Twitter Thread by Yaneer Bar-Yam

Yaneer Bar-Yam
@yaneerbaryam

How did India go from 90,000 cases per day to just over 10,000?

Answer is compelling

The big picture: Three things are important to stop the pandemic: Travel restrictions (International), travel restrictions (domestic), and strong local lockdowns where there are outbreaks

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It is time to recognize the scientific basis of India's success and give it its due. With the number of new cases in India leveling recently, the urgency is great to complete the elimination process so that a new surge does not occur.

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Was India saved by staying below the critical travel threshold and was lockdown and travel restriction the most important public health intervention?

Sunil Kumar Raina MD FIAPSM[1], Yaneer Bar-Yam[2]
[1]Dr RP Government Medical College, Tanda (HP) and
[2]New England Complex Systems Institute, Cambridge, MA USA
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Indian response to the pandemic has been described from "India is in denial about the covid-19 crisis" or "India staring at corona virus disaster", to "The mystery of India's plummeting covid-19 cases". These responses have been far from being backed scientifically and appear ignorant of India's capabilities of leveraging its strengths to mitigate the impact of the pandemic. Backed by a swift Government action of restricting/regulating movement to increasing public health capacity to meet the increasing demands of the pandemic, India seems to have done enough to emerge successful. India is doing well, if not guaranteed for the future, but at least for now. Here we review these measures and point to their consistency with analysis of the role of intercommunity transmission and within community action to stop localized outbreaks. In particular, severe restrictions on travel, stopping gatherings, targeted localized lockdowns, school closures, effective public communication, improvements in case identification, rapid ramping of industrial production of masks and other personal protective equipment (PPE) and testing capacity, as well as intensive measures in high density areas of urban deprivation have placed India in a regime of declining cases and outbreak control. It is time to recognize the scientific basis of India's success and give it its due. With the number of new cases in India leveling recently, the urgency is great to complete the eliminiation process so that a new surge does not occur.

I. BACKGROUND

Over one year into the COVID-19 pandemic there continue to be widely speculative ill-informed discussions of causal factors in pandemic dynamics despite scientific clarity about the essential role of public health measures. Some of the most common questions doing the rounds have been; was use of stringent lock down measures necessary? Why did it strike different countries differently or different states/cities in the same country with varying severity? In between such questions there have been headlines that read that "India is in denial about the COVID-19 crisis" or "India staring at corona virus disaster". [1] Surprisingly however, the last few months have seen a new narrative on India. The headlines now read "The mystery of India's plummeting covid-19 cases" although the word "mystery" is far from flattering.[2] From India's efforts in mitigating the impact of Covid-19 pandemic being viewed with suspicion to India's success now being equated with magic, the cycle of mis-information on India seems complete. Epidemiological experts and the mathematical modelers alike were predicting millions of deaths by August 2020, the falling numbers have left them perplexed and seeking non-scientific or still speculative explanations such as a hygiene/microbiome theory that has been widely talked about as the factor working in India's favor [5] and the country's age profile having played a positive role—which perhaps contributed to a lower death rate but does not explain why cases have declined. The achievement has been spectacular. As on 8th of February, India, with a population of 1.4 billion, has cumulative 155,080 COVID-19 deaths with 84 deaths in the preceding 24 hours and total number of active cases is at 148,609 is doing much better than in comparison to, the United States, which has seen 439,830 deaths or the United Kingdom for example, countries boasting of a superior healthcare delivery system. [3] We note that no positive correlation between superior healthcare delivery systems with pandemic excellence has been shown, and indeed, there is no reason to attribute effectiveness of prevention through stopping transmission to the medical quality or capacity of hospitals for treatment of infected individuals. Public health prevention and medical treatment are entirely different capabilities.

II. THE EVIDENCE SO FAR

India recorded 97,859 on 16th September 2020, the highest single-day number of Covid-19 infections since the start of the pandemic. However, ever since then the cases have seen a significant decline despite the number of tests being carried out continuing to be substantial. The Indian Council of Medical Research (ICMR) backed testing strategy had yielded 8 crore (tens of millions of) tests till 30th September out of which 3.1 crore were done in September only with a daily average of $10,42,750$ tests. As recent as 13th of February, the total number of tests conducted was $6,97,114$ to add to a cumulative total of $20,62,30,512$. The number of tests returning positive for Covid-19 was 11,106. The average number of new cases for last one week has been about $11,000$/day. [4]

The number of active cases has also seen a continues decline since 17th September 2020. India recorded highest number of daily deaths on 15th September at 1283 (except 2006 on 16th June; which was due to adjustment of old unrecorded deaths) and since then has seen a significant decline. [4]

Should India join countries in Asia and Oceania in elimination, 50% of the world would become COVID free, and provide an example for emulation that is surely unexpected by western observers.
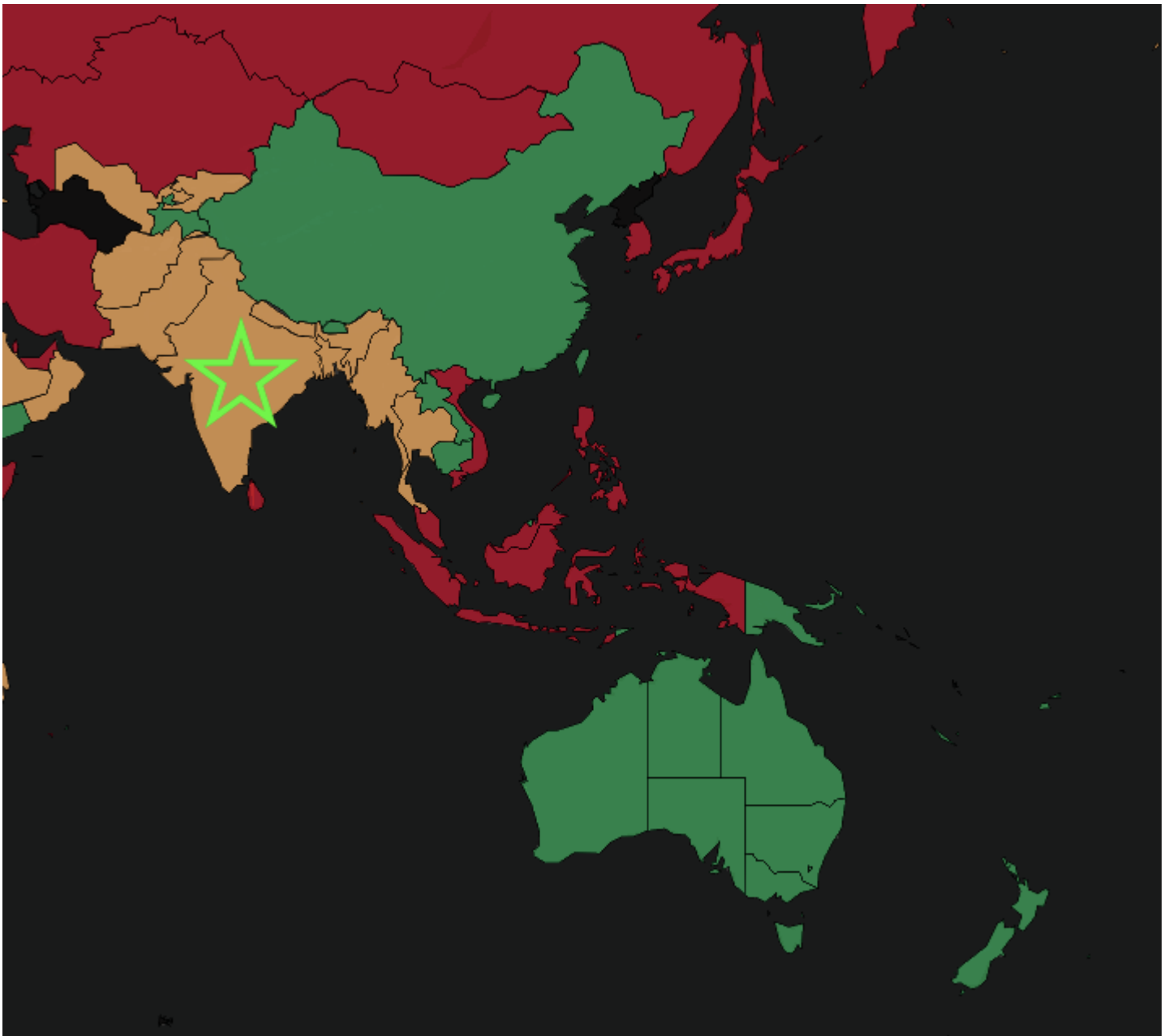
Through swift Government action of restricting/regulating movement and by increasing public health capacity to meet the increasing demands of the pandemic, India leveraged its strengths to mitigate the impact of the pandemic.

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In particular: Severe restrictions on travel, stopping gatherings, targeted localized lockdowns, school closures, effective public communication, improvements in case identification,

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.. rapid ramping of industrial production of masks and other personal protective equipment (PPE) and testing capacity, as well as intensive measures in high density areas of urban deprivation have placed India in a regime of declining cases and outbreak control.

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The evidence:

India recorded 97,859 cases Sept 16, 2020, the highest single-day number. Since then the cases have seen a significant decline despite the number of tests being substantial. Daily average of over 1M tests in Sept and 700K on Feb 13.

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India's advantage:

1. Experience: Successful response efforts in prior pandemics.

2. Less urbanized: 70% of population survives on agriculture. This limits travel and rates of community-to-community transmission, allowing localized actions to stop outbreaks from spreading.

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3. Limited travel: 86% of households never take a trip. Limited travel limits transmission between communities and allows regulation when proactive measures are taken.

4. Limited and localized tourism: India is not among top tourist destinations of the world.

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India's actions:

1. Lockdown and Zoning: Starting April 2020, government used a "smart lockdown" strategy with severe restrictions in affected districts, and partial lifting of restrictions in unaffected districts, with opening some sectors to meet the economic challenge..

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Three types of zones: red, orange and green. No activity allowed in red zone, minimum activities like opening limited public transport, harvesting farm products allowed in orange zones (where only a few cases in the recent past), and further relaxation allowed in green zones

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2. Restriction on travel: For large part of 2020, country saw restrictions on travel. Travel regulated through issue of e-pass with border checks on state borders across the country. The regulation of travel continues into 2021 as travel has not been fully de-regulated.

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3. Immediate isolation and contact tracing on testing positive: Isolates all individuals who test positive to Covd-19. Contact tracing is conducted. All primary high-risk contacts are quarantined and tested. Quarantines of locations (not just of individuals) also used.

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4. School Closure: For extended period of time, all Indians till age 25 were at home, no schools or colleges open. Recent reopening is partial and in a context of very low number of cases, and untested in epidemiological consequences.

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5. Industry: Industry responded like never before. From producing no high-end masks and personal protective equipment (PPEs) to being able to supply to the world, the shift was swift and decisive.

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6. Laboratory Testing Capacity: From one lab capable of doing RT-PCR to over 2300 (in both Government and Private sector) has been a significant public health initiative. The number of labs reduced the test result return time, strengthening isolation/quarantine strategy.

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7. Awareness: Public awareness drives with cautionary messages replacing ring tunes on phones to fines for not wearing mask in public, public communication and response efforts moved in sync. More awareness meant the population willingly accepted restriction guidelines.

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8. High density urban areas: The greatest challenge to pandemic response is areas of urban deprivation. India's response involved local intensification and refinement of lockdowns, travel restrictions, rapid case identification, and communication found in other locations

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9. Vaccines: The largest vaccination drive in the world started in India Jan 16th, riding largely on two vaccines developed by Indian vaccine manufactures. This action, reflecting an all measures approach, is expected to have a increasingly significant impact on the outbreak

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What India needs to continue doing:

In order to further reduce the number of daily cases, India needs to strengthen and continue regulation/restriction in areas reporting cases while allowing return to normalcy in areas without cases.

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Still, the difference between success and failure in pandemic response rests on decisiveness of action when numbers of cases are small.

Travel restrictions and reaction time could be the key for controlling pandemics.

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India, with less travel externally and internally than its western counterparts due to both intrinsic conditions and public health measures gave itself time to get the infection under control.

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Where localized restrictions are not needed, relaxing restrictions can be done without preventing effective control measures in other locations, resulting in overall ongoing reduction in cases.

The scientific and public health understanding should be clear.

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Here is the detail on high density areas of urban deprivation:

Dharavi in Mumbai, the largest slum in Asia

https://t.co/54C3rebfdX

> How did India go from 90,000 cases per day to just over 10,000?
>
> Answer is riveting
>
> Start with Dharabi, largest slum in Asia: Impressive community case finding, contact tracing, isolation, quarantine, communications, massive health and volunteer effort, lockdown, support.
>
> 1/ pic.twitter.com/HpvHTEPJfX
>
> — Yaneer Bar-Yam (@yaneerbaryam) February 25, 2021

See also Indian recommendation on prevention of airborne transmission published in July 2020

CDC/WHO are just beginning to get it right now.

Fresh air replacement best way to prevent airborne transmission of Covid-19: CPWD

https://t.co/Md3aKetG55

Links to pdf

https://t.co/jzIGqLUFpw

https://t.co/vGVCEQQAZu

https://t.co/AbHP3o9fHa