



ASSOCIATION OF
HEALTHCARE
PROVIDERS
INDIA

Utilizing Knowledge from Previous Waves to Prevent Future Waves of COVID-19

By Association of Healthcare
Providers (India)- AHPI

November 2021

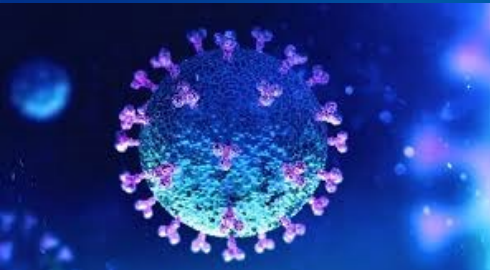


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Foreword

COVID-19 has brought to the forefront many hard-hitting realizations about the inadequacy of our healthcare resources: the lack of beds, the lack of healthcare workers – doctors, nurses and allied health workers – and the geographical inequalities in healthcare facilities across our nation, resulting in overcrowded hospitals, especially in metro towns.

Although we were not fully prepared for the first wave, we somehow successfully managed the patient load and kept mortality low in comparison to the global average. But the second wave struck hard and swift, bringing us to our knees with the lethal combination of inadequate resources, poor coordination of existing supplies, and a rapidly mutating virus. Our country suffered a huge loss of life due to the shortage of beds and doctors, inefficiency in synchronizing oxygen availability across states, and inability to communicate fast-changing treatment protocols to doctors in remote areas.

The only silver lining to emerge from this dark cloud is the immense potential for learning on all fronts. It is vital that we absorb, adapt and integrate our harrowing real-life experiences into concrete planning for future pandemics. Our political leadership has been very responsive, having already started to bridge the gaps in the supply chain. With both the public and private sectors bringing their strengths to the fore in mitigating a disaster of this scale, the dynamic synergy that has developed between them should not be allowed to falter but be strengthened into a mighty partnership.

The Association of Healthcare Providers – India (AHPI) has a strong network of member hospitals spread across 19 regional chapters. The regular meetings between these chapters were a source of immense learning, leading to a large knowledge base that was shared with KPMG and resulting in the creation of this document. It is hoped that the recommendations from the document will prove to be a useful reference for government bodies and research establishments in framing policies and help in supplementing both short-term and long-term resources. The document will be equally useful for private players in their resource-planning and in liaising with local bodies.

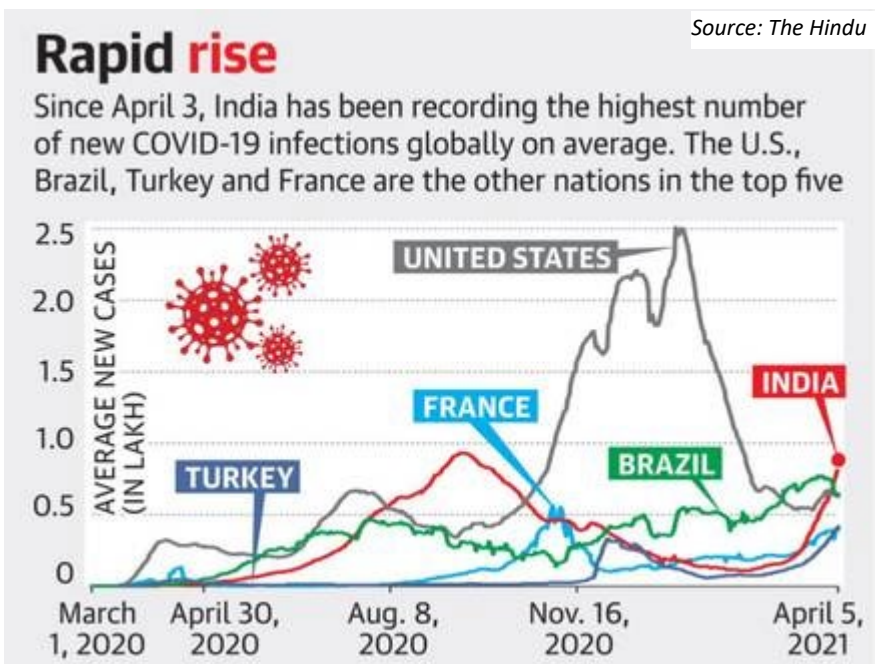
We wish to convey our sincere thanks to the AHPI state-level leadership for facilitating the knowledge and connections between member healthcare providers, leading to strong ties and shared resources in those difficult times. We are also grateful to the KPMG team for the high-quality resources they have put into this report to ensure the development of a useful and valuable product for the beneficiaries.

Dr. Girdhar J. Gyani
Director-General

Dr. Alexander Thomas
President

Preamble:

Starting January 2020, India and for that matter whole world witnessed one of the worst healthcare disasters in the form of COVID-19. It caused havoc as existing healthcare infrastructure including those in most developed nations could not cope up the sudden onslaught of unknown virus. We in India, have indeed undergone worst kind of experience in our lifetime during this period in general and April-2020 to July 2020 (Wave-1) and again from October 2020 to March 2021 (Wave-2). While Wave-1 took heavy toll on human lives in western world, India could minimize losses largely due to long term lockdown and utilizing the lockdown period in up-grading health infrastructure to extent possible. However, Wave-2 took everyone including, government, hospitals and civil society by surprise in every respect to the extent that even the experience gained from Wave-1 was not enough to deal with Wave-2. This happened largely due to complacency in public and more importantly due to mutations and emergence of more contagious variant of virus. While infection has largely been in control in most parts of country, the situation is far from being safe and there is every probability of future wave striking in near future in our country. In fact, some of western countries are already in the grip of future wave. It is in this respect that there is need to compile the learning from Wave-2 and attempt to identify how nation could prepare for probable future wave.



COVID – 19 Mutants that Could Lead to Outbreak of Future Waves (Delta and Mu)

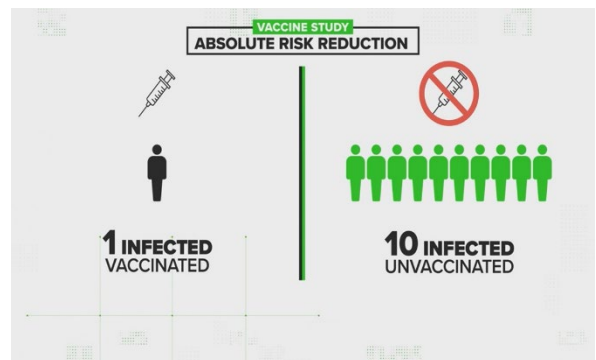
- Future waves of coronavirus may occur either because of mutations in the killer virus or due to the available pool of susceptible population and is also dependent on various pharmaceutical and non-pharmaceutical interventions for the management of the COVID – 19 pandemics.
- According to the World Health Organization, the Delta variant of SARS-CoV-2 has shown higher transmissibility than other mutant variants of concern (VOCs) identified to date.
- First, a significant increase in new cases reversed what had been a steady decline since January 2021. In the days leading up to our guidance update. Centers for Disease Control and Prevention

(CDC) saw a rapid and alarming rise in the COVID-19 case and hospitalization rates around the country.

- In late June, the 7-day moving average of reported cases was around 12,000. On July 27, the 7-day moving average of cases reached over 60,000. This case rate looked more like the rate of cases we had seen before the vaccine was widely available.
- **Second, new data began to emerge that the Delta variant was more infectious and was leading to increased transmissibility when compared with other variants, even in some vaccinated individuals.** Delta is currently the predominant variant of the virus in the United States. Below is a high-level summary of what CDC scientists have recently learned about the Delta variant.
- The Delta variant causes more infections and spreads faster than early forms of SARS-CoV-2, the virus that causes COVID-19.
- Some critical features of the Delta variant are mentioned below.

1. **The Delta variant is more contagious:** The Delta variant is highly contagious, more than 2x as contagious as previous variants.
2. **Some data suggest the Delta variant might cause more severe illness than previous variants** in unvaccinated people. In two different studies from Canada and Scotland, patients infected with the Delta variant were more likely to be hospitalized than patients infected with Alpha or the original virus that causes COVID-19. Even so, the vast majority of hospitalization and death caused by COVID-19 are in unvaccinated people.

3. **Unvaccinated people remain the greatest concern:** The greatest risk of transmission is among unvaccinated people who are much more likely to get infected, and therefore transmit the virus. Fully vaccinated people get COVID-19 (known as breakthrough infections) less often than unvaccinated people. People infected with the Delta variant, including fully vaccinated people with symptomatic breakthrough infections, can transmit the virus to others. CDC is continuing to assess data on whether fully vaccinated people with asymptomatic breakthrough infections can transmit the virus.

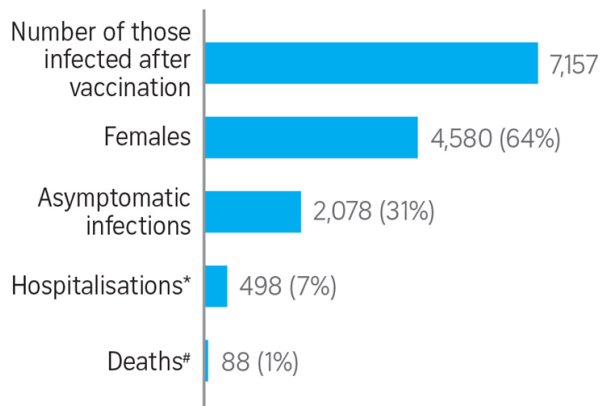


4. **Fully vaccinated people with Delta variant breakthrough infections can spread the virus** to others. However, vaccinated people appear to spread the virus for a shorter time: For prior variants, lower amounts of viral genetic material were found in samples taken from fully vaccinated people who had breakthrough infections than from unvaccinated people with COVID-19. For people infected with the Delta variant, similar amounts of viral genetic material have been found among both unvaccinated and fully vaccinated people. However, like prior variants, the amount of viral genetic material may go down faster in fully vaccinated

people when compared to unvaccinated people. This means fully vaccinated people will likely spread the virus for less time than unvaccinated people.

Number of people diagnosed with Covid-19 after vaccination in the US

More than 87 million people in the United States have been fully vaccinated.



NOTES:

- *167 (34%) of the 498 hospitalisations were reported as asymptomatic or not related to Covid-19.
- #11 (13%) of the 88 fatal cases were reported as asymptomatic or not related to Covid-19.
- The US Centres for Disease Control and Prevention (CDC) says the numbers are an undercount as reports are voluntary. There will also be unreported asymptomatic cases.
- Numbers as at April 20.

Source: US CDC STRAITS TIMES GRAPHICS

reported in the UK, Europe, the US and Hong Kong. While the variant makes up less than 0.1% of COVID infections globally, it may be gaining ground in Colombia and Ecuador where it accounts for 39% and 13% of COVID cases respectively.

- At least 32 cases of the Mu variant have been detected in the UK, where the pattern of infections suggests it was brought in by travelers on multiple occasions. A report by Public Health England (PHE) in July said most were found in London and in people in their 20s. Some of those who tested positive for Mu had received one or two doses of COVID vaccine.

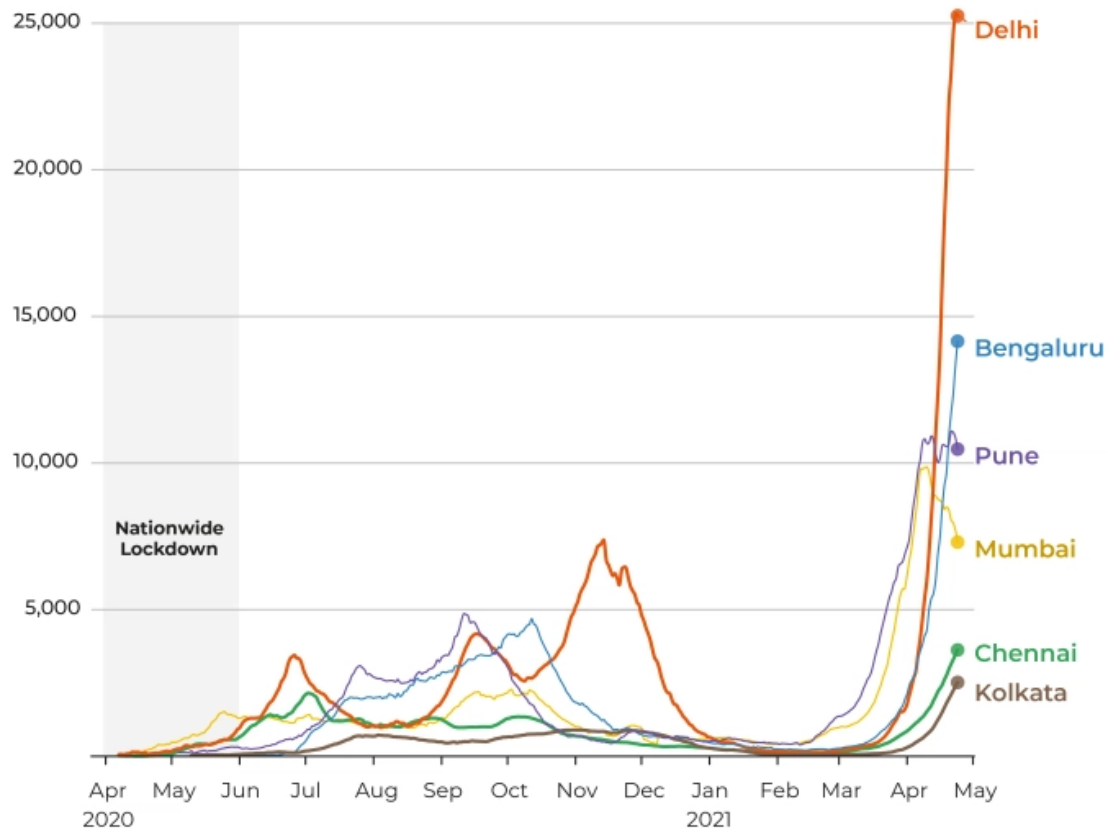
The Genesis of Future Waves

- As the cases began to increase rapidly, on April 22, India posted the highest number of COVID19 cases globally as it recorded 314,835 cases surpassing the daily record of the United States which had reported 297,430 cases in January. India recorded the highest number of COVID19 cases in a day when it posted 412,262 cases on May 6.

INDIA

COVID numbers in India's cities

Seven-day rolling average of daily cases from April 1-24, 2021.

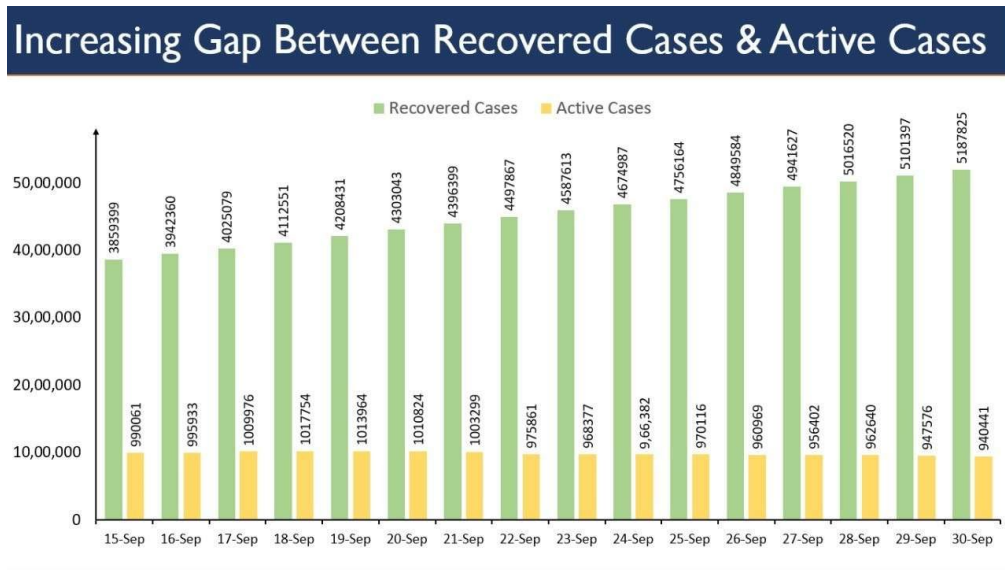


Note: District-level bulletins from Karnataka, Maharashtra, New Delhi, Tamil Nadu and West Bengal.

Source: State Health Bulletins, Reuters | April 24, 2021

- The Chief Ministers of Delhi and Maharashtra were amongst the first to admit that preparations were on in their states, to face a possible 'future wave' of coronavirus pandemic. Other states have also begun to plan for such an eventuality.
- The daily cases of COVID19 have begun to rise in some of the regions, almost a month after the second wave was deemed to be over.
- "The probability of a future wave is very much there," said Satish Kumar Gadi, a senior physician, who has been a doctor in the Indian Army and served as Chief Medical Director at the Indian Railways before retiring. "But it is a saying that 'forewarned is forearmed'. Delhi itself will have to be prepared for 36,000 to 37,000 clinical admissions per day. The government will have to listen to the experts," he added.

- Recently, Soumya Swaminathan, chief scientist at the World Health Organization, was quoted as saying that India should strengthen its surveillance and closely monitor key COVID-19 indicators to reduce the extent of a possible future wave.



Source: DNA India

- He also said that genomic surveillance, research and analysis of available data from the first and second wave, and data on sero-surveillance will be crucial to deal with future waves.

There remains very little information on what India's future wave of COVID-19 could be like.

Are Children the Most Vulnerable Group for Future Waves?

- There is no clarity on whether children are at a higher risk in the future wave of the pandemic.
- Last month, the National Commission for Protection of Child Rights (NCPCR) urged the Union Health Ministry and states to take cognizance of the preparations to tackle probable future waves of COVID-19 — which experts say is likely to impact the younger population significantly.
- “In a way we are trying to predict the unpredictable because we have barely understood the virus,” said Dr SP Kalantri, professor of medicine and medical superintendent at the Mahatma Gandhi Institute of Medical Sciences, Sevagram, Maharashtra.
- “The virus does not believe in these mathematical steps,” said Kalantri, dismissing the assumption that children would be the only vulnerable group left if the future wave strikes. “The virus is like someone who is deeply drunk, it does not know where his next step is, and we are trying to predict this next step.”
- A lot of it also depends on how much population immunity exists, that is the number of vaccinated adults who could protect children, said Jacob John, professor of community medicine at Christian Medical College, Vellore.

- “There is no reason to believe that children are more likely to get affected,” he said. “The only other thing I can think of is that adults will get vaccinated and as they get vaccinated there will be fewer adults who will get infected.”
- But Kalantri was skeptical of this possibility because of the pace of vaccination in the country, considering that as of June 13, only 25.3 crore doses have been administered in the country of a billion plus people, with only 4.8 crore being second doses.

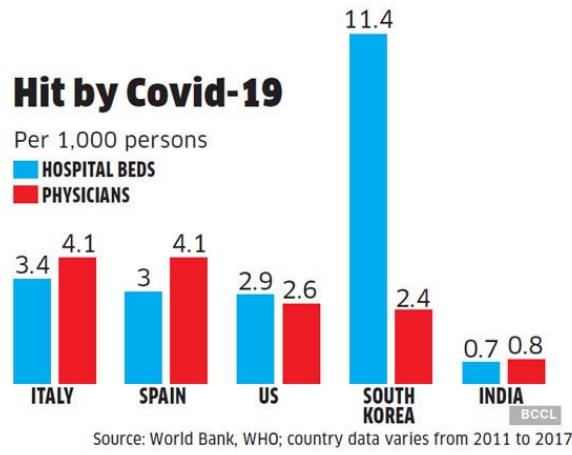
The Danger of Denial

- The Union Health Ministry has said that they had taken lessons from the second wave of COVID-19 and multiple steps have been taken in the past few months.
- Union Health Minister Mansukh Mandaviya in a written reply said that the COVID-19 vaccination protects from a severe manifestation of the infection and improves herd immunity and is accordingly likely to mitigate the impact coronavirus may have with any future resurgence.
- COVID vaccines currently being utilized for immunization offer substantial protection against the infection, besides reducing the severity of the disease, hospitalization and deaths, he said.
- On warnings by health experts and authorities about a probable advent of a future wave of the coronavirus in the form of its Delta variant, which is likely to affect children, Mandaviya clarified there was no scientific evidence either in India or globally to show that children get disproportionately infected with COVID-19, including its Delta variant.

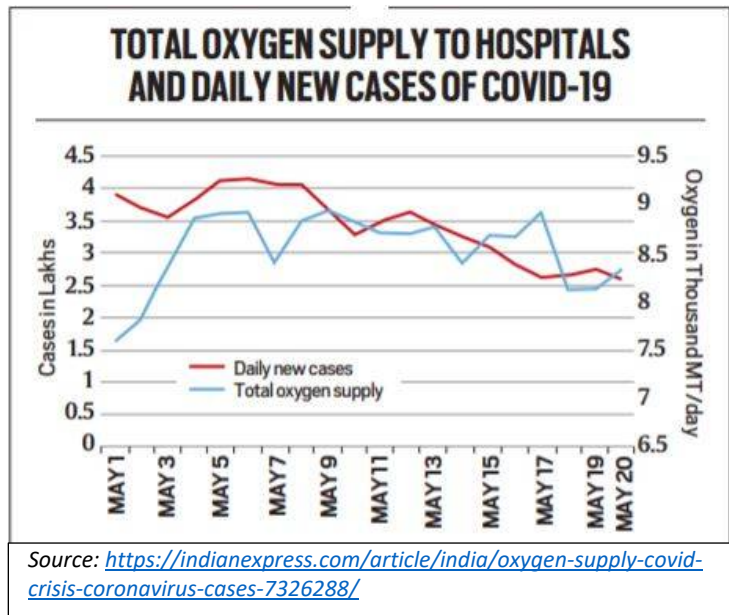
Significant Risk Parameters that Influence the Outbreak of Future Waves

- The document is prepared based on inputs from member hospitals across the country through 19-regional chapters of AHPI network. The emphasis is on taking short term measures to mitigate any possible impact of future wave. The action plan has been covered under 11 headings as appended below.
 1. **Health Infrastructure:** This obviously is the key component. Health infrastructure is insufficient is known. WHO suggests 3.5 beds per 1000 population for developing and 5.0 for developed nations? During pandemics there is no yard stick but as a rough guess we should have provision to rack up through makeshift structure to have 7.5 beds more so in worst affected areas. Similarly, we need to assess how many beds need to be with oxygen, ICU, ventilator etc. India presently has roughly average of 1.5 beds per 1000 population. But then there are regions with less than 0.5 beds per 1000. We need to assess existing health infrastructure at district level to be the least and possibly going down to gram panchayat level. This will help us in augmenting number of additional beds through short term measures. While we were able to raise number of makeshift beds in hospitals and even outside hospitals like, hotels, institutes, religious places etc. during Wave-1 and Wave-2, we did not have manpower commensurate with the number of beds. Government hospitals were found to be lacking in this regard more so at CHC and PHC level. Here again assessment has

to be guided by WHO requirement which says 1-doctor and 2.5 nurses per 1000 population. We need to realize this figure to the extent possible. For example, government may grant ad-hoc approval to foreign trained doctors, who have not yet formally qualified by the NBE to practice in India. We may prepare district wise requirement and identify number of interns and residents who could be put on COVID duties at short notice. Same applies for final year MBBS and Nursing College students. Nurses are going to be key resource and therefore special focus needs to be on training the final year nursing students to prepare them for COVID duties in wards. Government has already announced to train 1-lakh front line allied healthcare warriors through 4-month training. This needs to be pursued with utmost priority. We need to focus on availability of critical care doctors, nurses and allied healthcare workforce. We may focus on training at least 60-70% of existing nurses for ICU care so they can be rotated between COVID and non-COVID areas and prevent fatigue and stress of working continuously in COVID ICUs. This training should focus on picking up warning signs, oxygen therapy, central line care and other ICU focused training.



- Critical Supplies:** Here we need to spell out supplies like, medicines, consumables, oxygen, medical equipment/ devices. We need to figure out supply chain and logistics/ transportation again taking district as unit. The gaps especially on Oxygen, needs be addressed in advance. All oxygen cylinder filling stations need to work round the clock for better turn around even with limited number of cylinders. We need to incentivize big and medium size hospitals to have their oxygen generating plants through subsidy. We need to talk to manufacturers to ensure stock and timely supply at district level. Medical oxygen units should be strengthened, and timely supply should be ensured- 100%. Patient dying for want of oxygen supply is the worst thing to happen.



3. **Treatment Protocols:** This was one of the weakest areas as we kept on revising protocols, too frequently. While there can be reasons due to dynamic behaviour of virus, but there should be one designated agency as we kept getting protocols from ICMR, AIIMS and DGHS. More importantly there was no mechanism to propagate among various hospitals, nursing homes, clinics in general and those in remote locations in particular. This resulted in unnecessary use of anti-biotic, overuse of steroids etc. leading to unwarranted complications. Established institutional guidelines can be used as reference as long as they stick to current evidence. It is important to highlight, what not to give- like NO to antibiotics, ivermectin, oral steroids for early illness etc. To reach out to the doctors in remote areas, zoom meetings be arranged and communicate to them. This can be at regular intervals to address their queries. A core group of doctors be formed at Central level who can keep on updating these guidelines.
4. **Need for Uniformity in Regulation:** During pandemic we have disaster management ACT in place. Governments needs to have constant dialogue with private sector and establish complete synergy between private and public sector health establishments. Most of the time, governments kept on issuing regulations without consulting private sector. It demotivated private sector. Different state governments kept on fixing the treatment costs, which were vastly different and in most cases were illogical. Too much of documentation, by different state agencies and data filling demanded resulted in less focus on timely and efficient patient management. Training and rotating of doctors will help as everyone will feel participating and will alleviate fear and will not drain the core team.
5. **Public/ Private Partnership:** Pandemic saw fatalities among healthcare workers including doctors and nursing staff. There is need to establish management protocols by which there is perfect teamwork and motivation among healthcare professionals. This to a large extent will minimize fear and provide better care to patients. Use of tele-consultation and home-based care need to be promoted. Telehealth is the way forward in COVID times and cheaper for patients as well. Home tests and treatment can be offered for mild cases. Tele-triage be used for emergency calls. Ideally, we must have COVID WAR-ROOMS at Central level under the chairmanship of central Health Minister, State level War room headed by respective state health minister and one at district level under the district magistrate. The war rooms should have adequate representation from experts drawn from public and private sector hospitals. There needs to be collaboration between government and private hospitals including NGO operated COVID CARE centers through district level war rooms so as to have optimum use of resources including drugs, oxygen and manpower with NGOs and Government to provide step down facilities for milder cases.

6. **Safety of Healthcare Workforce:** Due to shortage of beds, the patients and family were driven to undergo stress, which at time resulted in vandalism and violence against healthcare workforce.



We need to come out with clear guidelines by which there is awareness among patients and families and at the same time, clear statutory provision for punishment to those who resort to violence. The PR is key function during such a difficult time, and which can minimize the chances of violence. Occupational health & safety of healthcare professionals should be given highest priority, and which will enable staff to put in their best efforts on patient care.

7. **Policy Issues:** During COVID Wave-1, it was unknown invasion but still we had effective ways in communicating right from top leadership to medical leadership. During COVID Wave-2, there was lack of communication. DGHS and NCDC were not assigned clear roles, which should have been in the forefront. We need to suggest structure for monitoring and control in pandemics including setting up of central, state and district level War Rooms.

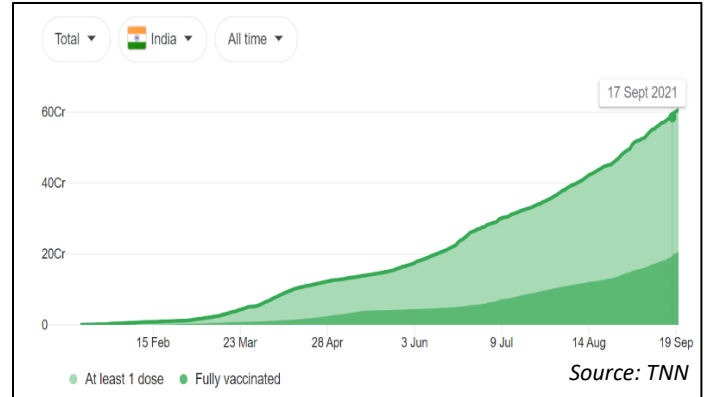
8. **Vaccination:** Considering that there is no effective cure in terms of any medication, vaccination remains our best defense against COVID in general and mitigating likely future waves.

There is hesitancy among population. We need to keep pushing ahead with vaccination, in terms of approving more vaccines, lining up supplies, and enhancing delivery capacity — with the immediate target of at least 60% of the entire eligible population to be fully vaccinated as soon as possible. Since the January 16, 2021 roll-out of vaccines, in the last nine months, as of September 15, 2021 only 20% of adult Indians are fully vaccinated, while 62 per cent have received at least one dose. It may take many more months before we have 60% of the population fully vaccinated, to avert the risk of a future wave. Once India approves vaccines for those

State/UT	% Of 18+ Population Covered	
	Both Shots	At least one shot
India	21.7	64
Himachal Pradesh	40	100
Kerala	36.7	89
Gujarat	34	81.5
Uttarakhand	33.6	89.5
Delhi	31.8	74.2
Jammu & Kashmir	30.3	76.2
Andhra Pradesh	29.8	64.2
Karnataka	29.7	76.4
NE minus Assam	28.7	64.7
Rajasthan	27.6	76.2
Haryana	26.6	74.4
Maharashtra	22.5	57.6
Madhya Pradesh	22.4	81.8
Odisha	21.9	62.5
Telangana	21.6	56.4
Chhattisgarh	21	60.8
West Bengal	20.2	49.5
Assam	19.2	73.4
Punjab	19.1	58.8
Tamil Nadu	15.1	56.6
Jharkhand	13.9	50.2
Bihar	12.6	55.4
Uttar Pradesh	11.3	52.6

Source: Health ministry for vaccination, Census projections for population. As of 7 am on Sep 12

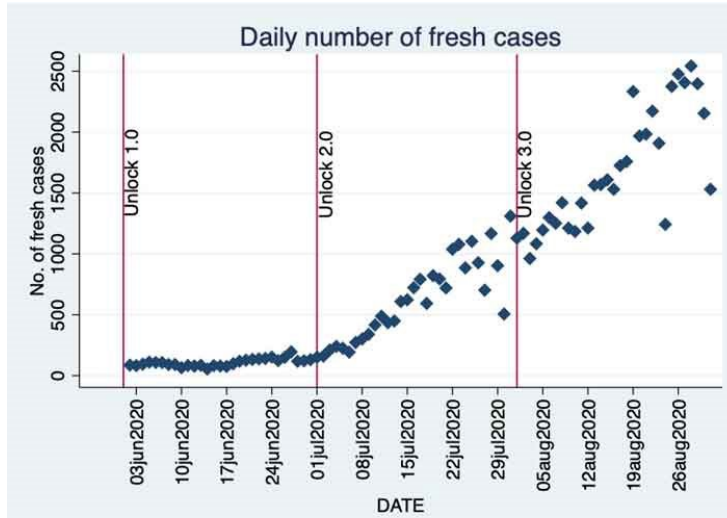
under the age of 18 years, the new target will be covering 40% of the entire population. Several countries have already done this. Israel has covered 62% of its entire population, the US, 51%, and Canada and the UK, 58%. An honest effort to increase this number is required — not empty statements about administering 10 million vaccines a day from July or



August (an unrealistic target given the supply situation). We need to come out with national conclave and reach out to population at large. Small clinics and nursing home being close to communities, can play an effective role. Promotional activities by social figures will help. At the same time, besides increasing the domestic production, we must try to get foreign vaccine. We may prioritize development of vaccine for 12-18 age group on priority.

- 9. Communication & Campaign:** This is key area by which there is constant dialogue with population at large. District level medical leadership needs to be set up which was completely missing. We need to define how communication channels need to be set up to keep population informed and minimize confusion and panic. Role of print and social media could be crucial. Communication needs to be precise with statistics of benefit and also outcomes of not getting vaccination or testing and getting treatment at right time. There is need to form large tele-consult or even group tele-consult to address large number of patients who tested positive to communicate on what, when and where to approach for medical help. Hospitals likewise need to establish communication channels to connect with family of patients so that there is no surprise in case of adverse outcomes. For example, everyday morning family is informed about the status and in case of ICU patients it could be twice a day.
- 10. Surveillance and Diagnosis:** We need to ensure that there is a system of population surveillance to capture data and ensure we can trigger local responses. Data collection must be simplified and coordinated to prevent multiple requests for data submission. There must be infection control committees and COVID task force at the Centre, State, District and every hospital. People should have access to early diagnosis and therefore the diagnostic capacity must be increased with 24/7 reporting. Communication of results to the patient and hospital must be improved. Surveillance needs to be enhanced in terms of including the sequencing of enough viral genomes and identifying potential threats from new variants of concern (new variants of the virus that are potentially more infectious) and acting on this knowledge. For instance, the UK, which, earlier this week celebrated zero deaths from COVID-19 for the first time since last March, is seeing an average of 3,300 cases a day, with almost 75% of these being caused by B.1.617.2 or Delta, the Sars-CoV-2 variant that was first spotted in India — and there are signs that the country may not end its lockdown on June 21 as it was scheduled to do on account of this.

11. Ending Lockdowns: Deciding when and where to ease lockdowns and restrictions on movement and activities that now cover most parts of the country. Some states and Union



How the pandemic evolved in Kerala over the 'unlock' phases

territories have already started the process; others have announced plans and deadlines for doing so; but none of these is based on the one parameter that matters. This is simply the proportion of the eligible population in a district that has been vaccinated. Ideally, this parameter should be read in consonance with the positivity rate. Some states and UTs are looking at the latter, but none appears to be basing its decision

on the former. Given that the Union government no longer wants to be associated with lockdowns — the economic pain caused by the 68-day hard lockdown last year is still fresh in everyone’s memories — it is unlikely that either the health ministry, or the Indian Council of Medical Research, or any of the empowered groups dealing with the pandemic, will prescribe guidelines for this. Therefore, it is up to the states. There is a need to link the stringency of non-pharmaceutical interventions in place in a district to the proportion of the population that has been fully vaccinated. More than anything else, this will give states the framework to decide when they can open up for certain activities. For instance at 60% fully vaccinated, most activities, such as malls, multiplexes, gyms as well as physical schooling, can be allowed, with masking and social distancing. It may still not make sense to allow large religious, cultural, or social events (including weddings). As a corollary, states should also decide which activities they will curtail in case of a flare-up in infections.

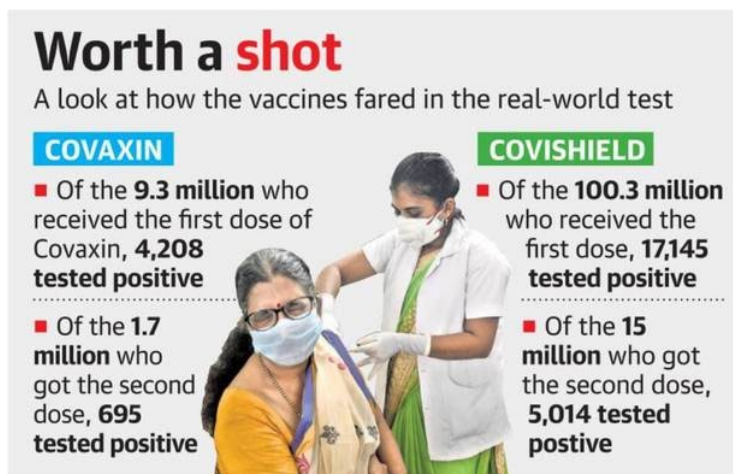
What Should India Do To Prevent any Future Waves of COVID-19?

- Drawing from the learnings of the first two waves, there are several measures through which any future wave can be countered
- The World Health Organisation recently warned nations about the early stages of future waves of COVID-19 amid the surge and spread of the delta variants. As the virus is continuously mutating into more transmissible variants, the future wave is already hitting several European and Southeast Asian countries and seems imminent in India.
- Based on different mathematical models, the current predictions by various Indian researchers and leading medical bodies indicate that a future wave can be expected to strike India in the coming months.

- According to a sero-survey conducted by the Indian Council of Medical Research (ICMR) in June and July across 70 districts of 21 States, SARS-CoV-2 antibodies have been found in two-thirds of Indians above the age of six, thereby suggesting that 40 crore people or one-third of the country's population is still vulnerable to the novel coronavirus.
- Drawing from the learnings of the first two waves, health experts have suggested several measures to counter any future wave. These include:

1. **COVID War Rooms** to be established at 3-levels; Central COVID War Room under the chairmanship of Union Health Minister and including members among; Member NITI AYO, Union Health Secretary, DG-ICMR, Director National Centre for Disease Control, DGHS etc. War Rooms on similar lines are to be set up at state level and at District level. These WAR Rooms also need to ensure specifying uniform treatment protocols, i.e., one nation-one SOP.
2. **Planning for material resources** in terms of hospital beds including critical care beds to be assessed at district level. Similarly, resources like oxygen supply, medicines and other consumables need to be made for each district. In case of serious gaps, the deficient districts are to be linked with more resourceful districts for networking and sharing of resources.
3. **Makeshift COVID Care Centers** can be established at each GRAM PANCHAYATS with 6-10 beds with oxygen concentrators. These centers can have trained emergency care technicians or nurse and be connected through Tele Health with nearest private or public hospital. Human resource likewise is most important. Each district level War Room must carefully assess the requirement in terms of doctors, nurses and allied healthcare workforce and supplement with the measures outlined.

4. **Vaccination needs High Priority**, and this includes overcoming hesitancy among community in general and more so in smaller towns and rural regions. This can best be done through ASHA, ANGANWADI workers, people representatives etc. This will also have impact on economy which has impacted population at large. Vaccination provides significant protection against severe



Source: The Hindu

diseases and hospitalizations. Breakthrough infections can occur but are likely to be mild in most instances. New data emerging on vaccines suggest that vaccination against COVID provides three times stronger immune response than when recovering from an infection, and this response is seven times higher in the younger age group. Indeed, a future wave could be significantly blunted or delayed, by scaling up the vaccination drive. Right from the onset of the pandemic, we had an effective, readily available but grossly under-utilized tool—**The**

Social Vaccine. Effective implementation of the social vaccine requires giving out authentic information, educating the entire population, involving all stakeholders and communicating through all available platforms. We literally need to go on a publicity blitzkrieg and convey the message, 'Adopt COVID-appropriate behaviour'. Additional messages on vaccine safety and efficacy should be included. This exercise is best done in each panchayat and ward nationwide. If we deploy the hitherto under-utilized social vaccine effectively now, we can hope to mitigate the impact of more infectious, vaccine-resistant viral variants in a future wave. Also, alternative strategies to protect the vulnerable population are being considered. For example, the Centers for Disease Control (CDC) in the US is considering whether fully vaccinated people with weakened immune systems need a booster dose of the COVID vaccine. Such studies should be conducted in India too.

5. **Sustained Surveillance and Sharing of Data to Guide Future Interventions** that includes systematic testing, collection, compilation, and analysis of clinical, epidemiological, and laboratory data hold the key to decision-making. In this context, as indicated by the WHO Chief Scientist, Sowmya Swaminathan, India needs to strengthen its surveillance and closely monitor key COVID indicators to reduce the impact of a possible future wave. Stringent genomic surveillance and monitoring of viral epidemiology and genetic diversity can help explain the evolving nature of the pandemic and help the authorities in making more informed decisions. Overall, this will enable us to design more effective healthcare strategies to better protect those at greater risk and also formulate region-specific strategies to curb the spread and severity of the virus.
6. **Focus on Post-COVID Care Rehabilitation** as many patients who have recovered from an active COVID infection are experiencing long-term residual effects of the disease both physically and mentally. The current setup does not offer any specific guidance to these individuals. There is a dire need to establish post-COVID care clinics and services to address these requirements comprehensively.
7. **Focus on the Susceptible Population, Including Children**, as the susceptible population including children need to be protected. Many countries, including India, now have a clear-cut protocol for COVID management in children.
8. **Continue to Bring in New Treatments** through global research that is working to create new prophylactic and therapeutic interventions to combat COVID. Among the newer treatments available in India monoclonal antibodies have high efficacy in mitigating the progression of the disease, reduce the risk of hospitalization or death by 70 per cent in international studies and thereby potentially reduce the overall burden on the healthcare system.
9. **COVID Appropriate Behaviour Must Continue** through mandatory use of masks, social distancing, restrictions on mass gatherings, localized mini lockdowns, and micro containments, must be implemented which can keep the number of cases under control, despite large-scale restrictions being lifted in most States. We should avoid crowds at all costs, especially as the Delta variant can be airborne in enclosed spaces. The number of

people inside enclosed spaces should be strictly restricted; open-air markets should be encouraged along with everyone wearing a mask and maintaining a physical distance of at least an arm's length. Public gatherings in enclosed spaces and public transport should only be allowed with adequate cross-ventilation, with air-conditioners switched off and everyone wearing a double mask. Mandatory requirement of vaccination and COVID-appropriate behaviour for entry into enclosed public facilities—transport, shopping areas, malls, meetings and places of worship—will surely curtail spread of coronavirus infection and prevent the spread of a possible future wave.

Conclusion:

- The question now before us is not whether there will be any future wave in India, but whether we have plans in place to prevent one and control it with minimum impact if at all it comes. Three key factors can determine the propensity of next wave — the nature of the virus, the extent of vaccination and people's behaviour. Thus, the priorities for union and state governments in the coming months are distinctly evident.
 1. Extreme focus on reaching target of at least 60% fully vaccinated adult population
 2. Effective use of legislation and education through print, electronic and social media for promoting self-hygiene, social distancing and wearing of masks
 3. Very careful consideration of multiple factors for creating universal protocols for the entire nation with regards to ease of lockdown and opening of public places.
- The recent bold step by Arunachal Pradesh to permit entry only to vaccinated people can be emulated by other states to protect their population.
- Bridging studies on vaccination in children should be quickly completed, analyzed and, once safety is assured, universal COVID inoculation for children adopted. Prioritized vaccination of disadvantaged rural school children, for whom access to online education is impossible, will enable their early return to schools, access to midday meals, education and school-health programs, all vital for their well-being.
- Systematic ongoing studies to identify new mutational variants is mandatory, with a special focus on any region showing a rapid increase in epidemic momentum.
- If we do all this, with will and wisdom, and only if we do all this **as a nation**, we can be confident and avert even the remote probability of any future wave.

AHPI Contact

Dr. Girdhar J. Gyani Director General Association of
Healthcare Providers (India)

T: +91 98107 30040

E: gyani@ahpi.in

ahpi.in



Knowledge Partner

