What India needs to do to eliminate Covid— A case for a sub-national Zero Covid Strategy

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India showed great success in reducing the numbers of Covid-19 with the early days of February showing an average number of new cases of about 11,000/day. However, the advent of March has seen a significant increase with 11th March recording 23,285 cases, more than double that of February's lowest days. The increase though having coincided with opening of restrictions is still a cause for worry. The good part though is that a majority of cases (around 86%) are restricted to few geographies only requiring implementation of a **sub-national Zero Covid Strategy**. Implementing it swiftly with strict discipline and resolve and active and sustained participation of the key stakeholders like business and industry will be important.

I. BACKGROUND

Vaccinations are often an excellent tool to prevent infection or the consequences associated with infections and it is expected that this will be true for Covid-19, despite limited experience. However, when cases are high, vaccination should not be relied upon as the only control measure. With India recording 23,285 cases in a single day on 11/03/2021, the highest ever surge in 2021, caution will need to be exercised when promoting vaccination as *the strategy* to mitigate the impact of covid-19. [1] It can be one of the many tools but *not the single tool, not for now, and not for a long time to come.* The reasons are many but the most important ones will be 1) the disease is evolving by mutations that in certain cases have already been shown to weaken the effect of vaccine acquired immunity 2) large parts of the world don't run vaccination programs for similar infections including influenza for example 3) the vaccines are in short supply and will remain so because of the worldwide scramble for vaccine supply 4) the vaccines currently available have not proven to be of use in children, and most importantly 5) to protect a large part of the world from this infection through vaccination, the largest possible vaccination cohort ever will be required; which is impossible to be reached in the near future.

So, what do nations like India need to be doing? This paper attempts to identify a set of interventions that can take us to the end of Covid-19 as we continue to see towns, cities, provinces, and countries eliminating coronavirus through the Zero Covid strategy, even without the completion of mass vaccination campaigns. With almost 86% of all new cases in recent days coming from a few states of Maharashtra, Kerala, Punjab, Karnataka, Gujrat and Tamil Nadu only, it is time to move for a **sub-national Zero Covid Strategy**. Eight of the 10 worst-hit districts are in Maharashtra state only, asking for a swift and decisive action. [1]

II. INTRODUCTION

Covid-19 continues to not just dominate the public health care landscape of the world but also continues to bring in its wake societal disruption and economic instability. The goal for all those working in reducing the impact of this pandemic is to return to normal social and economic activities safely. These include, and are not just limited to, gatherings with family and friends and opening of schools, restaurants, bars, theater, sports events and business activities without special precautions. Travel restrictions, isolation facilities, financial and other support for vulnerable individuals, and short and strict lockdowns have been seen to be an indispensable element of this approach.

India may have been successful in reducing the numbers but the numbers have shown a continuous increase recently. Although numbers are largely restricted to a few geographies, it may not be far from the time when it again starts spreading to other regions if swift action is not initiated. Therefore, it is time to go back to what has been done successfully. Since most of the cases are restricted to certain geographies, the mitigation strategy also has to be limited to these through a Zero Covid strategy. The Zero Covid strategy is being piloted in Europe and has already virtually eliminated the virus in Australia, New Zealand, Vietnam, Thailand, Singapore, China, Taiwan, Mongolia, and the Atlantic provinces of Canada. [2] The Zero Covid strategy is the optimal approach to containing coronavirus, as well as maintaining social/economic activities.

III. THE ROADMAP FOR ZERO COVID STRATEGY

This roadmap lays out Six steps that India can take to eliminate COVID-19 in 5-6 weeks:

1. **Define action zones.**

2. **Implement Zero Covid awareness campaign.**

3. **Strategize active case finding (ACF).**

4. **Identify facilities for managed isolation and quarantine.**

5. **Virus monitors.**

6. **Reopen through Green Zone strategy.**

The Zero Covid strategy does not necessarily need to look at upfront investments even if needed once but to leverage and strengthen the existing strengths of national/subnational regions through some investment or reallocation of investment, strategically. The magnitude of investment will always cost less than the alternative: several months more of yoyo-ing between lockdown and partial reopening, accompanied by the death, sickness, and permanent disability of a significant percentage of the population. Travel restrictions are an essential aspect of the Zero Covid strategy because they allow countries to preserve the benefits achieved by lockdowns.

Even if a six-week lockdown eliminates coronavirus transmission, the absence of quarantine requirements for incoming travelers means cases will be imported from neighboring regions, and these cases will grow exponentially in the absence of ongoing restrictive measures. We have seen this dynamic play out in every country of Europe and every U.S. state. [2] In contrast, strictly enforced travel restrictions have allowed life to safely return to normal following lockdowns in many countries, including places outside the Asia-Pacific, such as the Atlantic Canadian provinces. [2]

The optimal way to implement a zero Covid strategy is through a sound relationship between community and leadership at all levels. Recognizing that not all countries or regions would adopt a Zero Covid strategy at this time, we propose a bottom-up approach led by communities themselves. A community voluntarily submitting to the steps of Zero Covid strategy can be highly effective in the absence of state-run guidelines/regulations.

Step 1: Define action zones

The first step is sub national in operation and though the responsibility of initiating this step will largely remain with the Governments, the implementation will require involvement of all stakeholders. An action zone will be an area where the local population, government, and business community have decided to pursue the Zero Covid strategy. An action Zone will need to be defined on the basis of number of cases being reported in past two weeks. One case per 100000 individuals (living in the geographical domains of the action zone) starting at the beginning of this two-week period with a similar or rising trend in reporting cases should be considered an action zone (A more precise definition in terms of community transmission that incorporates the effectiveness of contact tracing is provided elsewhere [3]). For action in these zones the governments are expected to implement strict

lockdowns for 5-6 weeks to eliminate coronavirus transmission and require incoming travelers to isolate for 14 days to prevent the importation of new cases. The local population and business community will act as facilitators in this process. The following should be considered in implementing:

Don't wait for national lockdowns and exercise a bottom up and not top-down approach: In order to succeed, the Zero Covid strategy does not have to be pursued simultaneously by neighboring states, or even within the same states. Even if the national/state Governments are averse to lockdown at national/state level, sub national/district/sub-district lockdown must be exercised as an option. The Government of India after its announcement of first national lockdown allowed states to take their own decisions on restriction of activities and travel within states. Even at the state level, every district magistrate has been empowered to restrict activity or travel using powers vested in them through the National Disaster Management Act effectively making every district an independent administrative entity for Covid-19. [4]

Design zones to minimize disruption: Zones should be designed in such a way that inhabitants will experience the least possible disruption due to the imposition of travel-related isolation requirements. A zone should be a district that is naturally or artificially separated from its neighboring districts. It should only have controllable traffic links with neighboring zones. If two geographic regions have a shared border that cannot be effectively controlled, they should be considered as one zone.

In context of India where inter district travel is largely limited to through roads, the zoning is a feasible option. Across India, in most of the cases, each district effectively serves as a distinct travel zone with entry to each district generally marked through border entries.

Travel permits: A permit system should be used for necessary exceptions such as essential workers and freight drivers that cross zones on a daily or otherwise regular basis. Guidelines should be made for those workers that identify best practices for avoiding transmission and identify risk factors at work or home for mitigation in collaboration with employers. The Government of India and its state governments used this strategy very effectively. A concept of E-pass was developed to facilitate essential travel across states with application for E-pass requiring fundamental information including reason for travel to be included. Action Zones need to resort back to the concept of E-passes. While 100% compliance to travel restrictions would be ideal, restricting access by 90% or 95% of travelers would drastically reduce the rate of infection and allow robust testing and contact tracing to handle the small number of remaining cases.

Five Week Lockdown: Implement Strongest Possible Restrictive, Protective, and Supportive Measures: Authorities should impose a strict lockdown to eliminate coronavirus transmission in action zones. If sufficiently strong, the lockdown should only last 5-6

weeks. However, measures should be kept in place until transmission has been eliminated. Transmission should be stopped using every available tool to prevent the spread of coronavirus. If a measure is low cost, low risk, and has a reasonable likelihood of being successful, it should be deployed.

Restrictive Measures (Lockdown): If lockdowns are sufficiently strict, they can eliminate transmission within five weeks. The following is a non-exhaustive list of restrictive measures that should be imposed:

- Impose movement restrictions. Individuals in urban areas should be restricted from traveling more than two kilometers from home. Most of the villages are self-contained units, so the villagers can be restricted to the village boundaries.

- Close schools: Schools are drivers of transmission. The role of children in spreading coronavirus has been underappreciated due to undertesting of children. The UK variant may be more transmissible among children than traditional variants. The state Governments (like Punjab for example) need to play a pro-active role on this. [1]

- Require work from home when possible: Authorities should ensure businesses comply with "work from home requirements".

- Ban all non-essential indoor activities. This includes restaurants, bars, gyms, and other facilities.

- Require curbside pickup or delivery whenever possible. Authorities should ensure that stores minimize indoor foot traffic. Curbside pickup or delivery should be required where feasible.

Supportive Measures:

- Ensure financial support to those undergoing quarantine. Many people choose not to quarantine because they cannot afford to miss work. The desire to not cause economic hardship to friends and family is a reason why many individuals do not cooperate with contact tracers. It is essential that authorities ensure a positive COVID-19 test isolation and quarantine of close contacts will not impose a financial burden on individuals. Support includes employment assurance, mental health and other support by the community, businesses and government. Regular check-ins with individuals and families by the community makes both rapid case identification and other forms of support possible.

- The action zones should continue the online education mode leveraging the availability of existing infrastructure like television and internet. The national broadcaster, Doordarshan, can play an important role in this by continuing to beam educational programmes. It is important to recall that Doordarshan was originally started as Satellite Instructional Television Experiment and during its formative years, it was used for relaying school and adult education. [5]

- Ensure financial support to those affected by lockdown: With a Zero Covid strategy, lockdowns are strict and temporary. Authorities should invest in maximal financial support to affected residents to ensure compliance and support for lockdowns.

- Provide supported hotel-based isolation away from home for infected individuals and their contacts.

- Provide childcare for essential workers. Maximal precautions must be taken to minimize transmission among children and staff.

Protective Measures:

- Using regulatory framework for vaccination, vaccination of high-risk individuals should be rapid. Focus on disease severity (age and prior conditions) and essential employment needs (healthcare and other essential workers). Mass vaccination may help with transmission prevention and should be used as one of, not the only, tool to do so.

- Test massively; testing should be easily accessible and ideally free of charge or minimum charges for all residents. India has been able to increase its testing capacity by involving the private sector and regulating the price of each test. Testing should include symptom based, screening of high-risk individuals, mass testing, and other methods such as sewage testing.

- Require the use of premium masks outside the home. Individuals should be required to wear FFP2, KN95, or equivalent masks outside the home, when in close proximity to others. Authorities should provide these masks to those unable to purchase them. All shopping malls/multi-utility stores should install Mask Points in their stores to make them available to those entering without masks.

- Require all shared indoor spaces ensure proper ventilation (12 air exchanges per hour). This can be achieved through upgraded air ventilation systems, opening windows when weather permits, and installing HEPA air purifiers, including low-cost, home-made "Corsi Filters." Authorities should strictly monitor and enforce ventilation regulations, just as they enforce other building safety and health regulations.

Step 2: Implement Messaging Campaign to Build Support for Zero Covid

To prevent the spread of this disease, it is imperative for the people to take charge of the situation. For that

creation and update of awareness is the key. A Zero Covid messaging campaign should help individuals understand that elimination is possible within a matter of weeks, but it requires buy-in to an effort from the entire community. For India, the initiatives have to be incorporated through involvement of Community leaders. For example, the Panchayati Raj institutions (PRI) and the Urban Local bodies need to be involved in delivery of messages on zero Covid strategy through creation of Corona committees and Corona monitors.

Pandemic raises a shortage of manpower and resources in most communities and throughout the nations and India is no exception to this. The role of local community in overcoming this shortage cannot be overlooked. Beyond delivery of correct messaging this would prove useful in functions like the contact tracing and mask distribution. Emphasize that the lockdown will be temporary and, if enough people adhere to the Zero Covid strategy, life will return to normal within weeks, even before the completion of vaccination campaigns. Regions that implement Zero Covid will return to normal faster than places that don't, even if those places have higher rates of vaccination.

Bring in electronic, print and social media and enlist civil society and business to support Zero Covid: Encourage everyone to focus on what can they do to get to zero. This includes support and advocacy by community-based organizations (CBO), social networks, healthcare organizations, businesses, and government. The telephonic network works as well with for example India replacing the telephone caller tunes with Zero covid strategy initially and later on with messaging on Covid appropriate behaviors. [6] The messaging needs to shift to Zero Covid now. For this influencer and their voices can be used.

Transparency and updates in information: The delivery of information must be transparent and up to date. Experts should be involved in delivering these messages. Communication should follow a consistent format including information on current conditions, progress toward the goal of zero transmission, the expected trajectory, clarity about shared responsibility. A second part should include updates on or reiteration of guidelines and essential knowledge about how it will be possible to get there. It is important to provide information on the missing links in the epidemiology of the pandemic like for example provision of information about potential long-term effects for the health of adults and children. Authorities should publicize the stories of previously healthy adults and children to illustrate the real risk of COVID-19. The following need to be conveyed to everyone through all available means:

- Explain both airborne and surface transmission and how to protect against them. Explain that since we now know that coronavirus is airborne, and becoming more transmissible due to new variants, proper ventilation and use of premium masks is essential indoors at any distance or when in proximity to others outdoors. Explain that if individuals do have to meet with one another, they should do so outside with a mask and at a distance.

- Explain asymptomatic and pre-symptomatic transmission so people recognize that they don't know if they are sick and we must assume that anyone who is not isolating can be sick. Explain that isolating at home is high risk and that, to protect family and housemates, supported isolation and quarantines are needed. Care and services should be provided to help prevent them from getting sick or for their condition becoming worse if they are already sick.

- Explain the use of testing and its limitations so that tests are used to identify cases for isolation, but because of false negatives multiple tests may be needed to confirm someone is not infected. This is particularly important if there are symptoms or for close contacts.

- Provide guidelines for essential services both for workers and consumers. Provide industry specific guidelines as well as general information for the public on how to avoid transmission through encounters during essential services.

Step 3: Strategize active case finding (ACF).

COVID-19 is known for its 14-day incubation period and has the ability to transmit even by those who are asymptomatic, so individuals are infected by people who have not yet tested positive for COVID-19, and are thus unknown to contact tracers. In addition, door to door checks provide a safety net for those who live alone, lack access to support networks, have limited information about COVID-19, or have difficulties accessing treatment due to age or disability.

Set Up Door-to-Door Screening System:

- **Recruit/ deploy Personnel:** Authorities should recruit/deploy sufficient personnel (referred to as coordinators in the following) to conduct screening checks for all residents in the zone. The Himachal Pradesh state in India deployed Accredited Social Health Activist (ASHA) to conduct house to house survey around Active Case Finding (ACF) for Covid-19 using a structured questionnaire for screening. The ACF campaign began in April 2020 with 16,000 basic health personnel, ASHA, anganwadi workers and auxiliary nurse midwives (ANM). [7] Their job was to reach out to every single house and hamlet and collect basic data on the travel history and health indicators of every family member and upload it online through Google Forms made available on their smart phones. This needs to be

repeated and replicated across geographical locations reporting high number of cases.

- **Development of a screening tool and checklist for Community monitoring:** The following can be elements of the screening tool (adapted from one used in some parts of India and developed by Mahatma Gandhi Institute of Medical Sciences Wardha, Maharashtra):

  1. Preventive measures for control of Covid-19 pandemic
  2. Steps to deal with issues related to "Social stigma"
  3. Help in surveillance activities
  4. Support quarantine/isolation.
  5. Identification of needy families & plan for providing help
  6. Ensure continued provision of essential health services at village/ward level
  7. Prompt response in case Covid 19 positive cases is detected

- **Workplace screening:** All workplaces should ensure routine screening of employees. A weekly report format structured around a checklist will need to be completed for every department of the workplace. Reporting must be mandatory and zero reporting (in case of nothing to report) should also be a part of the protocol.

Step 4. Identify facilities for managed isolation and quarantine

Zones should consider establishing a network of Managed Isolation Facilities, and Isolation and Close Contact Quarantine Facilities, based on the New Zealand model. [8] Regions which may not have the resources/capacities to establish new facilities can identify existing ones for the same. Schools, religious places and centers can be identified to manage those isolated. These *Facilities* can be used for isolating/quarantining incoming travelers who are asymptomatic, have not tested positive for COVID-19, and are not close contacts of confirmed or probable cases of COVID-19.

Isolation and Close Contact Quarantine Facilities are higher-risk facilities for people who are confirmed or probable cases of COVID-19 and/or close contacts of confirmed or probable cases. These facilities can include both incoming travelers and local residents. Facility security and infection prevention protocols should be stricter than in Managed Isolation Facilities. Due to the higher probability of infection, each individual in quarantine should have their own room and bathroom. Exceptions for young children would be necessary. Facilities that are purely for isolation of confirmed cases do not require separate rooms for each individual.

Leverage Excess Hotel Capacity: Zone authorities should identify hotels that can serve as Managed Quarantine or Isolation Facilities. [9] which suggests many hotels may welcome the opportunity to work with local and state governments. For example, many US states have already established quarantine facilities with the support of FEMA's "Non-Congregate Sheltering" program.

Best Practices for Hotel-Based Isolation and Quarantine Facilities: When designing isolation and quarantine facilities, zones should take the following into consideration, and also consult best practices documents from other countries. Allow for home quarantine of travelers wherever possible: Travelers can be allowed to be isolated at home provided there is a provision to track them.

Community Volunteers/virus monitors can be involved in this. A few Indian states have successfully tested this model and found it working and beneficial.

Step 5. Virus monitors

Keeping track of the virus transmission will be important. For this volunteers from civil society need to be identified. These volunteers with support from police personnel and state authorities will be instrumental in:

- Keeping a track of incoming travelers: Establish checkpoints at land, air, and sea entry points to ensure individuals traveling from areas with active coronavirus transmission (red zones) are quarantined in Managed Isolation Facilities upon arrival, or have permits allowing their cross-border travel. Individuals traveling to protected zones directly from areas without coronavirus transmission (green zones) should not be subject to isolation requirements. These monitors will also be helpful in tracking all incoming travelers allowed home isolation/quarantine as per rules.

- Ensuring Penalties for Noncompliance: Monitors will also be useful in implementing imposition of penalties for violating quarantine requirements for incoming travelers. The Australian State of Victoria has imposed fines of over \$3,500 for violation of quarantine orders and fines of over \$14,000 for second offenses. [10] Taiwan also imposes comparable fines on incoming travelers who violate quarantine orders. If enforcement measures are too weak, they will fail to contain the spread of coronavirus.[11] For example, New York has imposed fines of only \$1,000-\$2,000 for violating quarantine orders and did not enforce these orders to the extent that Australia, New Zealand, and Taiwan did. Fines need to be imposed on all moving without masks in public places.

- Highway Checks: Again, these monitors can be used strategically to ensure travelers comply to guidelines. Australian police used highway checks

along the borders between the states of New South Wales (population 7.5 million) and Victoria (population 6.4 million) to successfully contain a COVID-19 outbreak in Victoria. The border between the two states measures more than 500 miles, longer than many state borders in other locations.

- Implement Special Procedures for Various Groups of Travelers: The border control and isolation system must be flexible enough to allow economic activity to continue and to cause as little disruption as possible for people inside and outside the zone. For further details please visit Endcoronavirus.org Travel Restrictions for Limiting Disease Spread [12]

- Designated Pit Stop Locations: Action zones should designate pit stops for freight vehicles and vehicles transiting through the zone. Pit stops should include bathrooms, vending or restaurant facilities, and hotels where distances may require overnight stays. These pit stops should follow enhanced infection control procedures. All workers should be given priority for vaccination.

- Deliveries of Goods: Freight drivers should have clear destinations and itineraries. They should attempt to enter and depart the protected zone on the same day. If this is not possible, they should stay overnight at a designated pitstop. Loading and unloading should be carried out by the customer.

- The Aarogya Setu app: The app should be mandatory for all smart phone users and travelers in action zones. Aarogya Setu is a mobile application developed by the Government of India to connect essential health services with the people of India in our combined fight against COVID-19. [13] The App is aimed at augmenting the initiatives of the Government of India, particularly the Department of Health, in proactively reaching out to and informing the users of the app regarding risks, best practices and relevant advisories pertaining to the containment of COVID-19.

Step 6: Reopen through Green Zone strategy

When a zone eliminates transmission, it can begin easing restrictive measures. "Green Zones," defined below, can fully reopen, even in the absence of full vaccination. When two zones achieve "green zone" status, they should allow unrestricted travel with each other.

- Green Zones are defined as areas that border other Green or Yellow Zones and have had no community transmission for 14 consecutive days. All new recorded cases, if any, occur in individuals who are effectively isolated from the moment they entered the zone (imported cases). Green zones can fully reopen schools, restaurants, businesses, and other activities, though travel restrictions must remain in place from Red and Yellow Zones.

- Yellow Zones are areas where there has been no local transmission for 14 consecutive days, but there are new cases identified using contact tracing, or the zone is adjacent to red zones. Yellow zones can undergo partial reopening or be subdivided into Green and smaller Yellow buffer zone areas.

- Red Zones are areas where community transmission has been identified within the last 14 days. Red zones should remain in transmission prevention (locked down) status until they eliminate community transmission.

By accelerating the process of stopping transmission zones can rapidly achieve green zone status within a few weeks and join with adjacent green zones to have few restrictions.

The Australia-New Zealand travel bubble is the most well-known example of a Green Zone to Green Zone free travel area. [14] Other example include the Baltic bubble which allowed travel among Latvia, Lithuania and Estonia, and the Canadian Atlantic Bubble including the four Canadian Atlantic provinces. Within country travel between previously restricted zones such as between Melbourne and the rest of Victoria, or between states in Australia, are other examples. Zones that see a recurrence of community transmission not contained through contact transmission should temporarily impose a hard lockdown to bring transmission back to zero. For example, Auckland, New Zealand entered a three day lockdown in February in response to the appearance of COVID-19 cases in the city. [15] Restrictions can be lifted once transmission is eliminated and cases are safely quarantined.

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