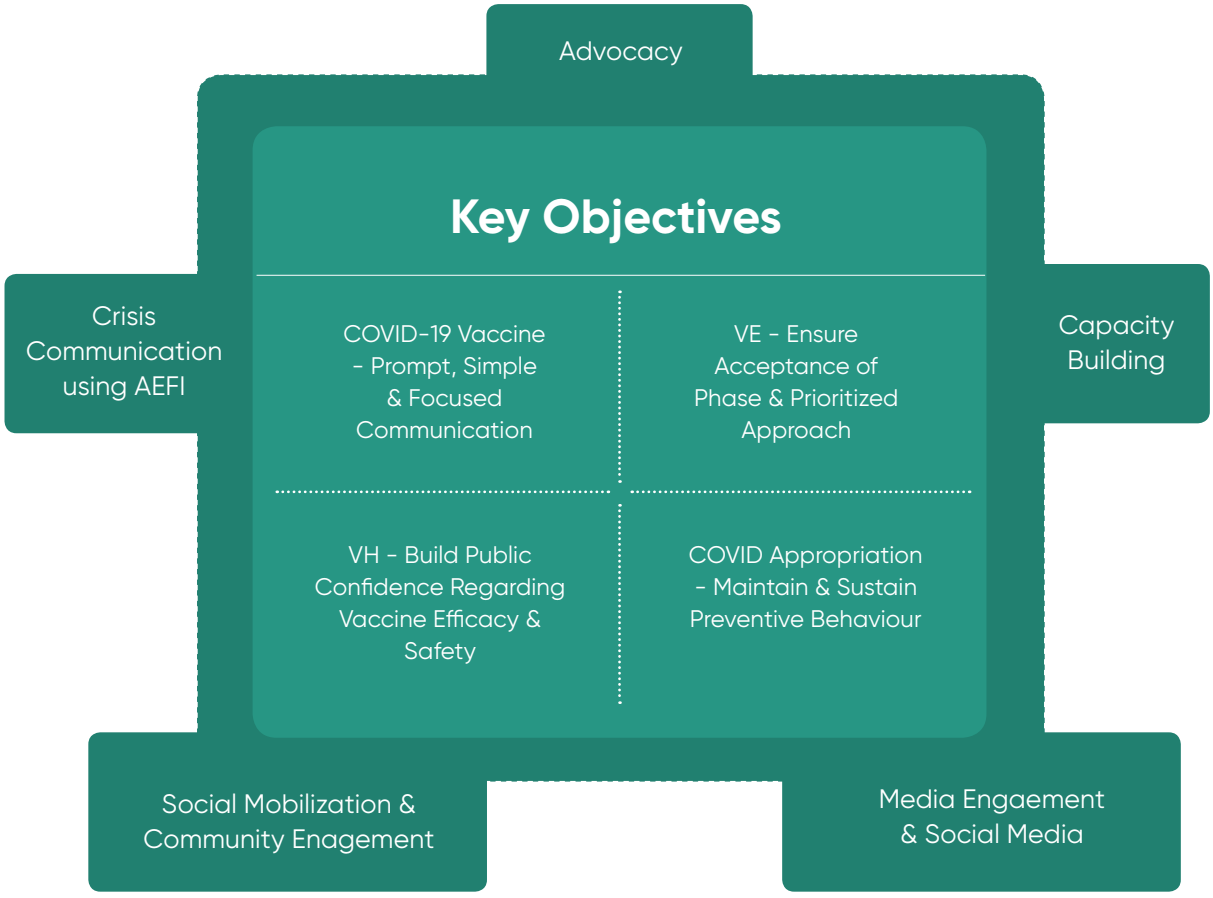
The first action, Advocacy involved taking steps to gain social trust, commitment and support for rolling out the vaccine for the masses. Second, Capacity building approach focused on enhancing the capacities and communication skills of the stakeholders involved in the vaccine administration, monitoring and control. Third, Media engagement and social media involved a deep-dive focus on promoting the evidence-based narrative regarding the benefits of vaccination among the masses. The approach involved engaging different

media channels (print, TV, bill-boards, radio, word of mouth, and social media) to connect with the masses and address their VH, VE, and rumours. The fourth action, social mobilization and community engagement involved engaging last-mile partners like NGOs, CSOs, volunteers and local community members in creating awareness and trust among the masses. Finally, strategy for crisis communication was devised to address the unexpected situations including rumours regarding adverse effects of COVID-19 vaccination. AEFI involved unfavourable or unintended signs, which required appropriate monitoring, response and action by the task force, depending on the severity levels.

To support the strategic choices framework, a robust monitoring and evaluation framework was put in place to support the implementation of communication strategies as well as to guide the mid-course corrective actions to maximize the impact and outreach of the communication strategy.

Figure 8 highlights the Integrated Framework comprising the COVID-19 communication objectives and strategic actions.

Figure 8: *COVID-19 Communication Strategy – Key Objectives & Choices Framework*



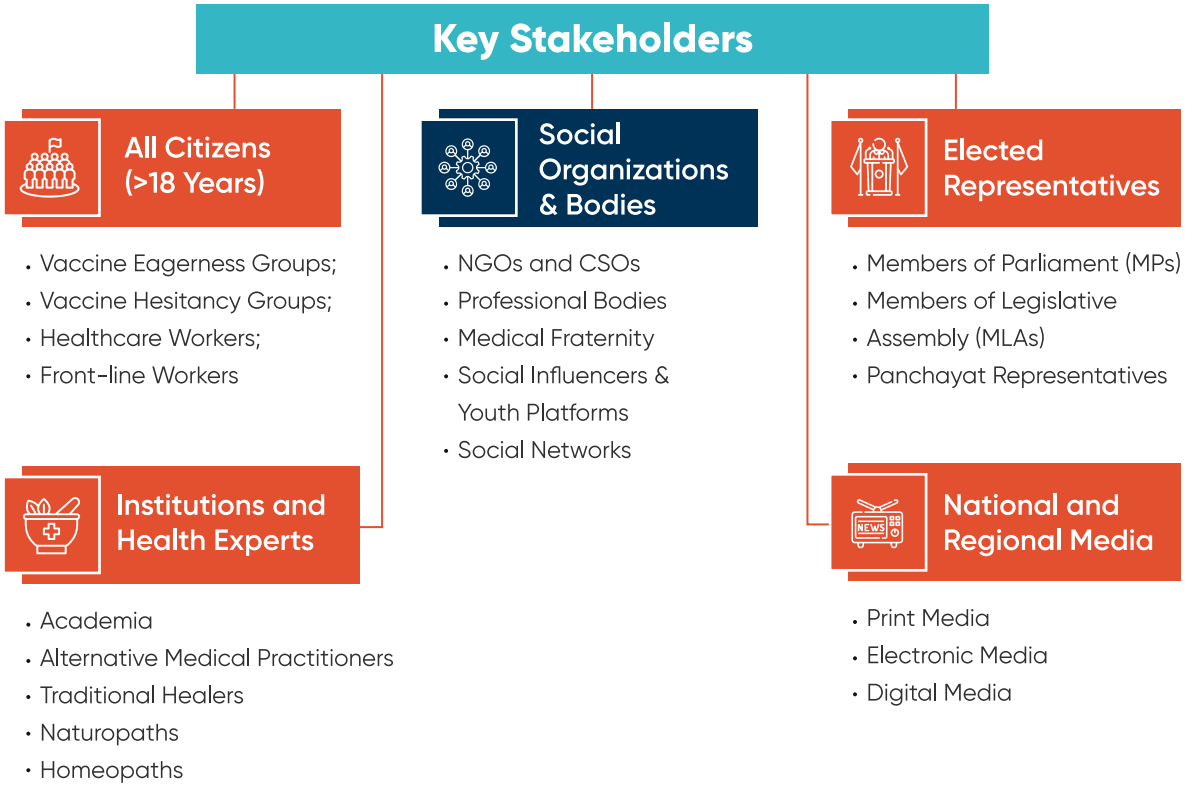
KEY STAKEHOLDERS - (INDIVIDUAL AND INSTITUTIONAL)

Policy and Healthcare Experts:
MoHFW engaged these experts to spell out the process of immunization (why, where, how, when – date and time), emphasize on the safety and efficacy of vaccines, as well as address the eagerness concerns by explaining the rationale behind the decision to conduct the drive in a phased manner.

National Media Rapid Response Cell (NMRRC) Establishment:
MoHFW established NMRRC to ensure frequent social monitoring, listening and real-time response to different sort of AEFI news and reactions of the individuals regarding the vaccination drive, on different media (print, electronic, and digital) platforms.

Social Engagement:
The communication cell involved and trained the community mobilizers and front-line workers to engage with the community at various levels like holding community consultations, engaging faith leaders and leveraging religious meetings as well as engaging youths, CSOs, SHGs, panchayats and other community-based platforms to become a trusted voice among the masses in different urban, sub-urban, and rural regions.

Figure 9: *COVID-19 Communication Strategy – Key Stakeholders*



ROLE OF DEVELOPMENT PARTNERS IN COMMUNICATION STRATEGY (DESIGN AND IMPLEMENTATION)

UNICEF, BMGF, and JSI played the central role in the design and launch of COVID-19 communication strategy. While JSI concentrated its efforts on designing the communication and monitoring strategy, BMGF and UNICEF contributed in the end-to-end planning, designing as well as on-ground execution of the communication strategy including setting up 24*7 war room during vaccine roll-out, as per the direction of the GoI.

UNICEF primarily focused on two levels of communication – advocacy (upper level) and community-based intervention (ground level). Advocacy implied engaging the influencers, leading voices and celebrities for motivating people, especially in dealing with VH and to register themselves for vaccination. In other words, UNICEF helped the Government and other key stakeholders in pushing the boundaries for demand generation and promoting pro-vaccine mindset among the masses in India.

Alongside other stakeholders, UNICEF was instrumental in laying down the roadmap for the COVID-19 vaccine communication strategy aimed at social-mobilization of the masses as well as managing both the control groups those having VH and not coming forward for the vaccination

as well as those having VE and making long queues at the vaccine session site bypassing the social distancing norms and risking the spread of COVID-19. Both VH and VE were evident at the large-scale during Jan – March 2021, so appropriate content-based messaging was developed to target both VH and VE groups. The choice of communication media (social media, print, audio, video, face to face), communication type (direct or indirect), as well as communication frequency were carefully decided to maximize the reach and impact among the target groups. Customized communication strategies were designed for different states and districts while looking at the socio-cultural differences, diversity of people and languages, and geographic differences. Significant emphasis was made on the engagement of the volunteers, especially from the local communities in the target areas, to build trust and transparency about the vaccines among both VH and VE groups.

UNICEF adopted an agile approach towards disseminating the meaningful content as part of the communication strategy. Considering the dynamic environment characterised by a lot of uncertainty, the communication (social media, print, and electronic) team adopted an approach comprising continuous listening to the issues from the ground and constantly designing and disseminating the new content based on inputs from the general public. Also, during the course of ongoing communication and sensitivity among the masses, it undertook continuous testing and validation about their strategy to ensure that their communication efforts made the maximum impact among the masses. For example, following the campaigns involving celebrities and faith leaders, UNICEF conducted on-ground testing to see who are the most trusted influencers among the masses with respect to COVID-19 awareness campaigns. UNICEF found an interesting phenomenon. Celebrities and faith leaders did not generate much confidence or appeal among the masses. Rather, people had more trust on the messaging or information coming from government sources like Ministry of Health or sources having a logo of Ministry of Health or UNICEF. Besides official sources and families or friends, people also relied on the information and communication coming from HCWs. Communication and messaging comprising HCWs' hero stories attracted considerable attention from the people.

The role of UNICEF in communication can be looked upon from two dimensions.

1. **How UNICEF supported the Government during COVID-19 pandemic in 2020 before the discovery and launch of vaccination?**

2. **How UNICEF contributed in the overall COVID-19 communication strategy during the vaccine administration post vaccine launch in January 2021?**

PRE-VACCINE ROLL-OUT

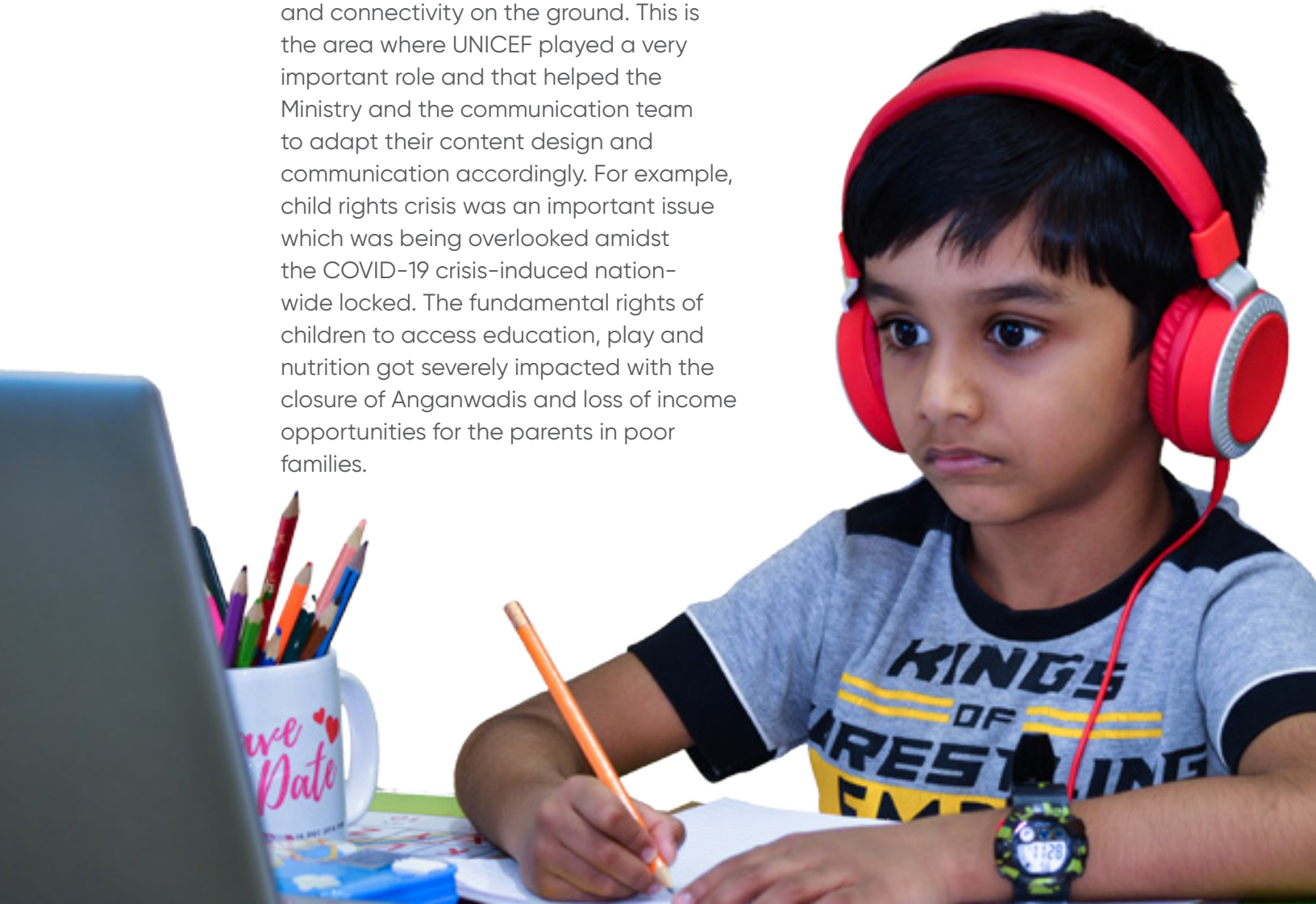
During the year 2020, UNICEF focused on helping the Government and MoHFW with the roll-out of preventive communication strategy. During that phase in 2020, vaccine was under development, people were confined to their homes under lockdown, and the pandemic had left people with a sense of panic all around the globe. There was no definitive comprehension regarding the severity of impact and possibility of any long-term solution. Children were also stuck at home with the closure of schools and colleges. During this phase of pan-India lockdown, it became imperative for the Government to focus on information-based and awareness-oriented communication to the masses, so that people could be sensitized to the significance of social distancing and CAB. Frequent messaging approach was adopted on print, electronic, and social media platforms to build awareness and sensitivity among the people towards CAB.

A rigorous verification process was set up to ensure the detailed review of the communication done by the COVID-19 communication team on various social media, print, and electronic platforms. The team engaged Bollywood celebrities and designed videos related to COVID-19 do's and don'ts, like social distancing and hygiene guidelines. These videos were posted on different communication platforms to build awareness and inclination among the people towards adoption of CAB. During the first phase of communication, that is, March – May 2020, following key focus areas were identified - child rights crisis, stigma and discrimination among the people in society, increasing stress level and fear of the unknown, as well as lack of awareness and clarity for the future amidst COVID-19 lockdown. Phase -1 involved lot of uncertainty and lack of clarity for the people, ministries, government and all other stakeholders involved in moving out of the situation.

UNICEF was involved in all the key communication aspects, from content design to delivery perspective. Gathering on-ground real information was one of the key areas where UNICEF focused upon during the first phase of communication. UNICEF realized very early into the lockdown phase that different people (gender, age, social grouping, ethnicity, profession) had different priorities, issues, concerns, queries and stress levels. To tackle their issues, different types of communication strategy catered to different types of people was required.

To gain deeper insight into the child rights crisis, UNICEF conducted phone surveys of the families having phones at their homes, and received additional insights from their partner Childline, which got at least 400,000 calls from the families regarding children's issues during Phase-1 COVID-19 lockdown.

The best way to create and disseminate meaningful content for different groups of people required strong outreach and connectivity on the ground. This is the area where UNICEF played a very important role and that helped the Ministry and the communication team to adapt their content design and communication accordingly. For example, child rights crisis was an important issue which was being overlooked amidst the COVID-19 crisis-induced nation-wide locked. The fundamental rights of children to access education, play and nutrition got severely impacted with the closure of Anganwadis and loss of income opportunities for the parents in poor families.



These insights prompted them to design the content strategy and communication plan along with Ministry of Women & Child Development.

As part of these efforts, UNICEF also encouraged children to build a narrative around their issues in video format, and the content was then reviewed and streamed on the social media channels, particularly platoforms having a greater presence of youth, like Instagram, Tik Tok, etc. Videos and graphics were extensively used to design and stream awareness and information-based content for the people in a friendly format. Regarding social media, all major platforms including Instagram, Tik Tok, Facebook, WhatsApp, etc. were used to connect with the masses and spread awareness and positivity during COVID-19 Phase-1 lockdown.

UNICEF managed the communication piece for the Government in more than ten languages on social media platforms. It also adopted the localization-oriented communication strategy to strengthen contact with people as they feel comfortable when they get communication in their own languages. For example, during the spread of mis-information in Kerala in 2020 regarding the use of garlic and ayurvedic medicines in curing COVID-19, UNICEF team developed the content in Malayalam and pushed the same on the social media platforms for the targeted people. Similarly, UNICEF looked into the communication outlets for tribal people living in different states of India to formulate the content, and decided upon the communication media accordingly, so that relevant information reaches the tribal people in time.

Another key challenge identified during COVID-19 Phase-1 lockdown involved the stigma and discrimination faced by many people including HCWs. UNICEF supported the Government in launching the campaigns aimed at controlling the spread of messaging that could fuel stigma and discrimination across social media platforms. Ministry aligned all the partners to analyze the hate and discriminatory content type in terms of people, supporters and target audiences, and plan a corrective course of action for those messages. UNICEF along with other partners designed the content comprising the narrative (written and video stories) around HCW's heroism, achievements and hard work amidst COVID-19 risk and crisis. For example, content showcasing HCWs travelling around on bicycle and helping infected people was shared on social media platforms to effect a change of perspective among the people who were spreading discrimination and negativity-based content against HCWs. Thus, designing content and communicating the same on the basis of knowhow about the actual issues on the ground helped a lot in creating a strong and positive narrative and faith among the masses.

POST-VACCINE ROLL-OUT

During Jan 2021 – June 2021, ground-level communication strategy played the central role in managing the three distinct phases of vaccine demand and supply. During this period, there was VH phase when majority of the people showed hesitancy in getting vaccinated. This was followed by Phase 2 in Mar – Apr 2021, when VE started increasing and many people started coming forward for vaccination even if they were not eligible as per government guidelines. Finally, Phase 3 happened in Apr – June 2021, which was the most challenging due to the huge demand-supply mismatch on the ground. Everybody above the age of 18 years became eligible for vaccine and to add to that, many elderly people became eligible for 2nd dose. Vaccination supply slowed down drastically during the same period as such a huge demand was not anticipated at the time of launch. At the communication infrastructure level, UNICEF facilitated setting up the media war room at the national and state levels, which was responsible for tracking and listening to the social media content, and acting or responding appropriately to the rumours or adverse news. The war room also included two representatives from the WHO, which were also instrumental in creation of the war room. Towards the end of December 2020, UNICEF was asked by the Government to set up a 24*7 war room focusing on three pillars – media monitoring, media content generation, and digital support team. During Dec 2020 – June 2021, UNICEF directed-war room generated and disseminated more than 500 communication pieces including editorials and expert interviews with a total outreach of around 800 million people across India. The war room team tracked every relevant news piece on all the digital platforms including WhatsApp, and other social media platforms like Facebook, Twitter,

etc. As the demand for vaccination picked up and scope was widened, many technical questions started coming up regarding the requirement for specific vaccine type. UNICEF and WHO engaged as a technical team with the entire communication team to provide satisfactory answers to all sorts of user queries and doubts related to the vaccines.

Regarding social media listening, UNICEF focused and spent lot of efforts with other stakeholders and Ministry in gaining insights into the actual issues and concerns, both from the diverse social media platforms and from the ground and formulating the communication content as per those real issues and queries. In the context of social media insights, UNICEF engaged one person full-time on reviewing and validating the content around COVID-19 issues, challenges, concerns on different social media platforms. In addition, UNICEF used three automated tools (Talkwalker, CrowdTangle from Facebook, and Hootsuite) for getting the intelligent insights based upon the conversations happening online. So, UNICEF adopted the hybrid approach for reviewing the online conversations and used the same for designing the communication content and messaging.

Regarding the ground conversations, UNICEF leveraged its on-the-ground network across majority of the states in India to pick up the conversations happening at different public places like bus stops, trains, railway stations, market places, metro stations etc. All the picked-up conversations were analyzed by UNICEF and its team in a bus huddle meeting held twice every week. Based upon the review of these anecdotal insights, appropriate content and messaging were designed as a part

of the government's communication strategy. This approach helped in generating high-quality relevant content for COVID-19 communication strategy. The effectiveness of the content was judged on the basis of several metrics like number of likes, number of forwards, comments, and number of negative sentiments. Whatever content was generated and communicated based upon the above approach, UNICEF's analysis showed that it did not generate negative sentiment among the masses, thereby reaffirming the significance and efficacy of this communication approach. Besides Social Media platforms, UNICEF supported the Government in strengthening the content development and dissemination of the same on the print (regional and national newspapers, magazines), radio and TV channels. First, UNICEF reached out to the CSR department as well as NGOs and CSOs, and collaborated with them to connect with the poor and underserved population and make them aware about the COVID-19 challenges and solutions as well as recommended safety guidelines, available government initiatives and facilities.

Second, UNICEF engaged the religious channels to leverage their network for reaching out to their disciples and creating COVID-19 awareness among those people.

Third, UNICEF, along with WHO held series of engagements with the media and radio. They trained more than 800 journalists by conducting four radio workshops and leveraged them to ensure that meaningful COVID-19 information reaches out to the masses living in rural areas. UNICEF also leveraged its links with India's leading newspapers like Dainik Jagran and Times of India to launch the COVID-19 awareness series,

which became very successful among the masses. The awareness series was launched as a special column called "A Shot of Hope" in Times of India, and "Jagran Dialogues" in Dainik Jagran. Jagran Dialogues mainly focused on the information needs around issues related to pregnant women, delta variant, mental health, and other recurrent issues. A Shot of Hope series involved Government-approved doctors as the primary spokesperson sharing their insights on dos and don'ts for safety against COVID-19. Fourth, UNICEF made significant contribution in formulating the Operational Strategy and Communication Strategy documents launched by the Government in December 2020.

Fifth, UNICEF conducted the skill-based trainings at national as well as international level for the people involved in different roles and capacities during vaccine administration. The trainees also involved the people from neighbouring countries who were receiving help from India as a part of 'Vaccine Maitri' program.

Another key player in the communications aspect of the programme, WHO's communications team was engaged in streamlining the risk communication aspect to make people aware and to plan corrective actions. Through its research capabilities and by leveraging information obtained from monitoring and evaluation exercises, WHO gained an understanding of the risks associated and the public's understanding of vaccination, to aid the risk communication efforts.

VACCINE HESITANCY

MULTI-CHANNEL COMMUNICATION PLATFORMS

One of the key focus areas of the COVID-19 communication strategy involved addressing VH among the people, especially those living in semi-urban and rural areas. While majority of the people went ahead with vaccination as per their eligibility, there had been many cases where VH held people back from getting vaccinated. Thus, less than expected outcomes had been achieved from the vaccination drive in the districts and villages as eligible citizens bought into the rumours regarding side-effects of vaccination, or hesitated because religious beliefs and fear arising from the occurrences of exceptional cases of AEFI among few people.

To understand the level of VH among the people in India, Facebook undertook

the COVID-19 Symptom Survey (CSS) of people in India after the launch of vaccination drive. This included mainly those individuals who had access to internet connectivity and had been using social media platforms. According to the analysis of this survey, VH was estimated to be around 28.7 percent with varying levels in different States and UTs of India. For example, survey results showed that VH rates were around 40% in Tamil Nadu and Punjab (Tarfe, 3 June 2021).

According to the survey undertaken by AIIMS Jodhpur, VH had been observed in highly informed groups as well. The survey revealed that 10.6% medical students across the states of India had shown VH. This was in stark contrast to the expected behaviour among the highly informed and participative groups. Overall, the rural and marginalized groups like women, tribal populations and other minority groups showed higher levels of VH as compared to urban people or informed segments in India. Due to these varying levels of socio-behaviour orientation and hesitancy among the significant percentage of the population, few regions lagged in achieving a significant level of vaccination despite the fact that multiple vaccination sessions were held in those regions and vaccination supplier were available.

Government focused on addressing VH among the people with a comprehensive communication strategy driven by local engagement of grassroot leaders, respectable individuals, subject matter experts and communities. A multi-dimensional last-mile reach strategy was adopted to connect and build awareness, compassion, trust and transparency

among the people towards vaccination, especially those living in semi-urban and rural areas. For example, many districts used mobile teams to address VH among the people. Also, many districts used folk songs to spread the right information on vaccination among the marginalized groups of people as well as those living in rural areas. The communication strategy included the following key action plans.

First, NMRRC was set up to issue the real-time alert to the district collectors for tacking the vaccine fake news in their areas.

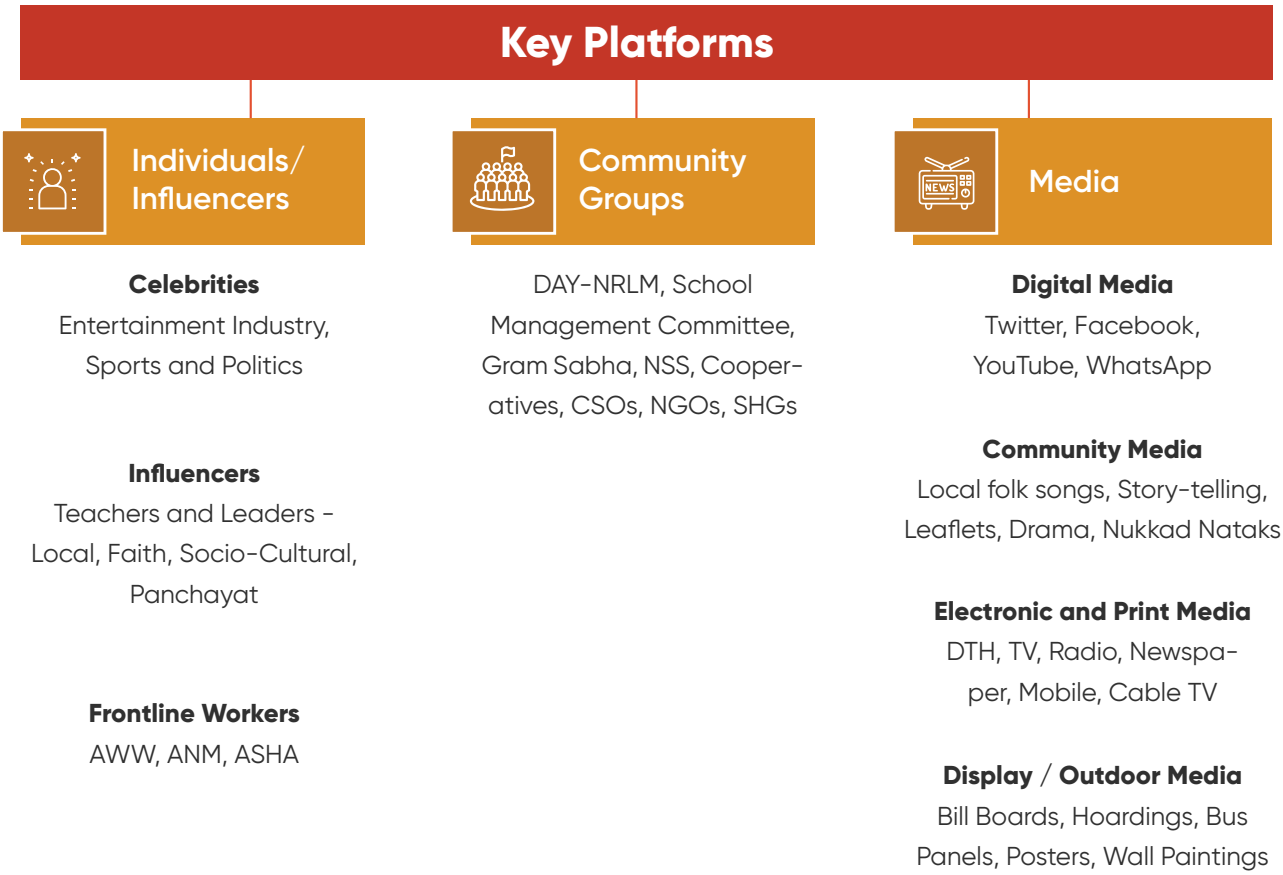
Second, individuals including celebrities, front-line workers as well as local influencers like teachers, faith leaders, panchayat leaders, etc. were engaged to establish trust and positive attitude among the local population towards social distancing norms, government efforts, and vaccination.

Third, local community groups like Gram Sabha, School Management Committee, Cooperatives, NGOs, and CSOs, etc. were engaged to build the momentum and bring out the systematic behaviour change orientation among the local people towards vaccine administration in their areas.

Fourth, media planning was being done and implemented on the print, electronic, and digital platforms to broadcast the different forms of messaging regarding benefits of vaccination and social distancing, Do's and Don'ts to protect the family members, as well as initiatives taken by the state and central governments for the welfare of the people affected by COVID-19. **Figure 10** provides a detailed overview of communication platforms.

A multi-platform approach was deemed critical, considering the varying forms of information consumption in the country. The trickier part was the mainstream media platform, which had much power to sensationalise a piece of information and influence public opinion on vaccines. It was also one platform through which various stakeholders could directly reach out to the masses. Hence, one of the learnings gained from the whole exercise was that there should be a uniformity in the messages and ideas shared by key stakeholder institutions. A conflict in opinions between representatives of key institutions could further fuel hesitancy and panic among citizens. To avoid such situations and ensure consistency in messaging, a lesson learned was that communication from the ministry needs to be streamlined and a single spokesperson can be assigned the responsibility of interacting with media. Secondly, greater coordination among scientific minds and institutions is key to curbing mass panic and VH.

Figure 10: *COVID-19 Communication Strategy – Key Platforms*



One of the key aspects which had not been highlighted much relates to the empathetic attitude and approach followed by the vaccination teams during the vaccination drive. All the resources engaged in vaccination were trained to engage and show empathy to the beneficiaries looking for information or sharing their concerns irrespective of their socio-economic or demographic status. Following statement by one of the doctors engaged in the vaccination program sums up the empathetic orientation.

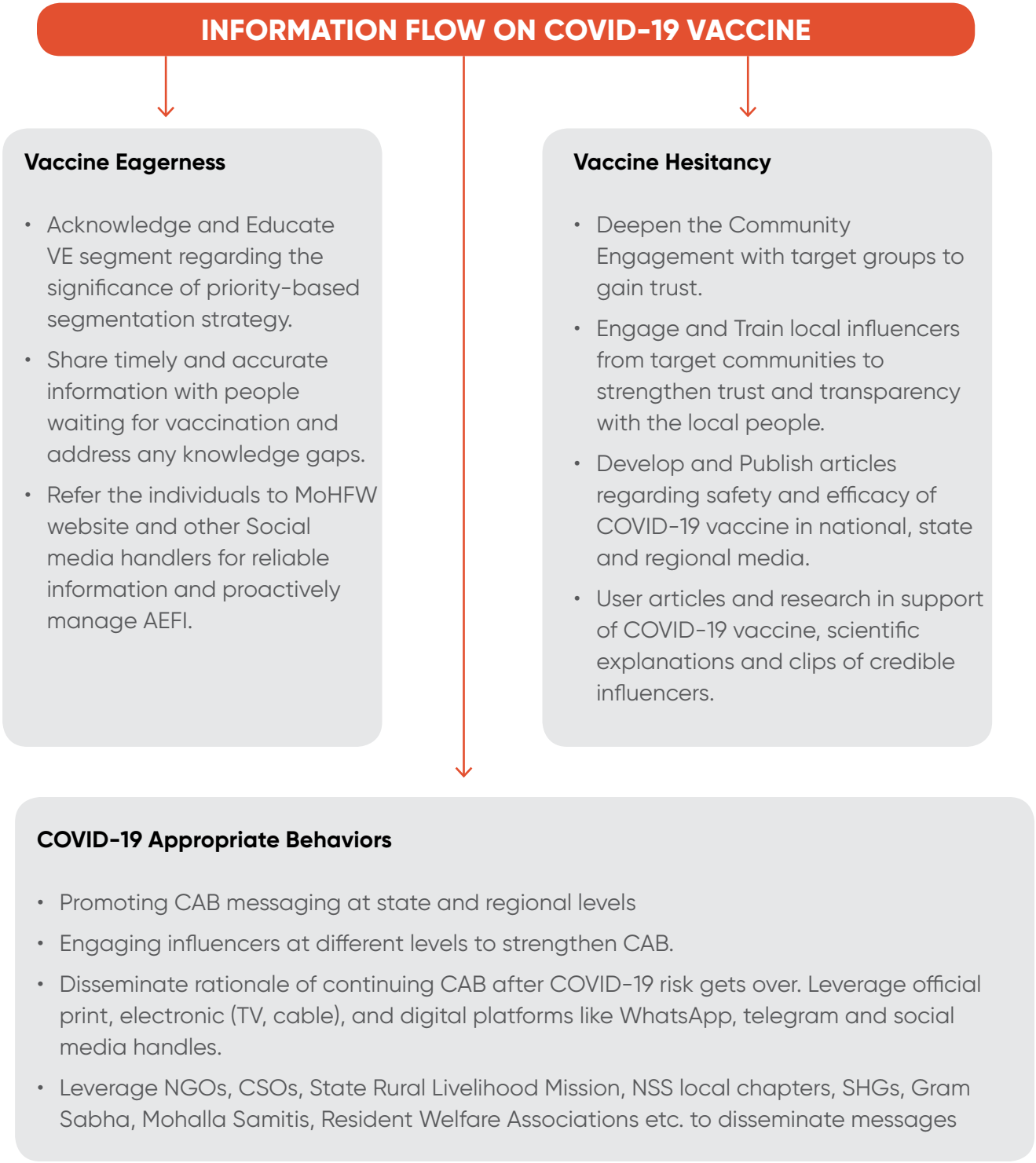
> we try to help each and every person. Anybody who comes to us during the vaccination drive without registration gets all possible help and support in terms of registration or whatever we can do in our individual capacity. Our approach to these kind of issues goes into the field and motivates the VH groups. We also feel nice when our own kids or family members tell us that the department is doing an excellent job for the people. So, we try to help each and every one and try to ensure that his/her problem is taken care of. So, that also matters, that also sends the right message.

VACCINATION INFORMATION FLOW – VE, VH AND CAB GROUPS

Those people who were eligible for getting vaccination had many questions, especially during the launch of the vaccination process in January 2021. Has the approved vaccine gone through trials? Is it safe to get jabbed with an approved vaccine? What is the eligibility criterion and vaccination process for my age group? Why can't get I vaccinated now? Where can I get the vaccination? What is the process of registration and pre-conditions for vaccination? How will I avail post-vaccination care and support? These were some of the questions that troubled the masses.

Different modes of information flow (Figure 11) and communication modes were designed depending upon the individual behaviour, eagerness or anxiety levels as well as desired outcomes.

Figure 11: *COVID-19 – Vaccination Information Flow*



Vaccine Administration and Data Management – Measuring, Monitoring and Evaluation

80

Development Partners like UNICEF also played a key role in strengthening the monitoring, evaluation, control and feedback processes across the vaccine administration value chain. The first monitoring aspect involved looking into the quality of vaccination sessions being held on an ongoing basis across the country.

The performance criteria included a detailed checklist used by WHO and UNICEF to monitor the vaccination sessions, which included indicators like CAB by the beneficiaries, compliance with social distancing protocols, vaccine availability, verification-to-vaccination-to-wait process, and so on.

The ongoing feedback was then shared with the Government at National, State and District levels. Based on the learnings from their polio routine immunization monitoring, WHO-NPSP ensured that monitoring and feedback sharing was done both locally and centrally, and that the communication between local administration and CSOs was robust and active. Therefore, the data from monitoring the session sites as well as other monitoring outcomes was used for discussions at either the evening meetings at PHCs, the block headquarters, the district headquarters or the DTF. Once the vaccine programme was rolled out, a major role of NPSP was in engaging with the DTFs and feeding them data, so that they could take action. Along with monitoring, NPSP also used their feedback to identify gaps and provide capacity building to address the issues.

The second monitoring aspect involved evaluating the performance of the cold-chain infrastructure by ensuring proper tracking and updating of cold-chain related activities on NCCMIS platform. The monitoring took into consideration attributes like logistics, transportation, storage and delivery performance of cold chain sites, cold-chain equipment breakdowns and recovery, and so on. The third monitoring aspect involved managing the communication pillar during vaccine administration. This involved working closely with the media room at the national and state levels and evaluating the overall strategy and response of the media team towards positive and negative news, rumors, reporting of adverse events, fake news and queries on various media platforms (print, digital, electronic).

Through the several monitoring exercises being undertaken on an ongoing basis, regions facing greater challenges in vaccination were also identified. For the regions having low vaccination rates, WHO-NPSP engaged Rapid Response Teams (RRTs) to ramp up the vaccination progress. In this context, WHO posted 50 RRT members in such challenging regions, with the north-east regions having a greater share of RRT members (29 out of 50). Before RRTs were formed, WHO extended similar support through their SMOs, who had to move to different

parts of the country to fill up the gaps, including in the north-east, as it was found that that the north-eastern states were lagging behind in preparatory status. The SMOs stayed there for a period of two to three weeks and supported these regions in preparations for the launch of the programme and ensured that the inoculation drive took off.

In addition, WHO facilitated the review of states and urban areas where high transmission was detected. It played a key role in facilitating reviews by IDSP, the National Center for Disease Control, GoI, Ministry of Health, and the state government/urban local bodies. Data came as a valuable tool that could be leveraged in varying ways to improve programme management during this pandemic. COVID-19 is the only disease for which the MoHFW maintained a dashboard displaying the number of cases and deaths in real time, for each state. This helped gauge the distribution of patients across the country and the severity of the spread of infection. It also opened up even more opportunities to enhance the existing repository of public data related to COVID-19, such that there were further classifications like gender and age of patients, their degree of infection, their previous infection status, and so on. This data was used for data modelling purpose, which resulted in gaining key insights for improving the data-driven policy responses and strategies.

09

Vaccine Maitri

India's exemplary diplomatic initiative of "Vaccine Maitri", Maitri being a Hindi word for friendship, was conceived inspired by India's age-old saying of "Vasudhaiva Kutumbakam", implying 'the world is one family.'

The concept emerged at the time, when several countries were engaging in the so-called act of "Vaccine Nationalism", which involves acquiring vaccine rights exclusively for their citizens.

This act resulted in there being a dearth of vaccination doses for disadvantaged low-income countries, hence creating a crisis of confidence across the globe. At such a moment, India reassured the nations of the world that India's manufacturing capabilities would be utilized towards producing and providing COVID-19 vaccines to countries in need of assistance.

India having a label of 'pharmacy to the world', is responsible for 60% of the world's vaccine supply (Sharun, 2021). India's low-cost vaccine development capabilities combined with the capacity to export large scale vaccine consignments across the globe positioned India as a major supplier of COVID-19 vaccines. Moreover, the ability to produce life-saving vaccines at cost-effective rates appeared as a blessing to low-income countries unable to compete with affluent nations when it came to procuring expensive vaccines.

India, till the 30th of November 2021 supplied the total of 127.27 lakh doses of COVID-19 vaccines to 52 countries in the form of grants (Table 1).

Dr Harsh Vardhan in one of his addresses had proudly commented that India reliably provided other countries with a steady supply of COVID-19 vaccines as well as training to healthcare professionals of several countries in the field of vaccine administration. As quoted by Dr Harsh Vardhan, "By being a "mitra" to the global community, India has earned global trust by supplying indigenously made vaccines at a crucial hour".

Table 1: *Vaccine Maitri Initiative, Supply grant to needy countries*

Country	Grants as on 30 November 2021 (lakhs)
Bangladesh	33
Myanmar	27
Nepal	11.12
Bhutan	5.5
Maldives	2
Mauritius	1
Seychelles	0.5
Sri Lanka	5
Bahrain	1
Oman	1
Afghanistan	5
Barbados	1
Dominica	0.7
Dominican Republic	0.3
Mongolia	1.5
Ghana	0.5
Ivory Coast	0.5
St. Lucia	0.25
St. Kitts & Nevis	0.2
St. Vincent & Grenadines	0.4
Suriname	0.5
Antigua & Barbuda	0.4
DR Congo	0.5
Nigeria	1
Kenya	1

Rwanda	0.5
Senegal	0.25
Guatemala	2
Malawi	0.5
Uganda	1.00
Nicaragua	2.00
Guyana	0.8
Jamaica	0.50
Belize	0.25
Botswana	0.30
Mozambique	1.00
Eswatini	0.20
Bahamas	0.20
Iran	10.00
Namibia	0.30
Paraguay	2.00
Fiji	1.00
UN Peacekeepers	2.00
Zimbabwe	0.35
Niger	0.25
Nauru	0.10
Trinidad & Tobago	0.40
Albania	0.50
Total	127.27

Source: *Ministry of External Affairs, Government of India. (2021, December 6). Vaccine Supply. Ministry of External Affairs. https://mea.gov.in/vaccine-supply.htm*

Summarizing the Vaccine Administration Journey

Figure 12: *Vaccination Launch and Journey till Date (Key Events)*

VACCINATION DRIVE MONTHLY DEVELOPMENTS 2021

Jan-19: GOI launches COVID-19 Vaccination Drive

Jan-21: IEC* Campaign launched against COVID-19

Jan-30: 3.7 million doses administered
GOI launches Vaccine Maitri initiative

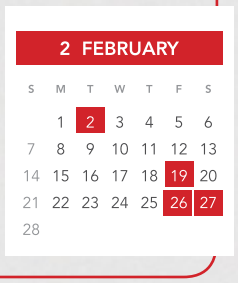
Feb-02: NEGVAC* constituted

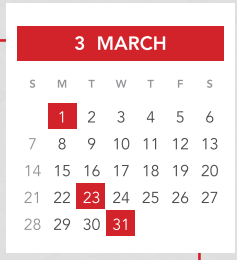
Feb-19: Landmark 1 crore doses administered

Feb-19: GOI launches Intensified Mission Indradhanush 3.0

Feb-26: 13.7 million doses administered

Feb-27: Private Sector Participation scaled up in COVID-19 Vaccination process





Mar-01: Second phase of vaccine administration commences

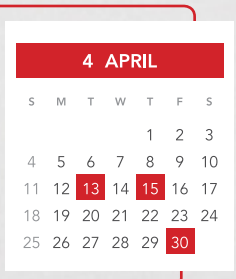
Mar-23: Export of Made-in-India vaccines to other countries commences

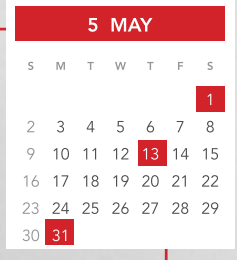
Mar-31: 64.3 million doses administered in the month of March

Apr-13: Restricted Use in Emergency Situations granted to Sputnik-V vaccine

Apr-15: Regulatory pathways cleared for foreign-produced vaccines

Apr-30: 154.8 million doses administered

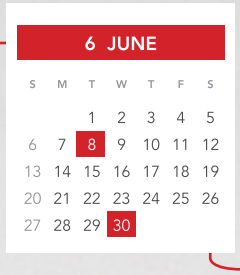




May-01:Phase 3 Vaccination drive commences

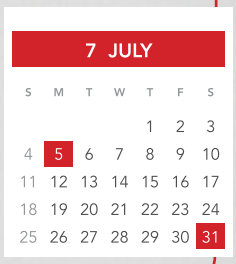
May-13: PhaseII/III trial of Covaxin approved

May-31: 215.8 million doses administered



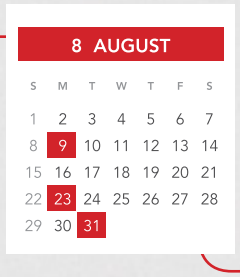
Jun-08: Fresh Order for Vaccines placed to achieve Universalization of Vaccination. 25 Crore doses of Covishield and 19 Crore of Covaxin to be procured

Jun-30: 335.4 million doses administered



Jul-05: Prime Minister Shri Narendra Modi inaugurates the Co-WIN Global Conclave

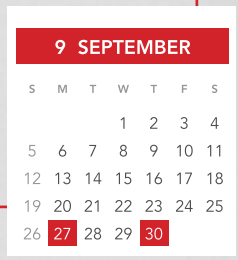
Jul-31: 467.2 million doses administered



Aug-09: Foreign nationals eligible for vaccination

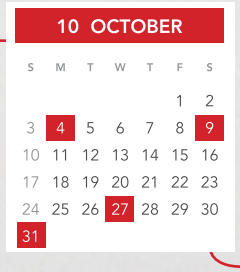
Aug-23: Digital certificates provided to Clinical Trial Participants through Co-WIN

Aug-31: 651.2 million doses administered



Sep-27: Countrywide Ayushman Bharat Digital Mission Launch

Sep-30: 890 million doses administered



Oct-04: ICMR's i-Drone launch. Vaccine delivery through drones

Oct-09: Antyodaya* for COVID-19 Vaccination

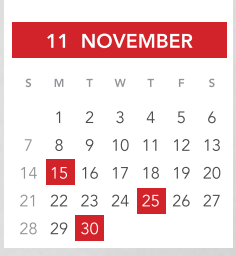
Oct-27: "Har Ghar Dastak Campaign" announced

Oct-31: 1061.4 million doses administered

Nov-15: The number of fully vaccinated individuals surpasses the partially vaccinated eligible population for the first time

Nov-25: Renewed emphasis on Vaccine Maitri

Nov-30: 1240 million doses administered



**"*IEC- INFORMATION, EDUCATION & COMMUNICATION,
NEGVAC- National Expert Group on Vaccine Administration for COVID-19, Antyodaya- Quantitative Restriction on Export of Syringes Put in Place. Restriction applies to just 3 categories of syringes for 3 months"**

India did very well during the controlled vaccine roll-out phase between January – March 2021. During this initial phase, VH was high among the people, and supply of vaccine (Covishield and Covaxin) was in sync with the comparatively lower demand levels due to VH as well as selected approval of specific age-groups by the Government; only HCWs, FLWs were allowed to get vaccinated in January 2021 followed by the approval to elderly people above the age of 60 years and those above the age of 45 years with co-morbidities. From April 2021 onwards, demand-supply situation started having the widening gap due to the rapidly increasing number of COVID-19 cases, tagged as COVID-19 Second Wave, along with the wider range of people above the age of 18 years becoming eligible for vaccination and last but not the least, due to delays in getting the vaccines in large quantities from the manufacturers of Covishield and Covaxin.

On the demand side, as the Government expanded vaccination eligibility to all citizens above the age of 18, there came a sudden shift from VH to VE, thereby creating a huge demand for daily vaccine supplies. On the supply side, Covishield and Covaxin were the first two vaccines which got EUA in India on 2nd and 3rd January 2021 respectively. India was mainly relying on these two manufacturers to address the demand since the launch of vaccine administration in January 2021. Initially, demand-supply gap was minimal with the vaccination approvals for limited number of people. However, in May 2021, as people in the age group of more than 18 years became eligible for vaccination, Indian Government found itself in the significant demand-supply mismatch for the initial few weeks. With the longer cycle of 140 days and 95 days for manufacturing the lots of Covaxin and Covishield respectively, India got stuck with the shortfall in supplies. The situation can be dissected in multiple ways, and in hindsight, the response cannot be categorised into good or bad, but requires a more nuanced contextual understanding. At the time, based on the demand estimation for phase 2 of the vaccination drive, India was banking on the domestic manufacturers, Bharat Biotech International Limited (BBIL) and Serum Institute of India (SII).

Although there was no formal order placed with the manufacturers, there was an understanding that India would get its share of the vaccine from its domestic manufacturers only, which was around 50%, and the rest of it would be exported (10-15%) and allocated for COVAX (35%). Hence, there was no intention to approach external manufacturers.

Besides, among external manufacturers, the options were not viable, either because of technical limitations as in the case of Moderna and Pfizer, or geo-political reasons as in the case of Sinovac, or scientific hesitancy as in the case of Sputnik V at that time. Moreover, there were apprehensions that criticism and backlash would be much more severe if an externally procured vaccine were to fail. Hence, India chose to rely

on its domestic manufacturers, and the supply of vaccines was thus limited to our domestic production. An upside to this arrangement was that India had an end-to-end control over vaccine production and delivery, unlike many other developing countries who were dependent on external manufacturers. The vaccine shortage that India faced during April-May 2021 would not have been any better, given that vaccine shortage emerged as a global issue during that time, which raised much bigger questions about vaccine inequality as rich countries owned surplus doses when the developing world reeled under a shortage. On the downside, a delay in estimating the scope of the second wave played a considerable role in supply shortage. The unexpected second wave came as a curveball into the well-planned vaccine delivery mechanism.

The prioritisation of beneficiary groups had helped authorities ensure that the demand and supply were matched. However, the sudden uptick in cases led to increased demand for vaccines in a significantly short time. This is where the widespread infection and mass anxiety began to exert pressure on the planned vaccine delivery structure. However, this VE pressure must be seen from the viewpoint of the pandemic crisis, During crisis, people tend to be not very logical. India saw its first surge in September 2020, and as the numbers increased, health facilities were stretched and beds were being rapidly repurposed to ensure that patients do get adequate care and the mortality numbers remain low.

Then came the second surge in April-May 2021, which was at least three times higher in most geographies of the country, as compared to the first time. The VE pressure has to be seen in the context of these developments, because in the second surge, most of the people saw the disease at very close quarters. They saw people in their own household getting sick. They saw deaths happening in their family or in their neighborhood. So therefore, it was understandable if people were eager to get vaccinated.

In such a scenario, it became incumbent on the government to share with people what was the total COVID-19 vaccine production capacity in India? What are the priorities of groups that need to be vaccinated? And what is the overall plan of the government while going ahead to vaccinate the eligible population, because if you do not promptly share this information, then you leave the field wide open for all kinds of narratives which are not based on facts to emerge.

MoHFW started addressing the press conferences on the daily basis at 4 p.m. thereby bringing out the transparency and reducing the mis-communication. Then as the situation started coming under control, this was made thrice a week, then twice a week. In these scheduled press conferences, Subject Matter Experts along with the Ministry Spokesperson explained various nuances of COVID-19 vaccination as well as the public health response to COVID-19. The government also explained the people regarding the scaling strategy and last-mile accessibility as well as adoption plan.

Nevertheless, the collective pressure resulting in the policy decision to allow vaccination for 18+ citizens can be termed as a lapse in judgement on part of the administration, since it strayed from the initial plan and disrupted the whole supply chain. The result was that a huge section of the population became eligible for vaccination without the commensurate quantity of vaccines to meet the demand, thereby driving further shortage of supply and depriving the most vulnerable population from getting vaccinated.

However, India made the quick recovery and comeback in June 2021 from the tough situation of rapidly increasing COVID-19 cases as well as shortage of vaccine supplies. The supplies of Covishield and Covaxin improved in June 2021. Both the companies rapidly scaled up their manufacturing capacity considering the milestone of vaccinating more than one billion Indians with two doses each. Both the companies got adequate support from the Government during capacity building and scalability in terms of advance orders, and production linked incentives under COVID-19 Suraksha mission. Meanwhile, DGCI approved other leading COVID-19 vaccines like Sputnik V (13th April 2021) and Moderna (29 June 2021), thereby further enhancing the supply from July 2021 onwards. This led to the situation when India became COVID-19 vaccine surplus nation with adequate manufacturing capacity to serve the local demand as well as to export globally.

Since Jun-July 2021 onwards, India went into the rapid scale-up mode thereby increasing the average monthly vaccination count from 6 crores to 27 crores. This achievement sent the signal globally, that India had achieved adequacy in indigenous vaccine development and launch. Thereby, access to COVID-19 vaccine increased significantly at the state, district and block levels. India reached the state where it was able to vaccinate 25 million people in a day on 17th September 2021. Many times, Indian vaccination network achieved the milestone of vaccinating 10 million people in a day. India crossed one billion counts for administered doses on 21st October 2021. Till the end of November, India's vaccination coverage figures stood at 87.5% and 55.8% of the adult population having recieved the 1st and 2nd dose of vaccine respectively. The statistics hence provide evidence to the overall success of India's COVID-19 vaccination initiative.

In summary, India went through an exceptional journey of grit, determination, can-do attitude during the COVID-19 pandemic. When COVID-19 pandemic started in 2020, India faced the huge challenge of survival considering the weak healthcare infrastructure and understaffed pool of healthcare staff. By June 2021, India scaled majority of the COVID-19 pandemic challenges related to social distancing, critical care infrastructure for COVID-patients, and vaccination development and administration set up. This COVID-19 journey is a reflection of India's research capabilities, skilled manpower, willingness of everybody in India to come together for a common cause, never-say-die attitude and exceptional leadership.

11

Role of Leadership During Vaccine Administration

India has emerged as an exemplary model among the developing nations for its resilience, grit and determination in the fight against the COVID-19 pandemic. Looking at the India's journey during the COVID-19 pandemic, there is no denying the fact that India has emerged from the COVID-19 pandemic as a much stronger nation. The credit for this resilient action goes to the Government leadership as well as to each and every Indian involved in the fightback at the institutional or individual level. India's success in effectively curbing the spread of the COVID-19 virus can be attributed to the multiple systemic interventions undertaken at the leadership level both during the vaccine development and administration. Besides taking bold decisions and clear actions during vaccine development, GoI showcased exemplary planning, coordination and technology orientation skills, which made the vaccine administration possible at breakthrough speed at pan-India level. Prime Minister Modi Government's handling of the vaccine administration phase has been commendable on several fronts, with Solicitor General terming the approach as "responsive". He further commented that the Prime Minister ensured that India sustains itself through the global calamity, i.e., the COVID-19 pandemic with "minimal" and "unavoidable" damage (Reddy, 2020). With Prime Minister Modi at its helm, GoI designed and implemented an inclusive and responsive strategy after gathering the feedback and advice from the experts (institutional, individual, development organizations) with technology, implementation, planning, crisis management, and healthcare skill-sets. Following initiatives taken by the GoI highlight the significant role of the leadership in handling the crisis situation.

The first initiative comprised the focus on design and launch of an inclusive communication strategy targeting the diverse socio-economic groups at the ground level. Communication strategy addressed the four major areas of concern - VH, VE, AEFI, and CAB. To address these concerns, GoI drew up the detailed communication guidelines based upon the five-point strategic action framework - advocacy; communication capacity building; media engagement and social media; social mobilization and community engagement; and finally, crisis communication using AEFI. While framing the communication guidelines, GoI took into consideration the socio-economic and geographic diversity of the population across India and customised the content accordingly. For effective on-ground implementation of the communication strategy, GoI leveraged the expertise of the development institutions like UNICEF, WHO, BMGF and JSI etc. Also, Government engaged the grassroot partners including NGOs, CSOs, ASHA workers and regional volunteers etc. to facilitate the mobilization of the masses for vaccination.

The second initiative involved managing the synchronization between demand for and supply of vaccines while undertaking the mass vaccination at state, district, and block levels. Synchronization between demand and supply was critical for efficient supply-chain management of vaccine delivery and administration as well as for minimizing the vaccine wastage and shortage at different places. GoI formulated the segmentation

strategy, which involved dividing the eligible population into three priority groups- Phase 1 (HCWs, FLWs, and high health risk population), Phase 2 (people above 60 years, and individuals aged 45 and above suffering from one or more comorbidities), and Phase 3 (all citizens aged 18 years and above). Segmentation approach enabled the efficient demand-supply management during vaccine administration.

The third initiative comprised setting up the efficient vaccine logistics ecosystem (delivery, storage and disposal network) at pan-India level. Invaluable lessons can be learnt from the government's approach towards ensuring the appropriate vaccine infrastructure considering the different temperature and quantities available for approved vaccines. The government started proactively working towards strengthening transportation and storage facilities, ensuring that the required standards for vaccine preserve are maintained. The network for storage, transportation, and delivery was streamlined on the war footing basis. MoHFW released the detailed cold-chain management and logistics guidelines well in advance before the launch of vaccination drive to ensure the planning and readiness.

The fourth initiative was related to the capacity building of skilled resources for safe and effective vaccination of the masses. GoI knew very well that skilled resources were critical for the success of nation-wide vaccination. Any slippage during immunization would have created the major havoc thereby resulting in high level of VH and overall failure of the vaccination drive. To mitigate this risk, GoI launched the pan-India training and skill-building program mapping the resources at the national, state, district, bloc and village levels using the mix of face-to-face and virtual trainings. Diverse set of role-based trainings were designed and imparted on an ongoing basis to the vaccine administration workforce involved in different roles and capacities across different geographies in India. Focus on trainings had a significant positive impact on the vaccination quality and efficiency thereby enhancing the trust and confidence among the people to come forward for vaccination.

The fifth initiative involved focus on engaging the individual and institutional experts from diverse fields to work together towards the common goal of successful vaccine administration to the Indian citizens. All these experts came together under NEGVAC umbrella. NEGVAC was constituted to manage the end-to-end lifecycle for vaccine administration in India. It brought together 19 ministries at the national level, 23 departments at the state and district levels, and multiple development partners at the regional level for operationalizing the vaccine roll-out strategy and managing the end-to-end vaccine administration life-cycle.

The fifth initiative was related to the launch of Co-WIN technology platform for the registration and tracking of the beneficiaries thereby enabling the efficient demand-supply planning, implementation, monitoring and control. Co-WIN digital platform enabled the tracking of enlisted beneficiaries along with the broadcasting of real time

vaccination statistics. For instance; listing of facilities/planning unit and session sites, planning and scheduling of vaccine sessions with real-time status on booked and available booking slots on different dates and at different sites, end-to-end implementation of vaccine process, traceability of beneficiaries, vaccine sessions, registrations, etc. at national, state, district and block levels, and monitoring of vaccine doses and wastages at national and regional levels. The Co-WIN platform can hence be appropriately termed as the heart and soul of the vaccination programme. The platform made provision for many of the operations that could not have otherwise been performed due to the traversal restricting nature of the pandemic.

12

References

1. Chakravarti, A. (4 January 2021). Co-WIN app likely to be used for COVID-19 India vaccine rollout, what is it and how to register. India Today. https://www.indiatoday.in/technology/news/story/co-win-app-likely-to-be-used-for-covid-19-india-vaccine-rollout-what-is-it-and-how-to-register-1755703-2021-01-04 (last accessed 10 June 2021)

2. Chaudhary, A., & Saxena, R. (24 November 2020). India faces cold chain logistics challenge for COVID-19 vaccination. Business Standard. https://www.business-standard.com/article/current-affairs/india-faces-cold-chain-logistics-challenge-for-covid-19-vaccination-120112400101_1.html (last accessed 12 June 2021)

3. Chitravanshi, R. (14 May 2021). Russia's Sputnik V vaccine to be available in India from next week: Govt. Business Standard. https://www.business-standard.com/article/current-affairs/russia-s-sputnik-v-vaccine-to-be-available-in-india-from-next-week-govt-121051400004_1.html (last accessed 12 June 2021)

4. ECHO-India Website (2021). ECHO in India. https://www.echoindia.in/about/ (last accessed 5 June 2021)

5. FE Bureau (25 April 2021). Idea Exchange: Co-Win an extremely scalable platform, tech backbone is in place, we can handle (vaccine) load that comes, says RS Sharma. Financial Express. https://www.financialexpress.com/lifestyle/health/idea-exchange-co-win-an-extremely-scalable-platform-tech-backbone-is-in-place-we-can-handle-vaccine-load-that-comes-says-rs-sharma/2239699/ (last accessed 10 June 2021)

6. HBL (22 May 2021). Vaccine shortage attributed to India's expanded coverage for wider population: Experts. The Hindu Business Line. https://www.thehindubusinessline.com/news/vaccine-shortage-attributed-to-indias-expanded-coverage-for-wider-population-serum/article34622558.ece (last accessed 11 June 2021)

7. IANS (16 January 2021). Here's How India Plans to Store Covishield and Covaxin Vaccines. The Weather Channel. https://weather.com/en-IN/india/coronavirus/news/2021-01-16-heres-how-india-plans-to-store-covishield-and-covaxin-vaccines (last accessed 12 June 2021)

8. Koshy, J. (22 April 2021). People over 18 years can register for COVID-19 vaccines from April 28. The Hindu. https://www.thehindu.com/news/national/people-over-18-years-can-register-for-covid-19-vaccines-from-april-28/article34383602.ece (last accessed 11 June 2021)

9. Krishnan, G. (30 December 2020). India readies for COVID-19 vaccine roll-out. Fortune India. https://www.fortuneindia.com/covid-19-vaccine-in-india/india-readies-for-covid-19-vaccine-roll-out/104986 (last accessed 2 June 2021)

10. Kumar, V. M., Pandi-Perumal, S. R., Trakht, I., & Thyagarajan, S. P. (2021). Strategy for COVID-19 vaccination in India: the country with the second highest population and number of cases. npj Vaccines, 6(1), 1-7. https://www.nature.com/articles/s41541-021-00327-2.pdf?origin=ppub (last accessed 29 May 2021)

11. MoHFW (21 April 2021). Liberalised Pricing and Accelerated National COVID-19 Vaccination Strategy. Ministry of Health and Family Welfare. https://www.mohfw.gov.in/pdf/LiberalisedPricingandAcceleratedNationalCOVID-19VaccinationStrategy2042021.pdf (last accessed 28th May 2021)

12. MoHFW (24 February 2021). Guidance doc COWIN 2.0 MOHFW website. Ministry of Health and Family Welfare. https://www.mohfw.gov.in/pdf/GuidancedocCOWIN2.pdf

13. MoHFW (25 May 2021). Guidelines for Integration of Co-WIN with Third-Party Applications Developed by Ecosystem Partners. Ministry of Health and Family Welfare. https://www.mohfw.gov.in/pdf/CoWINAPIGuidelinesFinal240521.pdf

14. MoHFW (28 December 2020). COVID-19 Vaccines Operational Guidelines. Ministry of Health and Family Welfare. https://main.mohfw.gov.in/sites/default/files/COVID-19VaccineOG111Chapter16.pdf (last accessed 28th May 2021)

15. MoHFW Notification (24 May 2021). On-site Registration/Facilitated Cohort Registration in addition to Online Appointment for 18-44 years age group now Enabled on CoWIN. Press Information Bureau. https://www.pib.gov.in/PressReleasePage.aspx?PRID=1721225 (last accessed 23 July 2021)

16. MoHFW Notification (25 December 2020). Central Government gears up for roll out of COVID-19 Vaccine. Press Information Bureau. https://pib.gov.in/PressReleasePage.aspx?PRID=1683529 (last accessed 23 July 2021)

17. MoHFW Training Calendar (2020). Resource Material for Capacity Building of healthcare Professionals for COVID-19 Containment. Ministry of Health and Family Welfare. https://www.mohfw.gov.in/pdf/BASEDOCforRESOURCESrev06042020.pdf (last accessed 4 June 2021)

18. News18 (16 January 2021). Co-WIN Features Explained Ahead of COVID-19 Vaccination Drive; PM to Launch Platform Shortly. Microsoft News. https://www.msn.com/en-in/money/technology/co-win-features-explained-ahead-of-covid-19-vaccination-drive-pm-to-launch-platform-shortly/ar-BB1cNFAB (last accessed 10 June 2021).

19. Pandey, K. (16 January 2021). COVID-19 vaccination: Here's how India will transport, store and administer vaccines in immunisation programme. Times Now News. https://www.timesnownews.com/health/article/check-the-storage-transportation-needs-of-covid-19-vaccines-is-india-ready-to-roll-out-immunisation-drive/684660 (last accessed 12 June 2021)

20. PTI (15 December 2020). 29,000 Cold Chain Points, 41,000 Deep Freezers: India Gets Ready for COVID-19 Vaccine Storage. News18. https://www.news18.com/news/india/29k-cold-chain-points-41k-deep-freezers-india-gets-ready-for-covid-19-vaccine-storage-3180842.html (last accessed 12 June 2021)

21. Tarfe, A. (3 June 2021). How India's COVID-19 communication strategy is failing to combat vaccine hesitancy. The Indian Express. https://indianexpress.com/article/opinion/how-indias-covid-19-communication-strategy-is-failing-to-combat-vaccine-hesitancy-7342890/ (last accessed 23 June 2021)

22. UNICEF Cold Chain Guidelines (11 January 2021). Vaccine Carriers and Cold Boxes. UNICEF Supply Division. https://www.unicef.org/supply/media/6391/file/VaccineCarrierColdBox-guideline-2021.pdf (last accessed 13 June 2021)

23. WHO (15 April 2020). WHO's polio surveillance team, other field staff join COVID-19 fight. https://www.who.int/southeastasia/news/detail/15-04-2020-who-s-polio-surveillance-team-other-field-staff-join-COVID-19-fight (last accessed 31 July 2021)

24. Sharun, K., & Dhama, K. (2021). COVID-19 vaccine diplomacy and equitable access to vaccines amid ongoing pandemic. Archives of Medical Research.

25. Ministry of External Affairs, Government of India. (2021, December 6). Vaccine Supply. Ministry of External Affairs. https://mea.gov.in/vaccine-supply.htm

13

Annexure 1

	State Level			District Level		Block Level	
Activities	SSC	STF	SCR	DTF & UTF	DCR/ UCR	BTF	BCR
Cold Chain & Logistics: Storage, Transportation & Delivery	Y	Y		Y		Y	
Community Engagement: "Spread of 'Jan Baghidaari'	Y						
Create: Database of HCWs	Y						
Engage & Collaborate: State/District/Block Level Departments & Development Partners	Y	Y		Y		Y	
Engage & Collaborate: Youth Organizations and Self-Help Groups		Y		Y		Y	
Financial Planning: Funding Guidelines + Availing CSR Budget and Other Sources for Vaccine Administration	Y	Y					
Formulate Guidelines & Review: Operational Activities (Communication, Logistics, Delivery) - Accessibility | Availability | Acceptance | Awareness (Systemic Behaviour Change orientation)	Y	Y		Y		Y	
Funds Disbursement: ASHAs, Alternate Vaccinators, and Alternate Vaccine Delivery (AVD) Individuals Engaged in Vaccination Drive				Y		Y	
Identify & Engage: Potential Vaccinators for Smooth Supply of Vaccines		Y		Y		Y	
Infrastructure: Planning and Mapping of Vaccination Sessions at Vaccine Sites during Roll-Out for Registered Citizens		Y		Y		Y	
Infrastructure: Planning and Mapping of Vaccination Sites at Public Health Centres (PHC) & Common Services Centres (CSC)	Y						
Monitor, TroubleShoot & Update: Track Vaccination Schedule, Timelines and Share Regular Feedback Regarding On-Ground Vaccine Administration Activities			Y	Y	Y	Y	Y
On-Ground Monitoring, Execution & Control with 24*7 Helpline for vaccine administration			Y		Y		Y
Recognition and Rewa rds: Performance Based at District/Block/Urabn/Ward levels	Y						
Review Status Meetings: Task Forces at State/District/ Block Levels	Y	Y		Y		Y	
Track & Monitoring: Vaccine Roll-out & Administration	Y	Y		Y		Y	
Track and Act: Social Media Platforms for Mis-Information and Rumours	Y	Y					
Track and Surveillance: State and District AEFI Committees	Y	Y		Y		Y	
Track: Beneficiaries Database on CoWIN		Y		Y		Y	
Train and Mobilize: Skilled Healthcare Resources for the following: **- Operational Support** **- Information, Education & Communication** **- Resource Mobilization** **- Community Mobilization** **- Co-WIN platform**	Y	Y		Y		Y	
Train and Mobilize: Skilled Healthcare Resources for Vaccination	Y	Y		Y		Y	

Note: All images used in the report are for representation purposes only

IFC | INSTITUTE *for* COMPETITIVENESS

Institute for Competitiveness, India (IFC) is the Indian knot in the global network of the Institute for Strategy and Competitiveness at Harvard Business School. IFC India is an international initiative dedicated to the enlarging and purposeful dissemination of the body of research and knowledge on competition and strategy, as pioneered over the last 25 years by Professor Michael Porter of the Institute for Strategy and Competitiveness at Harvard Business School. Institute for Competitiveness, India conducts and supports indigenous research, offers academic and executive courses, provides advisory services to the corporate and government sectors, and organises events. The institute studies competition and its implications for company strategy; the competitiveness of nations, regions, and cities and thus, generates guidelines for businesses and those in governance and suggests and provides solutions to socio-economic problems.

www.competitiveness.in

• • •

The Institute for Competitiveness

U24/8, U-24 Road, U Block, DLF Phase 3, Sector 24, Gurugram, Haryana 122022 info@competitiveness.in | www.competitiveness.in