

Responding to the new coronavirus: An Indian policy perspective

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1. Background

COVID-19 is on the minds of most people in India today. The Government of India started its preparations at the field level on Jan 17, which was before the disease was classified as a Public Health Emergency of International Concern (PHEIC) by the World Health Organisation (WHO).¹ On Mar 11, the WHO classified COVID-19 as a pandemic.² The work program of the government, available at the website of the Ministry of Health and Family Welfare (MoHFW) has unfolded in many aspects³:

1. International travel focused (screening and testing, restrictions on visas and travel - at airports, ports and border check posts).
2. Contact tracing around suspected travel cases, or those who have come in contact with confirmed COVID-19 cases. Integrated disease surveillance systems are being used for contact and community tracing. Cluster containment strategies are being adopted in Agra, and other places.
3. Broad public health messaging via media, telecom and community messaging.
4. Kerala is taking social distancing measures (shutting down schools, cinema halls, etc).
5. The Indian government has also brought back Indian citizens visiting other countries (Iran, China) with monitoring of their health status.
6. There are efforts to ramp up testing capabilities from one reference lab NIV Pune, the testing is now being done in 52 centers around the country.
7. Government is partnering with the private sector for surge capacity on hospitalisation.

As the number of persons confirmed with COVID-19 in India crosses 60, in this article, we think further about health policy for the next few months. What are the aspects which the policy makers should prioritise amongst the many things which need to be done? An epidemic like this works at three levels: (a) The direct cost of health care for the sick and the caregivers, (b) The psychic cost of the fear and (c) The impact upon society and the economy of the behavioural adaptations. In this article, we draw on the experiences of other countries, and look at the questions from an Indian perspective, in two dimensions.

¹ See, World Health Organisation, 2020a.

² See, World Health Organisation, 2020c.

³ The various notifications, advisories and datasets made available by the MoHFW can be found at Ministry of Health and Family Welfare, 2020

1 How much should we worry?

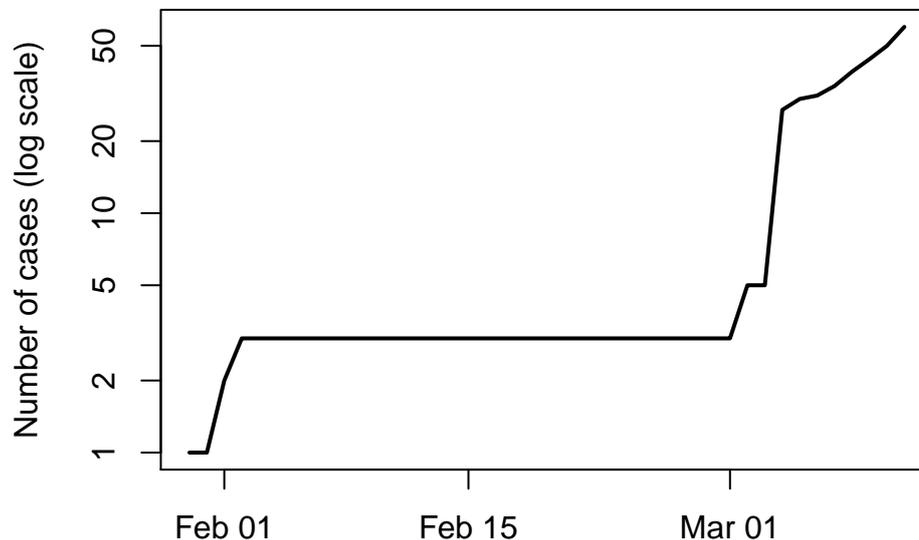


Figure 1: The time-series of number of cases detected in India.

Starting from 1 state and 3 cases at the end of Feb, India now has 60 confirmed cases across 12 states/UTs. The number of confirmed cases in India is still much smaller than most countries. However, the cases could double every 5-7 days, and proliferation can come from cases which have not been traced yet. As an example, Italy had less than 200 confirmed cases on Feb 22, and has more than 9,000 cases on March 10.¹ In the latest 8 days (4 March to 11 March), the number of cases has grown at an average rate of 11 per cent per day. There is a natural human instinct to hope that things will work well, for experts to conserve credibility, to avoid being the one to cry wolf. However, if a significant outbreak comes about in India, it would impose substantial human costs, directly through loss of health and loss of life, and indirectly through the adverse impact upon the economy. As

¹Information retrieved from University of Oxford, 2020.

an example, we need to analyse scenarios such as: half of India will get infected (650 million infections) and of the infected persons, 5% will require hospitalisation, which implies 32.5 million infectious hospitalisation events in calendar 2020 which could overwhelm the health care system. Similarly, if we think in terms of parameter values of a 0.5% mortality rate, and a 20% infection rate, this would result in the death of 1.3 million people in India. A prudent risk management approach calls for investments in preparedness well before the room to maneuver is lost in a crisis situation. The measurement and reporting of facts changes their materiality. Rukmini S, 2020 writes in the Mint on the scenario that the epidemic spreads through India, people get sick and die, but there is no health statistical system to tell the story. Shepard et al., 2014 estimate that Dengue perhaps afflicts about 20 million people in India per year. Tuberculosis kills 1200 people per day in India. These two diseases are examples where there is substantial under-reporting in the official health statistics in India. They are things that we in India have normalised in our minds, and learned to live with. Will COVID-19 become one more of these? Can we just be a little zen about it? There are many scenarios about COVID-19 in India which are not compatible with such normalisation, even with weak health statistics. Suppose $x\%$ of the population gets infected in 2020, and $y\%$ of the sick show up at hospitals. There are reasonable scenarios for x and y where the scenes at hospitals will make it apparent that an epidemic is in motion, even if it is not measured correctly.

2 What is known about SARS-CoV-2

COVID-19 is caused by SARS-CoV-2 which is a novel RNS virus of the coronavirus family. Relatively little is known about it as researchers have only been working on it for a few months. What we know about COVID-19, today, from a few early

studies such as Bi et al., 2020 is summarised as follows.

Transmission: On average, each patient gives the infection to about 2.5 persons (Ro: reproducibility rate), which induces a rapid expansion of the number of infected persons (World Health Organisation, 2020). Infected persons have been known to communicate the disease before they display symptoms, though the percentages are not known. All kinds of humans are part of the chain of infection and transmission, even though some categories (e.g. children) bounce back from the infection well. Surfaces can be contagious from 2 hours to 9 days. COVID-19 is being transmitted not only with imported cases, but with local transmission and in cases through community transmission. For many cases, it has been hard to understand the chain of transmission.

Detection and isolation: From the date of infection, the incubation period is around 5 days, though values range from 2 to 14 days. We have to also keep in mind that there is a delay between the onset of symptoms and the first visit to a health care facility. The testing process is complex which introduces delays and the possibility of mistakes. When the virus load in the body is low, the test may fail to detect the infection. For these reasons, there is a risk of gaps in containment efforts via active contact tracing and testing alone (Hellewell et al., 2020). Reports estimate that 46 out of 100 infected travellers, despite screening, enter a country undetected (J Quilty et al., 2020). In order to limit transmission, detection should be done outside hospitals, e.g. at “fever clinics” in China or drive-through testing in South Korea. Population scale screening (to detect missed cases, and track community transmission), as has been done in South Korea, requires mass production of accurate and rapid turnaround kits, and organisational capability in public health.

Care: There is no specific treatment that fights the virus (Suzman, 2020). While the disease is highly infectious, most persons bounce back. About 80% are mild cases and do not require significant intervention and can be isolated and managed at home, with recovery times of about 30 days. The mild cases also need to be monitored for progression to severe cases, which can sometimes be rather rapid. About 5-20% of the mild cases progress into severe and critical cases and need hospitalisation where they are given supportive care. The severity is the greatest for the old and those with pre-existing conditions. Severity has been found to be high in China amongst infected medical workers (China CDC, 2020). There are concerns about COVID-19 patients transmitting the virus to others in health care facilities. In particular, patients, who are suffering from other illnesses, are at high risk. This will enormously tax the healthcare system in case of a rapid outbreak (as has happened in Wuhan and Italy).

Fatality rate: World Health Organisation, 2020 estimates the fatality rate at 3.8% for all China with larger numbers in case of an outbreak like in Wuhan (5.8%). In the rest of China, and in S. Korea, the crude fatality rate has worked out lower, <1%, which would partly reflect more aggressive testing. Severe cases and fatality are highest amongst the old and those with underlying morbidities (diabetes, cancer, hypertension, COPD etc) with >5% fatality amongst this group, with some studies showing fatality among critical cases at 49%. This underlines the criticality of protecting the existing sick and the old from getting infected as well as protecting the health workers.

Knowledge about COVID-19 is evolving rapidly, and it is important to have strong linkages with the research community, in revising our priors, and in optimising the policy pathways.

3 Unique features of the Indian situation

Limitations of the public health system Communicable disease management is a key building block in public health. This involves watching the country for epidemics, engaging in detective work to identify outbreaks, putting a ring around everyone who may have come in touch with a sick person, and putting out these fires. As an example, the US CDC is an organisation with about 11,000 persons doing such work in the US. The emergence of such capability in India has been relatively limited. The relevant organisation, National Centre for Disease Control (NCDC) has about 400 people, and more limited capabilities. As an example, Ghosh et al., 2020 have a nice article in the Indian Express going behind the scenes at the NCDC in the present crisis. Most people who get sick in India get tested and/or treated at facilities which do not send information back into the NCDC, so the information that it can have is limited.

Limitations of the health care system Most health care, and testing, in India is done in a fragmented set of private facilities. Each of these facilities has its own management system which will make distributed decisions about how best to respond to the unfolding situation, reflecting their information set and their maximisation. With the risk of infections to other sick, paying patients and the high cost of managing COVID-19 cases on their own, private providers may refer patients to public hospitals, despite the calls of the government for active participation.

Public and private facilities may lack medical supplies and resources, and have weak management capabilities (Bloom, Sadun, and Reenen, 2014). Their preparedness (isolation, quarantine, severe case management) is inadequate in the

event of an outbreak.

There are concerns about the formal training, skills and incentives of health workers. Protocols that will limit disease transmission to health workers, and to other patients, may be lacking at many facilities, both public and private.

Could the temperature and the sunlight help greatly? There is a possibility that India will fare better than colder places of the world on account of greater ambient sunlight and higher temperatures. At an individual level, we should value the properties of sunlight, e.g. outdoors seating is better. However, the present state of knowledge does not suggest that this suffices in protecting India (Anderson et al., 2020).

4 Elements of the policy response

The objectives of policy are:

1. To deliver health care for the coming surge of sick people, with an eye to minimising morbidity and mortality;
2. To flatten the epidemic curve so as to avoid overwhelming the limited health care resources and to buy time for a year or so, by which time there is a possibility of a vaccine or a cure; and
3. To be mindful of the adverse impact of public health actions upon the life experience and economic status of the people.

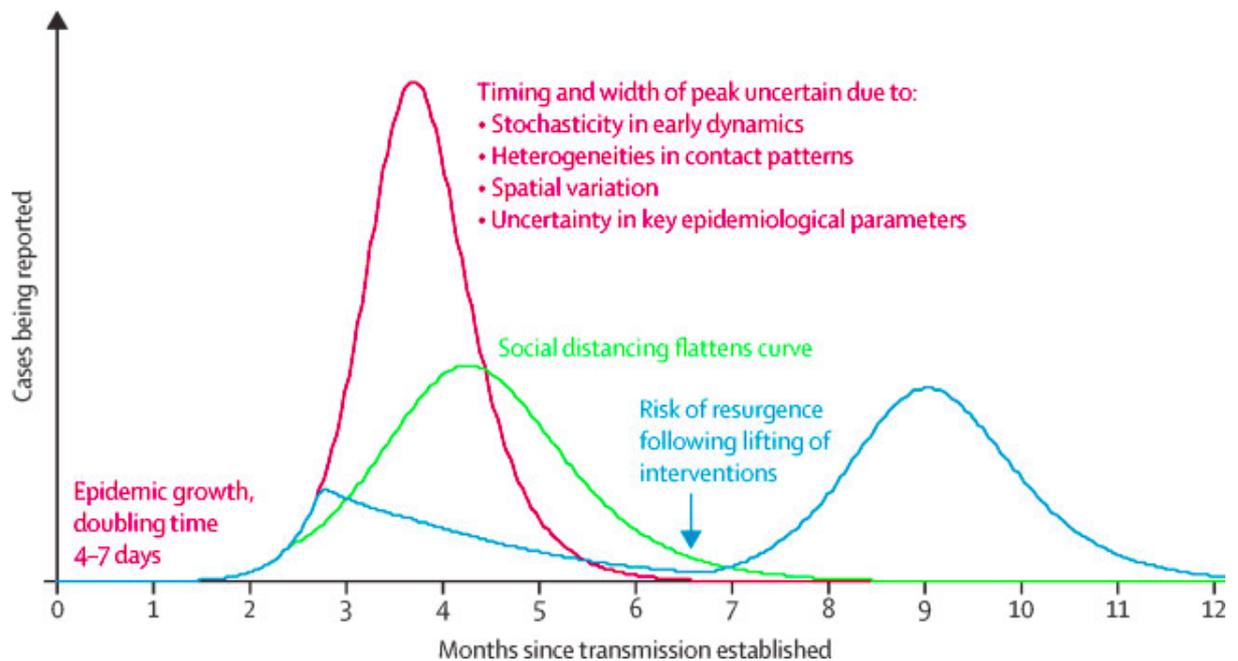


Figure 2: Figure: Illustrative simulations of a transmission model of COVID-19

Source: [https://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(20\)30567-5/fulltext](https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(20)30567-5/fulltext)

It would be valuable to rapidly build a new, transient, dedicated health care mechanism for the infected. This is desirable from two points of view: (a) There is not a lot of spare capacity at existing hospitals, and (b) It will be difficult to prevent disease transmission from COVID-19 patients to the persons presently in hospital. There is a need for the management mechanisms through which a large capacity for simple supportive health care is built, to deal with the scenario of a surge in COVID-19 patients in coming months, after which it should be closed down.

Building this new health care capacity is difficult and will take time. Hence, flattening the epidemic curve is essential, in order to buy time for building this transient health care capacity.

The workhorse methods of controlling an epidemic through tracing contacts of individuals who get sick, and isolating everyone who was in contact, are likely

to not perform well in the Indian setting, given the pre-existing limitations of public health, and the scenario where the number of cases overwhelms the limited staffing available for such careful detective work. As an example, we should read this [story](#) from Seattle and wonder how things might play out in India. Many people are excited about the public health work which took place in Kerala in 2018 when there was an outbreak of Nipah (AK Ajith Kumar and AS Anoop Kumar, [2018](#)). However, (a) COVID-19 is a more challenging problem than that outbreak of Nipah was, and (b) Most states in India do not have the state capacity that is seen in Kerala. The most important tool for flattening the epidemic curve, then, is social isolation. There are many mechanisms through which this can be done, including voluntary actions of individuals and using the coercive power of the state. In this conceptual framework, we should think about ten elements of the required response.

1. **Leadership:** This project requires clarity of leadership. Dedicated, full time leaders are required at each level of government in a command center mode, who coordinate with each other, with the Indian private health care sector, with the research community and international partners within the task force. The leadership requires adequate technical and operations teams, and the authority to act on the remaining nine elements enumerated ahead. Section 10 of the Disaster Management Act appears to be one mechanism for achieving better coordination between various arms of government, and has [recently](#) been brought into play to give powers to the Secretary of the Ministry of Health of the Union government. The leadership requires to orchestrate the deep collaboration with individuals and organisations outside government, so that all the energy is brought together to address the problem at hand.
2. **Resourcing:** When we think through the entire task ahead, considerable

and immediate resourcing will be required from the exchequer. Values of about \$ 10B are seen **China, Korea and the US**. Inter-governmental fiscal relations will need to be worked out, so as to get resourcing to the right level of government. Resource transfers will be required to non-government actors, both for profit and not-for-profit. Existing mechanisms to interact with the private sector for healthcare should be used like Pradhan Mantri Jan Arogya Yojana (PMJAY), Employee State Insurance (ESI), Central Government Health Scheme (CGHS) insurance schemes. These can help in contracting with the private sector for testing, care etc. For this we will need to create COVID-19 packages, standard treatment guidelines/protocols and leverage the existing network of hospitals. As an example, PMJAY has over 20,000 hospitals, with a large share being private). These networks also require expansion to cope with the present situation, with more hospitals, labs, and home care providers. Leveraging PMJAY and insurance company structures is desirable as they have systems to contract for care and also ability to track information on care being provided.

- 3. Enhanced social isolation:** Cutting down the transmission of the disease drastically, is imperative to reduce the peak load on the healthcare system (Ewald, 1990). It will also influence the evolutionary trajectory of the pathogen in favour of reduced virulence, favouring milder strains over more aggressive strains. It will buy time from the viewpoint of the hope for a cure and a vaccine. Ideally, individuals should spontaneously make better decisions, avoiding temples, demonstrations, movies, bars, festivals, cricket matches, school, fairs, etc. There should also be targeted communication to the population on their role and responsibility to not only themselves but to reduce the transmission risk for the old, sick and health workers. There may be a case to use state power in coercing people through 'locking down'

a certain geographical region with various grades of restrictions imposed and enforced by the government. There are provisions for such coercion in the [Epidemic Diseases Act, 1897](#). This law is unfortunately rooted in the ethos of colonialism, and lacks checks and balances. There is a need to think carefully about whether and how state coercion should be used, to enhance social isolation, under these Indian conditions of low state capacity and poor checks and balances. Quarantines and lockdowns only work well with the consent of the people. If state power is used in a way that appears high handed and lacking in democratic legitimacy, there is the possibility of a low cooperation by the citizenry, resulting in reduced effectiveness.

4. **Testing:** There are [52](#) locations where testing is taking place. On 6 March, 4,058 samples from 3,404 individuals had been tested. (For a comparison, the number of persons tested in Korea was about 180,000, in the UK it was 23,500 and in Italy it was 50,000). While the testing capacity in India is ramping up fast, the numerical values required would grow exponentially if an outbreak takes off. For this reason, all the [capability](#) in testing in India needs to be brought to bear on expanding testing. There is ample skill in related fields in private testing labs in India [\[example\]](#). Private sector capabilities for testing need to be harnessed, while working out the contractual arrangements through which private testing firms will be paid (either directly, or via PMJAY/other insurers).

We need to push the frontier, to innovate as was done in [South Korea](#), to reduce the time to confirmation, improve sensitivity rates, as well as improve early detection when viral load is small. In targeted areas, where the disease is spreading, active community screening will be required. The Indian diagnostic industry holds a possibility for rapid scale up of production of testing kits, potentially for use outside India also. Such a surge in production will be

well appreciated worldwide; it's a contribution that India can make towards the global challenge. The government needs to run a system where x% of the tests are repeated in a reference facility, to watch for quality issues in the large scale rollout of testing.

5. **Information systems:** The war on COVID-19 will play out as mini battles in every district/region. It will require coordinated flow of information at all levels on populations, care givers, supplies, and situation. Millions of civil servants involved in health across the country, and millions of employees in private health care, and the citizenry, require timely and **accurate information**. Aggregate statistics are required [example], and unit level data is required [example] about the exact location and characteristics of each patient. It is hard to **overstate** the **gains** from obtaining and releasing accurate and comprehensive data. This will help each person in India make better choices, which will influence the trajectory of the disease. This will improve the policy process, and the trust by private persons in the policy process. When testing and health care resources are scarce, and providers are triaging, a key consideration that should determine these decisions is the need for greater situational awareness in the overall information system. As an example, suppose we know that there is an active epidemic in City X while things are fine in City Y. In this case, reports of a first few cases in City Y should be given high priority in achieving hard information, even if this means ignoring requirements in City X. The Indian private sector has considerable capabilities in managing such IT systems, and can be useful in rapidly getting to a good system. The key bottleneck will be data quality at the case level.

6. **Communications:** There is a need for a trusted two-way mechanism of

communication between the COVID-19 policy team, the vast networks of government and private health workers, and the public. The public and all elements of the Indian health system need accurate information updated daily from a single authoritative source, without which there is a risk of misinformation, rumours on social media, wrong decisions by private persons, and panic. This should cover all the three stages of containment, detection and health care.

The communications process requires a combination of technical precision and a megaphone. The public needs to know the precise status of the epidemic, high risk locations to avoid, precautions, what are early symptoms, encouragement to get tested, where to get tested, quarantine and isolation process etc.

There should be dedicated and ongoing communication for care givers at home, health workers, essential manufacturers, businesses and other groups.

7. Health care workforce: The health care workforce is an important problem. They face a high risk of infection and the high likelihood of facing the most dangerous strains of the virus. There is a risk of certain persons in the present health care workforce retreating from this occupation, and a certain fraction of the operational health care workforce will get sick. This will, overall, result in a diminution of the size of the health care workforce. This is particularly problematic as the situation calls for surging capacity in health care.

Over the coming one year, it is hard to augment the stock of skilled doctors, nurses and ward boys in the country. Some of these persons will be removed from the workforce owing to COVID-19, and we will have a smaller workforce as a consequence. There is no policy lever to augment this workforce, on the

horizon of a year. We are reminded of pilots at the start of World War II: In 1940, the **UK RAF** had 1200 pilots and was producing new pilots at the rate of 200 a month, and there was no way in the short run to increase the supply of pilots. If more than 200 pilots went out of action in a month, the size of the pilot workforce went down.

In order to combat both problems (sickness & retreat), we require initiatives all across the country aiming at improving the health and morale of health care workers. This includes: getting protective gear into health care facilities (public or private), training health care workers on better protocols, health care for the health workers who get sick, and supporting the family members of sick health care workers.

8. **Surging specialised health care:** The treatment given to Covid-19 patients is supportive care. In the class of health care procedures, this work is not complex. The two key problems are (a) Preventing disease transmission to others in hospitals and (b) Aggressively preparing for a surge capacity for a short period after which a large capacity will not be required. Both these problems can be addressed by building a temporary health care system.

This temporary system would consist of a set of dedicated ambulances with adequate protective gear for Covid-19 cases, and tent hospitals to be built and taken down within a few months.

Most management and medical capability in India in the field of health care lies in the private sector. The government will need to find ways of working with private persons in contracting out these capabilities. The concerns faced here, and the skills required for developing and managing these contracts, are similar to those found more generally when fiscal resources for health financing are linked to privately produced health care.

Given the shortage of trained health care workers, there is a need for significant process and productivity gains, in conventional health care facilities and in the new specialised tent hospitals, so as to do more per unit health care worker, so that the system is able to perform if faced with a surge in requirements.

Despite our best efforts, there is the possibility that testing and health care might lag a surge in requirements. There will be a need for rational **triage**. There is a need to equip households with knowledge and materials to care for the sick at home, to the maximal extent possible, and thus reduce the burden upon health care while also reducing the risks of infection. Elements of this include arms length mechanisms for testing, consultations through video, and the design of protocols that govern when a person truly requires supportive care at a health care facility. Private home care private players which have a huge field strength in urban areas, can become a large capability to manage non critical cases. However, they will need to be resources, trained and equipped with protective gear.

9. **Research:** There is a need for statistical and qualitative research to study all aspects of this story, to rapidly produce knowledge that will help reshape the response as we go along, and to derive lessons for the long run.

At present, the frontiers of the biomedical science and engineering on this subject are found outside India e.g. the innovations in testing in Korea, the basic science in China, and at the US CDC. However, we are at the early stages of the story, and all countries are scrambling in order to understand the situation and respond to it. India has considerable capabilities in drugs and vaccines **[example]**. If the right energies are brought into this problem, India can come to play a leadership role in some aspects of Covid-19, on a

global scale.

10. **Resilience of foundational public goods:** In the worst affected locations, it is essential that the foundational public goods of law and order, water, electricity and transportation do not break down.

5 Conclusion

In this article, we have offered the elements of thinking that can usefully be applied by health policy makers at the union government and in sub-national governments. The government is already moving ahead on many of the elements articulated here, however this needs an aggressive and concerted effort like in a war using all the advantages which India may have (the private sector). This is, of course, high level thinking. Each of these elements needs to be fleshed out with research, planning and implementation teams.

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