

Indian Health Policy in Light of COVID-19: The Puzzle of State Capacity and Institutional Design[§]

ABSTRACT The Coronavirus pandemic has been a severe stress test for the Indian health system. In this paper, we review India's experience with COVID-19 in the first half of 2020. An array of initiatives are required in public health and health care in response to this experience. In testing and health care, the substantial role of the private sector needs to be recognized and integrated into thinking about health policy. There is a need to reform government organizations that wield coercive power or spend public money so as to refocus them on addressing market failures and improving state capacity. There is considerable knowledge in the field of building state capacity in India that can help in this task.

Keywords: *India, COVID-19, Health Policy, Public Health, Health Care, Market Failure, State Capacity, Regulation*

JEL Classification: *H11, H23, H41, H42, H77, I11, I13, I15, I18, K23, K32, O53*

1. Introduction

Prior to the pandemic, there were many concerns about the working of public health and health care in India. The pandemic constituted a severe stress test to these systems. In this paper, we pull together knowledge about the events in health and health policy in India in 2020, evaluate strengths and weaknesses, and obtain insights about the grand questions of health policy in India drawing upon these experiences.

* ajayshah@mayin.org

§ This paper draws on conversations with Amrita Agarwal, Harleen Kaur, Ila Patnaik, K. P. Krishnan, Nachiket Mor, Naman K. Shah, Renuka Sané, Reuben Abraham, Shubho Roy, and Vijay Kelkar. We thank participants at the India Policy Forum 2020 Conference for insights and ideas for improving the paper. By agreement with the IPF Editors Shekhar Shah and Karthik Muralidharan, the paper presents a snapshot and a benchmark for what we knew of the pandemic by July 2020 and soon thereafter, but does not seek to bring the paper up to date with subsequent developments.

At the time of writing this paper for the IPF 2020, the pandemic had not yet played out fully. There was no single epidemic curve for the entire country; each location was experiencing a curve with different characteristics and a different timeline. When the dust settles, it will become possible to look back and understand these events better. The ideas in this paper are thus necessarily preliminary and incomplete.

1.1. Public Health

Public health is primarily about disrupting the spread of the disease. Examples such as Taiwan, a country of 24 million people that has strong linkages to China and which had recorded a low 449 cases and 7 deaths as of July 5, 2020, hint at the possibilities of what institutional capacity in public health can achieve.

The standard recipe of public health involves testing many people, finding those who test positive, tracing their contacts, and isolating all these persons for a period of time. This requires institutional capabilities for contact tracing, including the management capacity to rapidly increase the contact tracing workforce at short notice. For the country as a whole, perhaps 300,000 contact tracing workers would be required. Contact tracing is not a particularly difficult problem in public administration; while there are multiple transactions, each transaction has low discretion, low stakes, and low opacity. There was significant heterogeneity within the country on how these functions work.

Enhanced social distancing can help slow the epidemic. The first element of this involves better choices by individuals and firms based on fine-grained data about the share of the population that is infected at the PIN code level. The public release of such data is not done in India. Second, the government ran a large-scale communication campaign for informing people about the disease and about measures that will enhance safety, which has helped modify behavior.

The third line of attack in enhanced social distancing is the use of the coercive power of the state to force reduced social interactions through varying degrees of “lockdowns.” There is room for greater sophistication in the policy analysis that leads to such decisions. These are best done in a decentralized way, reflecting the infection rate in a city and the trade-offs involved between public health objectives and social and economic objectives. The early lockdowns in India were led by the Union Government. Government-run testing facilities ramped up their work substantially. The bulk of the diagnostic laboratories in India are, however, in the private sector.

There were weaknesses in the engagement strategy of the government with this private industry.

While there is a universal admonition to do more testing, there are actually three distinct elements of testing that need to take place: testing in the context of clinical care (as part of the conversation between a doctor and a patient), testing special groups (e.g., finding out the infection rate among workers in a factory, which can be used to improve safety protocols), and testing in a neighborhood or a city in order to shape public health responses there. When there is considerable variation and shifting in testing protocols and capacity constraints in testing, the interpretation of aggregated data for the purpose of epidemiological research is problematic. Data on excess deaths, causes of death, and hospitalization could be a useful fallback for researchers, but these datasets also have constraints in India. Overall, we see a significant gap between the required systems of measurement and data release when compared with the requirements of private and public decision-makers in India.

There are many scientific questions about COVID-19 that are unique to India. There is a need for a better organized research community that can pursue these questions. In the coming months, one or more research teams worldwide will have efficacious vaccines against COVID-19. The Indian public health community needs to think about the variety of policy questions about how these developments can best be utilized in the Indian context.

These experiences encourage a renewed focus on public health in India. A more decentralized approach, with an emphasis on city governments, will help. Contact tracing is a key pillar of public health; there is a need to build organizational capability, including the option of surging this capacity when faced with an epidemic.

Recognizing the fact that the bulk of testing in India is in the private sector, and recognizing the presence of market failure in this market, there is need for multiple mechanisms to address this market failure. At the level of the Union Government, an organization roughly like the US Centers for Disease Control and Prevention (CDC) is required. This would require corresponding work in establishing the mandate, the law, the design, and the accountability mechanisms for such an organization.

While there is a case for public funding of scientific research, the bang for the buck can be maximized when the government contracts with private and public researchers through a system of grant-making and research review. Such an approach would work better than the conventional path of government hiring scientists as civil servants.

The essence of public health is more robust health statistics. Better measurement of births, deaths, and tests is required, and these datasets need to be connected to the research community while fully protecting the privacy of individuals.

Many elements of this public health reforms agenda involve the construction of state capacity. There is considerable knowledge in the field of state capacity in India—about the establishment of checks and balances, and about organization design—with the help of which capable state institutions can be constructed.

1.2. Health Care

The most important problem in health care, in each country that has faced the pandemic, is about surging health care system capacity for the relatively simple supportive care that is required for most patients. The pandemic came relatively late to India, the lockdowns bought more time, and India has relatively young demographics. This gave greater time to prepare the health care system for the peak surge of cases in most locations.

The public sector health care system has borne the brunt of health care for COVID-19. This is despite limitations in what was possible in the public sector, owing to pre-existing constraints such as the number of ICU beds or the number of specialists.

The bulk of health care in India is in the private sector. There is an important market failure in private health care in the form of asymmetric information between the provider and the patient. Mechanisms for addressing this market failure—private clubs, domestic and overseas accreditation, sophisticated buyers including public sector buyers, and a light layer of law and regulation—are at early stages of development.

When the COVID-19 surge reached cities such as Mumbai, Delhi, and Bengaluru, this generated difficulties much like those seen in cities elsewhere in the world. There is an important possibility that needs to be harnessed, that of contracting with the private sector, in order to augment capacity.

The health care workforce faced difficulties through a combination of poor safety protocols, health care workers succumbing to the disease, the fear of workers about the possibility of getting sick and the consequences of getting sick, and the problems of commuting to workplaces under conditions of lockdown.

Private health care organizations also faced considerable difficulties. The decline of non-COVID-19 health care activity was an adverse shock to their cash flow. Their health care workforce was stretched. There was legal risk

in the form of bans, lawsuits, and price controls, both as a flow of events and as uncertainty about future events of this nature. This has adversely impacted their ability to surge health care capacity.

Health care expenditures associated with COVID-19 have also interacted with the difficulties of health care financing in India. While employees of large private firms are covered by the Employees' State Insurance (ESI), in practice, ESI facilities are inadequately present for most workers. Government-sponsored health insurance schemes have become a significant part of Indian health care financing. However, they face constraints concerning the complexities of contracting with private health care firms.

Looking forward, the lessons that we can draw for health care lie in finding private and public mechanisms to address market failure. This agenda is a more complex version of the market failure in testing. The solutions include private clubs, domestic and overseas accreditation, public procurement that has features designed to combat market failure, and a light-touch approach to regulation through law.

2. Questions on Health Policy Raised by the Pandemic

The Indian health system represents a slow evolution from the early beginnings in colonial India. The academic community and the policy community have evolved in their thinking. Health policy has gone through three main phases: from an early focus on public health to an emphasis on government-run health care facilities starting with the Bhore Committee, and then into government-funded health insurance schemes such as the *Rashtriya Swasthya Bima Yojana* (RSBY).¹ Through this period, health outcomes as seen in some standard metrics such as longevity, infant mortality, and maternal mortality have improved considerably, but remain at absolute levels that are inconsistent with a country at the present level of income.

There is a broad consensus on the difficulties in health policy in India. The foundations of public health (i.e., addressing market failure in the form of public goods and externalities) are in poor shape. In health care, the citizenry has begun to exit government-run facilities in a fashion that is similar to the exit from government-run schools that was seen in the field of elementary education. Private health care is now the dominant force in Indian health care. However, the private market for health care suffers from important market failure in the form of asymmetric information. The state

1. A history of ideas in Indian health policy is given in Patnaik et al. (2018).

has retreated into an owner/operator of a network of hospitals with declining salience and has not played an adequate role in addressing market failure.

It was in this context that the novel Coronavirus appeared on Indian shores in early 2020. The following period has proved to be an acid test for the Indian health system. Can health policy make a difference to these outcomes?

In this paper, we sketch the key elements of how the Indian health system fared when faced with this challenge and utilize these experiences to obtain insights into Indian health policy. Thus, we try to address the following questions:

1. What happened in India when the pandemic appeared here?
2. How do these difficulties illuminate the traditional debates about policy questions in health policy?
3. What insights can we draw from these experiences for the priorities of health policy in the coming year and for the long run?

The rest of the paper is organized as a section on public health (Section 3) and a section on health care (Section 4). Finally, Section 5 concludes the paper.

3. Public Health

From the first principles of public economics, market failure in health has a clean split between public health and health care (Kelkar and Shah 2019). Public health is about externalities and public goods. In recent years, the WHO has initiated a “Common Goods for Health” initiative, aiming to bring back the focus in global health policy on these issues (Shah et al. 2019; Soucat 2019).

The field of public health is about state interventions at the *population* level rather than at the level of one individual at a time. This primarily comprises scientific research, the statistical system in health, combating communicable disease (e.g., eradicating some diseases, fighting epidemics and disease vectors, disrupting disease transmission) and creating conditions in which morbidity will be reduced (e.g., improving air quality in North India). Going beyond the narrow confines of health policy, there is an array of fields in public policy that should be viewed as being part of the field of public health, areas such as water, sanitation, air quality, and road safety, among others.

Public health is largely about the prevention of ill health and not about curing people. There is an essential role for the state in public health. It is hard to envision coping mechanisms through which private persons can overcome failures of public health. The puzzles of public health are largely problems of state capacity; the expenditures involved in public health are relatively modest.

There is considerable interest in India in *health care*, including primary health care. Health care is, however, largely a private good, with some kinds of market failure (asymmetric information, when faced with a private producer, and positive externalities when communicable disease transmission is diminished). Health care and primary health care are distinct from public health.

In this section, we focus on public health, the population-scale activities of the state that combat market failures of public goods and externalities. The six big issues that have confronted Indian public health in 2020 are contact tracing, social distancing, testing, the statistical system, medical research, and the coming vaccines.

3.1. Institutional Capacity for Contact Tracing

The machinery of public health when faced with an epidemic consists of testing a large number of persons, finding persons who are infected, tracing their contacts, isolating and testing their contacts, and treating the sick. Through this, the epidemic is contained.

A critical step in this is contact tracing, which requires complex organizational capability. Contact tracing requires a large workforce. A rough estimate suggests that India may require a contact tracing workforce for COVID-19 of about 0.3 million individuals for the entire country, or about 0.1 million individuals if this is done in the dense cities that add up to a third of the population.² This correspondingly calls for management capacity to overcome principal-agent problems and get frontline workers to be effective. It involves writing process manuals, training staff, and establishing oversight to monitor their work.

In the class of problems in public policy, contact tracing is not a particularly difficult challenge for achieving state capacity. It is useful to think about this problem from the classification framework of Pritchett and

2. The values per 100,000 of population for some countries are as follows: the USA's requirement is 66, Germany's is 25, the UK's is 37, and Iceland's is 14 (Luo et al. 2020; Morris and Beck 2020; Triggler 2020); if we use a value for India of about 25 per 100,000, this scales up to an overall headcount of 337,500.

Woolcock (2004), as extended by Kelkar and Shah (2019), which determines the complexity of building state capacity on a given problem by asking the following four questions:

1. *Are there a lot of transactions?* Contact tracing involves a high number of transactions.
2. *Is there a lot of discretion with frontline workers?* Contact tracing involves low discretion in the hands of frontline workers.
3. *Are the stakes high?* In contact tracing, the stakes are low; the decisions of frontline workers cannot have a large impact on an individual.
4. *Is there opacity?* It is possible to do contact tracing under conditions of high transparency.

By this reasoning, contact tracing meets one test of what creates difficulty in building state capacity: it involves a lot of transactions. As with other transaction-intensive problems in Indian public administration, there is the ever-present danger of frontline workers sinking into apathy or becoming overbearing (Parsheera 2020). Some of the ideas about how this can work, which are well understood elsewhere in the world, do not port readily to most Indian settings; for example, Sané (2020) draws attention to the difficulties of ensuring isolation of infected persons in crowded Indian cities.

The public administration challenge with contact tracing for COVID-19 was accentuated by the fact that in most of India institutional capacity for contact tracing was either fledgling or absent, and there was a need to build or scale this in merely one or two months.³ This is a unique dimension in the public administration challenge, one that has not been part of the reasoning around the framework of transactions-discretion-stakes-transparency mentioned above.

Contact tracing for COVID-19 seems to have fared better in some states such as Kerala and Tamil Nadu, and it is important to understand how this was achieved (Das et al. 2020; Isaac and Sadanandan 2020; Sadanandan 2020). These states have foundations of public health in terms

3. In early February 2020, the first newspaper columns about the concerns about COVID-19 were appearing in India. Sethi and Shrivastava (2020) document two papers by government scientists in the *Indian Journal of Medical Research* which appeared in the last week of February. In early March, some health policy papers started appearing (e.g., Kelkar and Shah 2020; Rajagopalan and Tabarrok 2020; Shah 2020a), and the first nationwide lockdown began on March 25, 2020.

of organizational structures and laws of the kind that are not seen elsewhere in India.⁴ At the same time, given the large differences in local conditions all across India, it is not easy to directly transplant the institutional design of public health in Kerala or Tamil Nadu into many other states. This is a problem that requires careful local solutions, one city at a time.

Given the difficulties of building state capacity for public health in the form of organizational capability to do contact tracing, there was some initial attraction to a technology-intensive solution: an application on a mobile phone that would keep track of every person-to-person contact, so that once a positive result is obtained, a central computer database would be able to show all the individuals who have been met in recent weeks. However, such an application is no substitute for the painstaking work of contact tracing by a large field force of trained contact tracing staff. In addition, there are many concerns associated with personal information being visible to the Indian State (Bhandari and Rahman 2020). There is a need to focus on process engineering for contact tracing, where the development of applications is an element of institution-building for contact tracing.

3.2. Social Distancing

Enhanced social distancing is an important mechanism through which human societies modify the dynamics of an epidemic and create incentives for pathogens to evolve towards reduced virulence.

The first element of this is the optimization by each individual (Cochrane 2020). Each individual has an assessment about their own trade-offs and manages the tension between the health hazard and the economic/social imperative. Different persons will face different trade-offs. The first line of attack in public health must be to earn the trust of the populace, deliver accurate knowledge to the people, and obtain gains from non-coerced modification of behavior. These individual decisions will be supported by better knowledge about mechanisms of virus propagation, better estimates of the conditional probability of grave illness or death, and neighborhood-specific updated data about the extent of infection. These three elements of knowledge are a public good, and there is a case for state provision. Alongside this, there is a need for a communication strategy, which can take this knowledge and send accurate and consistent messages on a population scale.

In India, there was fair access to information about virus propagation and the conditional probability of grave illness or death based on international

4. For example, there are public health laws in these states in the form of the Tamil Nadu Public Health Act, 1939, and the Travancore Cochin Public Health Act, 1955.

experience. The government ran large-scale information communication programs, and these appear to have been effective. There was relatively little information about India-specific questions, for example, the links between COVID-19 and spitting *paan*. Similarly, an article such as Thomas (2020) utilizes papers done elsewhere in the world to illuminate what might happen under Indian conditions of temperature, humidity, and insolation, but little research was available under Indian conditions that directly informed decision-making in India.

When an individual chooses to engage in economic and social activities, there is a small negative externality that is imposed upon others. The magnitude of this negative externality is proportional to the infection rate prevalent at each point in time. In order to correct for this market failure, there is a case for using the coercive power of the state to force reduced social interactions.

In the limit, this leads to ideas such as lockdowns. While extreme measures might sometimes appear attractive, it is important to bring logic and evidence to analyzing a lockdown (Melnick and Ioannidis 2020). For an analogy with cholera, though cholera is a waterborne disease, closing down the water supply of a city is not a wise path to control cholera.

Some countries have used lockdowns to successfully control the COVID-19 epidemic (Baker et al. 2020), but these were small populations with high state capacity. Asymptomatic transmission poses serious challenges for lockdown policies (Gandhi et al. 2020), which suggests that lockdowns are useful either when they are done very early, or when they are accompanied by very large-scale testing–tracing–isolation. An overall analysis (Islam et al. 2020) suggests that earlier and longer lockdowns were associated with reduced spread of the disease. However, conditions in India (high density housing, low state capacity in testing–tracing–isolating, and the economic imperative for many households to obtain an income) suggest that controlling the epidemic through lockdowns was going to be hard. A second class of arguments in favor of a lockdown is based on the objective of gearing up with increased health care capacity.

There are complex puzzles in addressing the trade-offs faced in such regulation. Using state power to close temples and bars appears reasonable. As an example, the “Ashadh pilgrimage” in Pandharpur, Maharashtra, was closed for the first time after 1944 in 2020. In contrast, the Kumbh Mela in Haridwar, Uttarakhand, which was scheduled for 2022, was moved to March/April 2021. In many other respects, the picture is less clear. There is a case for decentralized action that utilizes local data for the infection rate, weighs trade-offs in a way that is sensitive to local conditions of economic

and social life, engages in a cost-benefit analysis, achieves democratic legitimacy through consultation and the display of expertise, and emerges with the cautious use of state coercion to increase social distancing, over and beyond the rational decisions of individuals.

The use of the coercive power of the state in forcing social distancing rules faces pitfalls in India owing to foundational difficulties on civil liberties. These weaknesses in the “invisible infrastructure” shape health policy thinking in India, while they are not a concern in mature liberal democracies. As an example, few health policy experts could have anticipated the episode in Tamil Nadu, where two persons were arrested for allegedly keeping their shop open for 15 minutes more than the time allowed in a lockdown and died in police custody.

In the Indian story, decisions about the design of social distancing regulations were taken at the Union Government level and not in cities; there was insufficient information available about the true infection rate, and a high extent of coercion was applied. It was hard to see a sophisticated analysis of trade-offs. These problems are related to the lack of checks and balances in the Epidemic Diseases Act, 1897, and the Disaster Management Act, 2005 (Kaur 2020; Kumar 2020; Shah 2020c).

The lockdowns in India helped in gearing up the public sector health care system in terms of things such as PPEs, ventilators, and training. Most of the guidelines published by the Ministry of Health and Family Welfare came out after March 23, 2020. Alongside these successful elements, there was slow progress on engaging with the private sector, which holds the key to scaling up health care and testing. Improvements in the measurement of COVID-19, which could have been established during the lockdown, were limited.

3.3. Testing

Government-run testing facilities were significantly enhanced in response to the pandemic. The throughput through these labs went up dramatically once that happened. However, the bulk of testing capacity in India is in the private sector, particularly in the West and the South. The business of testing contains a market failure, asymmetric information, as it is hard for the customer to know the extent to which the test is accurate. There were long-standing gaps in private and public initiatives that could address this market failure. There is an interesting tension between state power and a private health care system. One element of this was seen in diagnostic laboratories, which do testing. This is analyzed in Kaur et al. (2020). There was a process of obtaining approvals through which the government gave

approvals to over 200 private laboratories and only thereafter did testing in private laboratories start.

When the pandemic started, the Indian Council of Medical Research (ICMR) was thrust into a regulatory role on testing. ICMR is primarily a research organization, and it did not have the organizational capacity for regulation of a private industry. The laws that were employed for the purpose (the Epidemic Diseases Act, 1897, and the Disaster Management Act, 2005) lacked checks and balances, and were, therefore, not conducive to the development of state capacity (Kaur 2020; Kumar 2020). ICMR and other state organizations drifted into an intrusive command-and-control approach toward private testing, featuring bans, price controls, and interference in the management choices of private persons. These intrusive actions are generally inefficient.

One pathway to utilizing the testing capacity in the private sector is public procurement. The government could become a large-scale purchaser of the services of private diagnostic laboratories. This procurement process can include elements that address market failure, for example, it can ensure minimal quality standards.

3.4. Statistical System in Health

A key function in public health is obtaining high-quality information about the state of health in the country. A statistical system needs to be constructed in health featuring microdata from all across the country, where the information is timely. Statistical analysis of this data would then reveal outbreaks, epidemics, and pockets of unusual morbidity, which can kick off investigative work by public health authorities in order to solve these problems at their root cause.

All over the world, the response to COVID-19 has demanded high quality data. These data (and models based on these) are required at the city and neighborhood levels in order to understand the threat, shape the public health response, optimize the behavioral decisions of each individual, and shape social distancing measures that are adopted at the community level.

There has been a clamor for “more testing” worldwide. Governments have come to compete on achieving more tests per day. There was a dramatic gain in the raw number of tests per day that took place in India over the early months of 2020. ICMR COVID Study Group et al. (2020) show basic facts about the measurement work at the ICMR in early 2020. However, it is important to see the four distinct elements of testing as delineated below (Malani, Mohanan, Balsari et al. 2020; Mukhopadhyay 2020a; Shah 2020b):

1. *Testing in the health care context:* When an individual reports certain symptoms to a doctor, the doctor might prescribe an RT-PCR test. The results of all RT-PCR tests can be aggregated and, as a high-frequency time series, can be a valuable decision-making tool at the neighborhood, village, district, or city level.
2. *Public health objectives in small groups:* Consider an at-risk group such as nurses or railway employees. It would be valuable to obtain a statistical estimate of the infection rate every week. This can guide improvements in processes and improve the morale of these groups.
3. *Public health objectives in a neighborhood:* At a neighborhood level, accurate and timely estimates of incidence are valuable as they feed back into the decisions of each individual about the optimal level of economic and social activities. These estimates can also be used to shape state coercion on social distancing, which can be useful when the probability of getting infected is high.
4. *Restarting the economy:* The scientific community is working on a fuller understanding of immunity, which can ultimately lead to one or more tests generating an “immunity passport,” which will tell the individual that the disease is no longer a threat.

Each of these four objectives is important and needs to be pursued. In the present state of the science, the fourth is not yet feasible, so we discuss the first three. A large number of tests can take place in a clinical care context. However, for many reasons there are concerns about the extent to which the aggregate data is useful:

1. There have been fluctuations in the prescribed decision process (“protocol”) that a doctor is supposed to use when prescribing a test.
2. When each change in the prescribed protocol takes place, there are vagaries in the communication of these changes to every doctor in India.
3. There have been capacity constraints in testing.
4. The bulk of both health care and testing capacity in India is in the private sector, but state coercion was used to limit the ability of private doctors to prescribe tests and private labs to conduct tests.

In standard epidemiological models such as the Susceptible–Exposed–Infected–Recovered (SEIR) model, the measured I is the fraction of persons who are infected in the population. This should ideally be measured by a statistical sample. It can be approximated by using data from a clinical

setting if the protocols are stable, applied consistently, with sound frontline measurement procedures, and are in place on a large scale. These features were not in place in India in early 2020. As a consequence, the conventional data about the number of tests and the fraction that test positive are difficult to interpret (Bajpai 2020; Bansal 2020; Das et al. 2020; Mukhopadhyay 2020b; Rukmini 2020a; Sharma and Premkumar 2020). This limits the usefulness of papers such as Philip et al. (2020), which estimated that the age-adjusted case fatality rate in India was higher than would be expected based on estimates from 14 countries.

Some papers are more effective in estimation. As an example, Malani, Mohanan, Kumar et al. (2020) did antibody testing for a statistical sample of migrants returning to Bihar from many locations across the country and found numerical values that were difficult to reconcile with conventional estimates reported from source locations or for the whole country. While epidemiological modeling is a difficult area even with the best of data, in India, data limitations have particularly hampered the extent to which the analysis of aggregate data could become useful.

One natural fallback for measuring the state of the pandemic would have been to fall back from estimating the number of persons infected to estimating the number of deaths. Here, we encounter the weaknesses of the systems that attribute the cause of death (Barnagarwala 2020; Rukmini 2020b; Sinha 2020). In particular, once officials are evaluated on the number of deaths owing to COVID-19, they have an incentive to understate the number of deaths. Trusted daily statistics for birth and death, and hospitalization data, can also be highly influential for public health work, but they are not available in India. Novel approaches to estimating all-cause mortality using panel household survey data can be brought to bear on the problem (Sané and Shah 2021).

There is thus significant uncertainty surrounding published estimates of the number of infected persons at a point in time, the number of persons who were ever infected, and the number of deaths that can be attributed to COVID-19. Statistical sampling offers a natural path to sidestep these difficulties and obtain sound estimates of the number of persons infected (using the RT-PCR test) and a lower bound of the number of persons ever infected (using data from antibody tests). There was one such episode of measurement through statistical sampling, where the ICMR conducted a study in late April 2020 in 70 districts. A key finding of this appears to be the presence of high heterogeneity within these 70 districts, where some locations, such as the containment zones in Mumbai, had seroprevalence

rates as high as 30 percent, while there were other districts with values near zero. There are some newspaper stories that give a sense of these results, but the dataset or paper has thus far not been released. As of this writing in July 2020, this one survey dataset from end-April 2020 was the most recent measurement project of this nature.

There are weaknesses in the information systems through which test data are assembled and released. With all its weaknesses, a substantial amount of testing has taken place in India, and there are many opportunities for utilizing these data in ways that would better inform the actions of citizens, firms, doctors, and various arms of the government. However, there are limitations in the mechanism through which aggregate time-series information is published (Agarwal and Kaur 2020). Unit-level information is not released.

Weaknesses in the statistical system are present in other aspects of COVID-19 also. As an example, assuming that useful forecasts could be obtained of future infections and hospitalizations, these would need to be compared against the health care system capacity in terms of the number of regular beds, ICU beds, and ventilators, among other things. These things are, however, not easily measured. The bulk of health care capacity in India is now in the private sector, and there is no measurement system that is able to obtain and update this information. The Ministry of Health has a National Health Resource Repository (NHRR) that enumerates facilities and their capabilities. The institutional infrastructure for continuous updating of the NHRR is not yet in place; it is updated episodically. It was last updated in 2019, but there was no data release.

Within public sector health care, Roy (2020) points out that when officials are measured on the total number of beds, they have a tendency to portray progress on the total number of beds while sacrificing the ratios that are normally maintained about the number of ICU beds and number of ventilators per unit hospital bed; this hampers the estimation of (say) ICU beds using thumb rules based on the total number of beds.

Overall, it appears that there was a gap between measurement and data dissemination in India when faced with the pandemic, as opposed to information production that would have been influential in improving decisions by many persons across the country. It is important to see these difficulties in the initial conditions in the core public health objectives of the statistical system in health that were in place before the pandemic arrived (Chandra Sharma 2019; Rajan and James 2016; Sharma 2016). From that starting point, the outcomes from the firefighting in a few months when the pandemic arose are not surprising.

3.5. Medical Research

Once the pandemic started, there was remarkable progress worldwide on producing research in real time, which unlocked many of the secrets of the virus and the disease. Knowledge is a global public good, and India has been a great beneficiary of this knowledge.

There is an array of scientific questions, however, that are more specific to India, and for which researchers elsewhere in the world will not ordinarily embark upon research projects. Some examples of these include the following:

1. A significant body of evidence has been obtained from natural history studies in Wuhan (China), Lombardy (Italy), and New York (USA). The temperatures prevailing in the months of rapid growth of the pandemic there were 3–11°C, 4–9°C, and 0–10°C, respectively. How do Indian conditions of temperature, humidity, and insolation change disease transmission?
2. What are the implications of Indian social practices (e.g., spitting *paan*, customs in temples, death rituals) for disease transmission?
3. What statistical techniques of epidemiological research are required to find patterns in Indian unit-level data about who gets infected and who gets adversely affected when infected, so as to create feedback loops that can help alter behavior by individuals?
4. How do the standard results about the probability of serious illness and death, and their variation with age and comorbidities, get modified under Indian conditions? Is there geographical variation? Is there variation by income or other social class?
5. What are effective clinical protocols that are feasible under median conditions in an Indian health care facility? As an example, once we assume that ventilators cannot be used on a large scale in India, how can oxygen therapy be best applied (Sudhir and Mor 2020)?
6. What is the immune system response in India to the Coronavirus? What is the demographic variation seen in India on issues such as cross-reactivity, antibody neutralization, and reinfection?
7. The high prevalence of adult malnutrition in India is unique; could it interact with COVID-19 fatality in some ways?
8. India has the largest pool of persons who are or have been infected with tuberculosis. To what extent is this an important comorbidity?
9. What variants are prevalent, and how effective will mainstream vaccines be against contemporary variants at different points in time?

These are, of course, only examples. A robust process of the exchange of questions and ideas between researchers, persons in health policy, and medical practitioners is required through which questions are identified and answers are rapidly discovered. The ICMR has established teams as part of the COVID-19 “Rapid Response Team,” which are doing medical research. There is a need for a strong scientific community that is able to rapidly produce such papers, with large-scale capacity across the public and private sectors. This community will benefit from better linkages into researchers and research institutions outside India.

3.6. The Coming Vaccines

There is an active global race to build vaccines that protect against COVID-19. There are about 30 vaccine research projects in India, including the major work at Bharat Biotech. It is likely that in the coming months, multiple high-quality vaccines will come about. This optimism draws on the remarkable scientific advances in the development of vaccines that has come about in the last 20 years.

Even if good vaccines are invented outside India, India is an important producer of vaccines on a global scale. As an example, Ramu (2015) shows a global vaccine development project that chose to use certain elements of the overall project in India. Some of the prominent vaccine designers worldwide are likely to turn to Indian companies for their manufacturing capabilities. Whether through research or manufacturing, there will be significant movement on vaccines in India in the coming months.

At that point of time in the future, the following important questions will arise:

1. How can the vaccine approval processes of mature market economies be harnessed to make decisions for the approval of vaccines in India?
2. How will Indian economic agents be able to purchase large quantities of vaccines at relatively affordable prices? What can be done to secure supplies of sufficiently high volumes at sufficiently low prices?
3. A vaccine is a private good with a positive externality. What is the optimal combination of private purchase and public financing that can share costs wisely?
4. How can a nationwide program be organized to distribute this vaccine to a large mass of people? The present state-led immunization programs have many flaws. How can the private health care sector be harnessed for this problem?

5. Assuming that there are supply limitations, is there a role for voucher programs from the state in favor of certain persons? Should the vaccine first be given to high-risk populations, health care workers, or front-line workers who could become super-spreaders because they are in contact with many?
6. Herd immunity could be achieved in theory without immunizing the entire population. What is an optimal strategy for India that puts the epidemic to an end, protects those persons who are at risk, and yet minimizes cost?

There is a need for innovative policy research on these questions in the coming months.

3.7. Building a Public Health System in India

The COVID-19 pandemic has brought fresh emphasis on building institutional capacity for public health in the country. Based on these experiences, we have fresh insights on elements of the public health system in India that would help deal with such a situation.

3.7.1. THE GAINS FROM DECENTRALIZATION

A recurring theme is the importance of the Constitutional vision of India as a union of states. The bulk of the work in public health is best performed by cities and states. How to solve the trade-offs between livelihoods and contagion? How to allocate resources in testing? How to mobilize health care? What are the precise tactical details of organizing a response that would work well? This work is best placed at the level of the city or district government. Officials at the local level understand their neighborhoods and economic activities the best and face greater feedback loops of accountability.

Local context is highly important. As an example, in a Kerala setting with significant institutional capacity in contact tracing, there may be a certain optimal pathway for building sound institutional arrangements for contact tracing, and there might be a certain optimal role for contact tracing apps in that context. But this context, and thus the optimal role for a contact tracing app, could be quite different in other states. This emphasizes the need for a decentralized approach.

There is a small negative externality suffered by society when each individual interacts with others in the course of economic and social life. The magnitude of this negative externality is proportional to the infection rate prevalent at a point in time, which varies sharply across cities. The trade-offs about the kinds of economic and social activities that should be

sacrificed depend upon local conditions. Hence, the best way to organize state coercion in social distancing is at the city level.

Public health work is best conducted through discussion and persuasion and not the use of coercive power. Officials at the local level are well connected to local human networks. They have the ability to organize meetings with residents of the city, engage in communication, persuasion, and negotiation layered with a small amount of coercion. An example of a feasible mechanism design at the local level, involving a “Social Distancing Committee,” is presented in the Appendix. One argument in favor of local control is that in fighting the epidemic, officials at the local level have to “eat their own dog food.” Success or failure will directly impact them through the health of their family and friends, and through the respect or criticism that they earn for their efforts. This is one element of the gains from decentralization from the subsidiarity principle, which argues that every government function is best placed at the lowest level of government where it can possibly be done efficiently.

The problems of the entire 3.3 million sq. km of India are dauntingly large. It is difficult for any one mind, or any one team, to envision the correct strategies for health and economic policy on this large a scale. As an example, if a policy team had to think about doing antibody measurement for a random sample of India, this is a difficult project to design and execute. The problem statement, “Establish a random sample of 1,000 people in Pune and run an antibody test on them,” is a more tractable one when compared with the statement, “Establish an adequate sample of people all over India and run an antibody test on them.”

Large states of India are of the size of countries elsewhere in the world. The decentralization agenda in India is not just about decentralization to the state capital; it is critically about decentralizing all the way to the city. The most important level of government for high-transaction public health functions is the city government. This is another dimension in which states such as Tamil Nadu and Kerala have fared better than mainstream Indian arrangements.

At present, the organization of Union, state, and city governments in India has many problems. There is a fragmentation of authority between the state government and the city government. Officials in the city government or at the district level are often overloaded and find it difficult to meet this challenge. Policy design needs to recognize these capacity constraints and envision commensurate responses to these constraints. The decentralized approach to health policy needs to go hand in hand with capacity enlargement for local government.

As an example, by default many functions are often placed with a chief medical officer (CMO), who easily slips into the role of being the point person for anything connected with health. However, problems of public health, and particularly the problem of COVID-19, are intersectoral and often go beyond the capacity of a CMO. The CMO may often be the point person for the operations of government hospitals, but public health is distinct from hospital management.

In establishing a decentralized approach to health policy for COVID-19, there is a need to precisely articulate the problems that local governments have to solve, and the support that will be available to the leadership of local governments from state and Union governments.

3.7.2. BUILDING STATE CAPACITY FOR CONTACT TRACING

Each state and city needs to address the problem of organization design and developing state capacity for contact tracing. Recent events remind us that this organization design is not like, say, hiring a lot of schoolteachers. What is required is a flexible, small organization that is able to rapidly scale up when faced with an epidemic and go back to its original size after the epidemic has ended. The small “standing army” must be primarily about the option value of rapidly achieving large-scale contact tracing when the need arises. As an example, while New York City had world-class public health institutions, once the pandemic arrived, 3,000 additional workers were hired into contact tracing. In this aspect, contact tracing presents a challenge in public administration that is a bit different from mainstream problems in organization design as seen, for example, with police and schoolteachers.

3.7.3. ADDRESSING MARKET FAILURE IN TESTING

The private sector is the dominant force in the Indian diagnostic testing industry. There is a market failure due to asymmetric information in this area. This market failure needs to be addressed through a three-pronged effort with (a) private certification initiatives; (b) mechanisms of public procurement; and (c) a light layer of regulation.

In this, we need to recognize the difficulties associated with more intrusive tools, such as price controls, bans, export bans, and government control of the technology used in testing. As an example, when the prices of PPE rose in India, this was not a cause for concern. In fact, this was the signal that worked its way through the market economy and induced a large supply response to the point where India is now a large exporter of PPE. Every state interference in the prices of PPE served to slow down this supply response.

The construction of state capacity for a light layer of regulation can draw upon modern thinking in India about the difficulties of building state capacity in regulation.

3.7.4. PUBLIC GOODS AT THE LEVEL OF THE UNION GOVERNMENT

There is a need for institutional capacity that is akin to the US CDC. While the ICMR was placed into certain roles in the short run when the pandemic began, clear thinking is required about the role of the National Centre for Disease Control (NCDC), and a systematic effort needs to commence on building state capacity in the chosen organization.

3.7.5. SCIENTIFIC RESEARCH

There is need to rethink the framework using which public resources are put to work through government research institutions, private research institutions, and private firms in order to achieve the requisite research capacity in the country that can be galvanized to address questions of importance to private and public decision-makers in India.

In the prevailing vision of science in India, there is a fusing of public expenditure and public production. It is more effective to use public funding through a grant mechanism to get the production of research out into non-government organizations. This creates greater competition and places management decisions about research organizations into the hands of non-government and private organizations that are better able to perform these functions. For an analogy, the National Aeronautics and Space Administration in the US is a contracting organization; it does not have a vast scientific workforce, it does not do research, design spacecraft, or build spacecraft (Shah 2019).

3.7.6. HEALTH STATISTICS

There is enormous value in building datasets and models around the questions of health. As an example, Rivers and George (2020) draw an analogy between the public goods of government-run weather data and forecasting, and the required public goods of government-run health data and associated forecasting. A particularly simple dataset, which can be highly influential for public health research, is the daily release of accurate statistics about births, deaths, and hospitalizations.

When tests take place in a clinical care setting, these data need to be assembled into a single database and made available in anonymized form to the research community. The Union Government, state governments, and city governments must all have the ability to create time-series survey data,

where some or all parts of the country are put into intensive surveillance using periodic waves of testing of random samples. Public health officials require the ability to commission testing of a random sample of, say, health workers in a given city as part of their process of isolating the problem.

The development of electronic health records, with an open ecosystem of multiple but interoperable software systems at health care organizations, will help create a more information-rich environment, though there are grave concerns about the privacy of individual information. The National Digital Health Mission could potentially play a useful role in protecting individuals and improving the data quality and interoperability of electronic health records.

3.7.7. THE PROBLEM OF PURCHASING

When an epidemic gathers momentum, a surge in testing is required. This necessitates the ability of the government to purchase testing services from private persons. This, in turn, requires establishing state capacity in contracting (procurement, dispute resolution, contract renegotiation, and payments) in public health authorities at all three levels of government.

3.7.8. A SYSTEMATIC PROCESS FOR CONSTRUCTING STATE CAPACITY

Many of the steps mentioned above (e.g., contact tracing and the role of the NCDC) require the systematic creation of organizational capability. Poor public administration in India in public health meant that a diverse array of public servants was pulled out of essential health (and non-health) services in order to prioritize COVID-19, and that has had its own adverse consequences. There is need for the systematic construction of organizational capabilities on all fronts so that a diverse array of state functions can harmoniously take place even in a crisis.

The lack of checks and balances in the foundational laws is a key source of arbitrary power and, thereby, low state capacity; a key feature of the road ahead lies in establishing checks and balances in law.

The road ahead involves designing laws, organization diagrams, process manuals, accountability mechanisms, training procedures, and putting in the homeostatic functions of contracts, finance, human resource management, facilities management, and transparency. The public administration dimensions of this problem are similar to the mainstream state capacity problems seen in India, for example, as analyzed in Srikrishna (2013); Ministry of Corporate Affairs (2016); Roy et al. (2019); and Kelkar and Shah (2019).

4. Health Care

There are two strengths that worked in India's favor in the pandemic in its early months. First, with young demographics, the fraction of those infected who required significant medical care as of this writing has been small. Second, there was more time to prepare, given that the pandemic came relatively late to India and with the additional months that were obtained through varying degrees of lockdown. By and large, this time was utilized to significantly galvanize the public sector health care system into action.

From the first principles of public economics, health care is largely a private good, with the special case of infectious disease where there is market failure in the form of positive externalities. When we think of the market for private health care, there is an important market failure in the form of asymmetric information. Most customers are not able to understand the extent to which the producer, doctor, or nurse acted in their best interests, or to be able to shop around and thus exert market pressure on pricing. There is thus a significant problem in consumer protection.

In India, there is one large health care organization—the government—which accounts for about a 30 percent market share of health care and about a 10 percent share of intensive care staff. The remainder of health care is produced by a large number of private health care firms within a competitive market structure. While in some other countries there is market failure in the form of excessive market power with a small number of health care firms, this is not a problem in India.

The prime focus of health policy in India has, however, been on the management, resourcing, and operation of health care organizations that the government controls. There has been little attempt at addressing market failure in the private market for health care, and in recognizing the important role of private health care providers, and utilizing them to achieve policy objectives.

4.1. The COVID-19 Surge in Health Care Requirements

As has been seen elsewhere in the world, the peak of the epidemic curve is associated with a surge in health care requirements that can overwhelm the health care system. In the Indian cities with the largest number of cases, Mumbai and Delhi, the health care system came under considerable stress. However, at the same time, in large parts of the country the epidemic did not enlarge sharply in early 2020. The timing of the epidemic in each city was different, but the features of the health care crisis in each city are similar

and are reminiscent of those seen elsewhere in the world. As an example, Johnson (2020) is a recent story of the surge in Bengaluru.

Newspaper reports of the ICMR's statistical sampling in 70 districts in late April 2020 suggest that in a large fraction of the districts the prevalence of the disease was rather small. In April and May 2020, the expansion of cases was limited by the lockdown, which also helped forestall the possibility of capacity constraints in health care.

In a strategic view of the COVID-19 pandemic in India, the challenge lay in utilizing the levers of public health to flatten the epidemic curve while simultaneously enlarging health care capacity so as to minimize the extent to which surges took place that exceeded the health care system capacity. The overarching issue in the normative analysis of the Indian health care system in 2020 is to think about the extent to which health care capacity was indeed enlarged.

Indeed, looking into the deep future, COVID-19 has brought new attributes into the challenge of health policy. In order to address the possibility of an epidemic in the future that cannot be contained by public health alone, it will be important to plan for a health care system that has the capacity to scale up its services on demand. This will of course come at a cost. For example, it will mean holding in reserve capital goods such as hospital beds and ICUs, and paying for operating expenses, for example, salaries of intensivists who are underutilized in normal times.

How can meaningful capacity surges in health care be managed? The first path lies in building additional health care capacity through the one large health organization—the government. The public sector health care system has worked very hard so far in 2020 and has played a disproportionate role in addressing health care requirements. Indeed, without these capabilities, the outcomes in India would have been significantly worse. However, given initial conditions, where only about 30 percent of ICUs or ventilators, and an even smaller share of specialist staff were available, it was difficult to obtain the supply response needed through the public sector health care system. This approach also faced the constraints of operational capabilities and quality.

The other path lies in establishing contracts with the private sector. While this would face the complexities of government contracting, it would be attractive in several respects: (a) the private sector started out with about 70 percent capacity, and it is thus easier to obtain large expansions when working through the private sector and (b) the private sector is likely to have greater operational capabilities and quality.

For a city in India, there are many uncertainties about the magnitude of health care capacity required at a future date. A risk management perspective

is useful in thinking about this sizing. It would be efficient for the government to establish contracts with private persons that would cover the cost of establishing enlarged facilities regardless of actual use, so that society would have the option of being able to utilize these facilities in the event of a surge in the disease.

4.2. Difficulties Faced by Private Health Care Organizations

In the epidemic, demand for health care other than for COVID-19 patients appears to have declined, perhaps through a combination of patients being afraid of infection at health care facilities, difficulties of transportation owing to the lockdowns, and financial constraints faced by households. Alongside this, some health care facilities pulled back from non-COVID-19 activities in order to prioritize COVID-19 activities, there were difficulties with the health care workforce, and some managers of health care facilities may have chosen to retreat from full-fledged operations. Monthly notifications of TB have dropped by 80 per cent, which gives a sense of the extent of the disruption (Ethiraj 2020).

The new government health care program, the *Pradhan Mantri Jan Arogya Yojana* (PMJAY), has become an important source of information about developments in health care. Smith et al. (2020) analyze the data for claims in PMJAY during the COVID-19 epidemic from January to June 2020. The value of claims dropped by 76 percent in the early lockdown phase. There was a slight decline in claims by women, the young, and the old. The number of active hospitals in the PMJAY system dropped by half at first, with private hospitals gradually recovering. Elective surgeries such as cataract or joint replacement at first dropped to near zero levels.

Table 1 shows the 2020 returns on the stock market index of health care firms after the returns of the overall market index is subtracted. This shows

TABLE 1. Excess Returns: Monthly Share Price Index of Health Care Firms Net of Overall Market Index during January–June 2020

| <i>2020</i> | <i>Returns (%)</i> |
|-------------|--------------------|
| January | 14.0 |
| February | -1.0 |
| March | -27.0 |
| April | 11.0 |
| May | -2.0 |
| June | 4.5 |

Source: CMIE Overall Share Price Index.

that in March 2020, with the lockdown, there was a 27 percent decline in health care stock prices reflecting these concerns. The large underlying declines in revenue driving the share price index are likely to have induced significant financial stress in private health care organizations. In an ideal world, private health care organizations should have been devoting their management skills to enlarging capacity; instead, their energies were significantly utilized in addressing their financial stress.

4.3. Protecting Health Care Workers

In the locations where the epidemic has surged, the health care system has faced significant constraints on the health care workforce. This reflects a combination of factors.

Given the substantial viral load that health care workers can be exposed to, many health care workers got sick and thus dropped out of the workforce. This problem was exacerbated by poor protocols in most Indian health care organizations. Concerns about possible sickness hampered labor force participation by some health care workers, particularly the elderly. In the lockdown, transportation constraints hindered the commute to work for junior staff. These problems added up to a decline in health care system capacity on account of the reduced workforce. Improved protocols, access to PPEs, and health insurance could help improve outcomes.

4.4. Health Care Financing

COVID-19-related health care expenses are a highly insurable risk; large expenditures are only incurred for a small fraction of the infected. One pathway for public resources to feed into health care financing lies in a government-run health care system. The other pathway lies in public financing of private health care.

Employees State Insurance (ESI) is a mandatory program for workers of large private firms that offers expansive benefits alongside mandatory payments by workers. In principle, ESI could be the kernel around which a significant health care arrangement could come about. However, in practice, ESI has become one more, large public sector health care organization, with a prime focus on building and operating health care organizations. For most compulsory participants in ESI, the promise of service delivery in practice is not matched by supply-side capabilities. ESI could significantly enlarge its outreach by shifting gears from an emphasis on production to an emphasis on contracting, where it could become a sophisticated purchaser of private health care services.

The many elements of government-funded health insurance schemes could also play an important role in health care financing for COVID-19. There were initial delays in enlarging package designs to encompass testing and treatment for COVID-19. There is a need to build institutional capacity in the operations of these programs in order to respond to the coming surge in requirements.

4.5. What Institutional Apparatus Would have Helped?

The private market for health care suffers from market failure in the form of asymmetric information. The conventional response of the state has emphasized instruments such as bans, price limits, and the commandeering of private facilities. It is desirable to address the market failure through a combination of private clubs, domestic and overseas certification, and sophisticated buyers (either public systems like ESI or PMJAY, or private health insurance companies), all centered around a small core of law and regulation. There is considerable complexity in identifying the minimal core of law and regulation that fits inside the envelope of what is feasible given the constraints on state capacity.

A key barrier that inhibits the relationship between public health policy and the private sector is that of contracting. Many government departments have low capacity in procurement, contract disputes, contract monitoring, contract renegotiation, and timely payments. Private persons have negative expectations of the extent to which the government will litigate or arbitrarily delay payments. Constraints in contracting have shaped up as a critical constraint inhibiting health policy.

At a practical level, in many cities there is an impending storm of the peak of the epidemic curve. The present landscape of actions by the Union Government, state governments, and city governments does not fully address the problem. It is in the self-interest of the health care industry and the business community in each city, and therefore of the city residents, to prepare better and to form local coalitions for coordination and action (Shah 2020d).

5. Conclusion

The pandemic has posed a huge challenge for health policy in all countries. There were significant weaknesses in Indian institutional arrangements before the pandemic commenced. These difficulties were partly grounded in the arrangements for health policy, and partly weaknesses of the homeostatic processes of the Indian State, such as in government contracting.

Some parts of the Indian health system have responded strongly to the pandemic. These include testing and health care in the public sector. At the same time, their pre-existing weaknesses have inhibited the scale of the response.

The stark light of the pandemic has created fresh insights on the difficulties and the priorities for reform. The enormous adverse consequences of the pandemic serve to reinforce the prioritization for public health. The possibilities for public health are summarized in one fact: Taiwan, a country of 23 million with strong travel links to China, has had 9 deaths so far. While the adequacy of resources is an important element of public health, the primary problem is that of institutional reform. Doing the institutional reform and then devoting resources would reflect the long-standing Indian tradition of scaling up resources into pathways that have proven themselves in delivering sound outcomes.

There is now considerable knowledge in the field of state capacity, on the tangible elements of institutional design, of the establishment of checks and balances, through which greater capability can be obtained. This knowledge can now be usefully brought into the field of health policy, with the accent on public health.

Appendix: Institutional Arrangements for Regulating Social Distancing

The pre-COVID-19 world of social interactions is infeasible as it will give rise to an infection surge that will overwhelm existing health care facilities. The other extreme, a complete lockdown for the entire country, has a large impact upon livelihoods. When GDP declines, this will in and of itself generate adverse health outcomes. As an example, infant mortality and maternal mortality go up when GDP declines. Similarly, the resources in the hands of the government that can possibly be brought to bear upon the COVID-19 epidemic are linked to GDP; when GDP declines, tax collections and the resources available to fight COVID-19 also decline.

The puzzle lies in finding a balance between these two extremes. If an environment is created of the state trying to prevent personal freedoms and people trying to surreptitiously regain personal freedoms, then the people will always succeed, and the health policy objectives of social distancing will be lost. The emergence of an adversarial relationship with people will hamper the everyday public health work of tracing, testing, isolating, and

reducing pathways of transmission. When scientific progress comes about in the form of a vaccine, a prophylactic, or a cure, trusted public health channels are of the essence in rolling out these advances on a nationwide scale. This will be impeded if an environment of coercion and conflict is established.

For these reasons, there is need for democratic legitimacy for the chosen path of social distancing. The strategy for social distancing should involve a great deal of discussion and very little coercion. While the state can introduce information into this decision-making, ultimately, each individual and each organization has to make these trade-offs.

This starts with public health officials persuading individuals and organizations that there is an important threat. The government has made good progress in sending information into the populace about the dangers of the pandemic. If sickness or death takes place in a neighborhood, this will impact fear and concern in that neighborhood. Individuals will typically be amenable to thinking about this problem and changing their behavior in response to it. The sheer creation of accurate data and its timely release will create the requisite risk aversion.

Conversely, public health officials do not know enough about the life of each individual and each organization. The imposition of a single rulebook on all people at all times will induce difficulties. If anything, the imposition of a rulebook that lacks nuance and is insensitive to the particular conditions of each individual, household, or organization runs the risk of public health being seen as an out-of-touch imposition, leading to people devoting themselves to evasion.

Alongside social distancing measures (e.g., closing a *mandi* or modifying the working of a *mandi* in ways that lead to reduced disease transmission), there are a host of public health measures that need to be considered. This raises questions relating to the use of masks, enclosed spaces with recirculated air, disinfection protocols for public places, and the use of hand sanitizers and hand washing, among others. All these problems need to be analyzed at a local level, reflecting local constraints and local trade-offs.

Democratic legitimacy comes from expertise, information, persuasion, and the minimal use of coercion. A policy framework for social distancing may hence be envisioned as the following steps:

- There should be Green, Blue, and Red manuals for social distancing. The Green manual should have the mildest requirements and the Red manual should have the highest requirements.

- A group of academics and intellectuals should be organized that creates reference drafts of these three manuals at an all-India level. These draft manuals should then be released on a website for public commentary. There should be no state coercion around these manuals; they should only be inputs for public discourse.
- Each of these manuals should involve the minimal use of force. The bulk of the manual should involve reasoning and recommendations, not threats of state violence. A tiny portion of the manual should involve using powers under the Epidemic Diseases Act, 1897.
- Associated with these manuals should be the full reasoning about the logic behind the design of these manuals. Communication materials should be developed, which explain these manuals to officials and private citizens.

This work can be organized by the Ministry of Health and Family Welfare, the NITI Aayog, and academic institutions. The manuals should be given as intellectual inputs to cities/districts. Armed with this knowledge, officials in the rural districts and cities should debate with their local interest groups and adapt the manuals for their own use. For some places, it may be feasible to close down a *mandi*, but for another city it may be essential to keep *mandis* open and the response there may lie in the extent of safety procedures built into the working of *mandis*. These decisions are best made locally.

Each city would utilize the raw material of the three draft manuals made at an all-India level and come up with their own practical manuals that are grounded in their reality. We might thus have a Nagpur Green, a Nagpur Blue, and a Nagpur Red manual that are discussed and released in Nagpur. Manuals for different cities and districts would appear on the Internet, and their merits would be debated.

The bulk of each city or district manual would involve voluntary actions by various communities, associations, and organizations. The use of state coercion should be minimal. Local officials would have to manage this process of engaging with the community, developing these manuals, developing consensus around the design of the manuals, and getting to the right design of the manuals while using minimal state coercion.

Once a city/district has chosen its design of the Green/Blue/Red manuals, how might it transition between these manuals? When social distancing measures are brought in with greater predictability, economic activity can be better designed around this stochastic environment, and a given level of social distancing can then have a smaller impact upon economic activity and, eventually, GDP.

In order to achieve democratic legitimacy, predictability, and high compliance, each city should establish a Social Distancing Committee to control which manual is presently in use.⁵ Designing the working of this Committee involves thinking about its composition and operations. Here are some suggestions.

Composition and Appointment of a Social Distancing Committee:

1. It should be made up of two officials (the most senior officials of the city government), three scientists, and two businesspersons, thus adding up to seven persons.
2. The appointment of these seven persons should be done by the city government.
3. All seven persons must be residents of the city and each must have at least six family members living in the city.
4. We may note that in a committee of seven, winning requires four votes. If the two city officials have made up their mind on a given idea, they have two votes in hand. For this idea to go through, they would require the support of two more votes from among the remaining five persons. Thus, we see that there is a healthy tension between having an important say for the officials and requiring that they carry at least two of the five other private citizens and their thought processes with them.

Operations of the Social Distancing Committee:

1. This committee should meet every Friday to review the current data about conditions in the city and the neighboring environment, and vote on a possible change over from one manual to another.
2. City officials and their associated researchers would make a presentation to the committee at the start of the meeting, which would provide the committee with the requisite information, based on which a decision can be made. This presentation would be released into the public domain.
3. Each individual in the committee should be required to release a one- or two-page of a rationale statement about why they voted in the way that they did. The public release of the voting record, and the rationale, would generate accountability. In the future, if it is clear (with the

5. These ideas draw on knowledge in the field of monetary economics on the working of monetary policy committees, for example, Shah (2014).

benefit of hindsight) that a decision to go to the Red manual was a mistake, this will generate an adverse impact upon the reputation of the individual. Meetings and voting should take place on a Friday and take effect from the next Tuesday, thus giving everyone three days to gear up for the changed setting.

4. This committee would also have the authority to modify the text of the three manuals over time. These decisions would also take place through voting, rationale statements, and transparency.

Such a committee process ensures that there is deliberation and democratic legitimacy in the decisions about social distancing. In their ordinary life, each of the seven persons would meet and hear the viewpoints of hundreds of persons, and all this knowledge would feed into thinking about the trade-offs and discovering low-cost mechanisms to improve public health that can be used to modify the manuals.

A well-known empirical fact in the history of epidemics is that democracies fare better in epidemics. The tools of public discussion, consensus building, transparency, and lack of the concentration of power will yield the best decisions. The democratic legitimacy of the Social Distancing Committee will help ensure that people cooperate with its decisions instead of trying to get around the constraints. The bulk of the actions envisioned in the three manuals would be voluntary actions of individuals and private organizations without bringing state coercion into the picture.

References

- Agarwal, Natasha, and Harleen Kaur. 2020. "Information about COVID-19 in India." *The Leap Blog*, June 13. Available at https://blog.theleapjournal.org/2020/06/information-about-covid-19-in-india_13.html (accessed May 25, 2021).
- Bajpai, Vikas. 2020. "Half-Truths and Twisted Data Won't Help Control COVID-19." *The Wire*, June 28. Available at <https://science.thewire.in/health/covid-19-icmr-response-seroprevalence-survey-critique/> (accessed May 25, 2021).
- Baker, Michael G., Nick Wilson, and Andrew Anglemyer. 2020. "Successful Elimination of COVID-19 Transmission in New Zealand." *New England Journal of Medicine*, 383: e56, DOI: 10.1056/NEJMc2025203. Available at <https://www.nejm.org/doi/full/10.1056/NEJMc2025203> (accessed May 25, 2021).
- Bansal, Samarth. 2020. "Indian Govt. Trots Out Meaningless Data as COVID-19 Cases Rocket despite Lockdown." *HuffPost*, May 20. Available at https://www.huffingtonpost.in/entry/india-coronavirus-cases-response-data-crisis_in_5ec49658c5b6956f4169fb4f (accessed May 25, 2021).

- Barnagarwala, Tabassum. 2020. "451 Missing Deaths in Mumbai, BMC Updating Records after Mismatch." *The Indian Express*, June 16. Available at <https://indianexpress.com/article/cities/mumbai/mumbai-missing-covid-deaths-bmc-records-mismatch-6460939/> (accessed May 25, 2021).
- Bhandari, Vrinda, and Faiza Rahman. 2020. "Constitutionalism during a Crisis: The Case of Aarogya Setu." *The Leap Blog*, May 25. Available at <https://blog.the-leapjournal.org/2020/05/constitutionalism-during-crisis-case-of.html> (accessed 25 May 2021).
- Chandra Sharma, Neetu. 2019. "Why India Lacks Quality in Its Demographic and Health Data?" *Mint*, July 25. Available at <https://www.livemint.com/news/india/why-india-lacks-quality-in-its-demographic-and-health-data-1564048796002.html> (accessed May 25, 2021).
- Cochrane, John H. 2020. "An SIR Model with Behavior." *The Grumpy Economist*, May 4. Available at <https://johnhcochrane.blogspot.com/2020/05/an-sir-model-with-behavior.html> (accessed May 25, 2021).
- Das, Jishnu, Neelanjana Sircar, and Partha Mukhopadhyay. 2020. "A Blueprint for a Testing Strategy." *Hindustan Times*, April 22. Available at <https://www.hindustantimes.com/analysis/a-blueprint-for-a-testing-strategy-analysis/story-OEx409xxBbAXbzLDV1diGI.html> (accessed May 25, 2021).
- Das, Mehul, Isalyne Gennaro, Sneha Menon, Anahita Shah, Kadambari Shah, Tvesha Sippy, and Priya Vedavalli. 2020. "Kerala's Strategies for COVID-19 Response: Guidelines and Learnings for Replication by Other Indian States", May 11 Mumbai: IDFC Institute. Available at http://www.idfcinstitute.org/site/assets/files/15617/kerala_strategies_for_covid-19_response_updated_may_11_2020-1.pdf (accessed May 25, 2021).
- Ethiraj, Govindraj. 2020. "'COVID Will Set Back India's TB Programme by a Decade': Madhukar Pai." *IndiaSpend*, May 13. Available at <https://www.indiaspend.com/covid-will-set-back-indias-tb-programme-by-a-decade/> (accessed May 25, 2021).
- Gandhi, Monica, Deborah S. Yokoe, and Diane V. Havlir. 2020. "Asymptomatic Transmission, the Achilles' Heel of Current Strategies to Control COVID-19." *New England Journal of Medicine*, 382 (22): 2158–160.
- ICMR COVID Study Group, COVID Epidemiology and Data Management Team, COVID Laboratory Team, and VRDLN Team, Indian Council of Medical Research. 2020. "Laboratory Surveillance for SARS-Cov-2 in India: Performance of Testing and Descriptive Epidemiology of Detected COVID-19, January 22–April 30, 2020." *Indian Journal of Medical Research*, 15 (5): 424–37. Available at <http://www.ijmr.org.in/article.asp?issn=0971-5916;year=2020;volume=151;issue=5;spage=424;epage=437;aulast=ICMR> (accessed May 25, 2021).
- Isaac, T. N. Thomas, and Rajeev Sadanandan. 2020. "COVID-19, Public Health System and Local Governance in Kerala." *Economic & Political Weekly*, 55 (21), May 23. Available at <https://www.epw.in/journal/2020/21/perspectives/covid-19-public-health-system-and-local-governance.html> (accessed May 25, 2021).

- Islam, Nazrul, Stephen J. Sharp, Gerardo Chowell, Sharmin Shabnam, Ichiro Kawachi, Ben Lacey, Joseph M. Massaro, Ralph B. D'Agostino, and Martin White. 2020. "Physical Distancing Interventions and Incidence of Coronavirus Disease 2019: Natural Experiment in 149 Countries." *British Medical Journal*, 370 (2020): m2743. Available at <https://doi.org/10.1136/bmj.m2743> (accessed May 25, 2021).
- Johnson, T. A. 2020. "Bengaluru Battle: Amid Spike, Shortage of Staff and ICU Beds with Ventilators." *The Indian Express*, July 6. Available at <https://indianexpress.com/article/india/bengaluru-battle-amid-spike-shortage-of-staff-icu-beds-with-ventilators-6491895/> (accessed May 25, 2021).
- Kaur, Harleen. 2020. "Can the Indian Legal Framework Deal with the COVID-19 Pandemic? A Review of the Epidemic Diseases Act." *Bar and Bench*, March 27. Available at <https://www.barandbench.com/columns/can-the-indian-legal-framework-deal-with-the-covid-19-pandemic-a-review-of-the-epidemics-diseases-act> (accessed May 25, 2021).
- Kaur, Harleen, Ameya Paleja, and Siddhartha Srivastava. 2020. "Legal and Regulatory Framework for Laboratory Testing in India: A Case Study for COVID-19." *The Leap Blog*. Available at <https://blog.theleapjournal.org/2020/07/legal-and-regulatory-framework-for.html> (accessed May 25, 2021).
- Kelkar, Vijay, and Ajay Shah. 2019. *In Service of the Republic: The Art and Science of Economic Policy*. Bristol: Penguin Allen Lane.
- . 2020. "The Epidemic of 2020: Setting Course for a V-Shaped Recovery." *Business Standard*, April 7. Available at http://www.mayin.org/ajayshah/MEDIA/2020/covid19_india.html (accessed May 25, 2021).
- Kumar, Alok Prasanna. 2020. "Lawless Law-making in a COVID-19 World." *Economic & Political Weekly*, 55 (25), June 20. Available at <https://www.epw.in/journal/2020/25/law-and-society/lawless-lawmaking-covid-19-world.html> (accessed May 25, 2021).
- Luo, Eric, Nicholas Chong, Clese Erikson, Candice Chen, Sara Westergaard, Edward Salsberg, and Patricia Pittman. 2020. "Contact Tracing Workforce Estimator." Washington, DC: Fitzhugh Mullan Institute for Health Workforce Equity, The George Washington University. Available at <https://www.gwhwi.org/estimator-613404.html> (accessed May 25, 2021).
- Malani, Anup, Manoj Mohanan, Chanchal Kumar, Jake Kramer, and Vaidehi Tandel. 2020. "Prevalence of SARS-Cov-2 among Workers Returning to Bihar Gives Snapshot of COVID across India." *medRxiv*, June 28. Available at <https://www.medrxiv.org/content/10.1101/2020.06.26.20138545v1.full.pdf> (accessed May 25, 2021).
- Malani, Anup, Manoj Mohanan, Sanchit Balsari, and Anu Acharya. 2020. "Rethinking COVID-19 Testing Strategy." *The Hindu Business Line*, May 29. Available at <https://www.thehindubusinessline.com/opinion/rethinking-covid-19-testing-strategy/article31697253.ece> (accessed May 25, 2021).
- Melnick, Edward R., and John P. A. Ioannidis. 2020. "Should Governments Continue Lockdown to Slow the Spread of COVID-19?" *British Medical Journal*, 369

- (2020): m1924. Available at <https://doi.org/10.1136/bmj.m1924> (accessed May 25, 2021).
- Ministry of Corporate Affairs. 2016. "Report of the Working Group on the Building of the Insolvency and Bankruptcy Board of India." New Delhi: Government of India. Available at <https://www.ibbi.gov.in/Wg-01%20Report.pdf> (accessed May 25, 2021).
- Morris, Loveday, and Luisa Beck. 2020. "While U.S. Struggles to Roll Out Coronavirus Contact Tracing, Germany Has Been Doing It from the Start." *The Washington Post*, May 25. Available at https://www.washingtonpost.com/world/europe/contact-tracing-coronavirus-germany/2020/05/24/7e59a668-93c1-11ea-87a3-22d324235636_story.html (accessed May 25, 2021).
- Mukhopadhyay, Partha. 2020a. "Locking Down Is Not Enough. Ramp Up Testing." *Hindustan Times*, March 27. Available at <https://www.hindustantimes.com/analysis/locking-down-is-not-enough-ramp-up-testing-writes-partha-mukhopadhyay/story-uInlUzJnkbc7iPXeyuUI.html> (accessed May 25, 2021).
- . 2020b. "The Stability of Test Positivity in India." New Delhi: Centre for Policy Research, May 19. Available at <https://www.cprindia.org/news/stability-test-positivity-india> (accessed May 25, 2021).
- Parsheera, Smriti. 2020. "Street-level Officials in India's COVID-19 Response." *The Leap Blog*, April 6. Available at <https://blog.theleapjournal.org/2020/04/street-level-officials-in-indias-covid.html> (accessed May 25, 2021).
- Patnaik, Ila, Shubho Roy, and Ajay Shah. 2018. "The Rise of Government-funded Health Insurance in India" (Working Paper No. 18/231). New Delhi: National Institute of Public Finance and Policy.
- Philip, Minu, Debraj Ray, and S. Subramanian. 2020. "Decoding India's Low COVID-19 Case Fatality Rate" (Working Paper No. 27896). Cambridge: National Bureau of Economic Research. Available at <https://www.nber.org/papers/w27696> (accessed May 25, 2021).
- Pritchett, Lant, and Michael Woolcock. 2004. "Solutions When the Solution Is the Problem: Arraying the Disarray in Development." *World Development*, 32 (2): 191–212.
- Rajagopalan, Shruti, and Alexander Tabarrok. 2020. "Pandemic Policy in Developing Countries: Recommendations for India", Policy Briefs. Arlington, VA: Mercatus Center, George Mason University, April 9. Available at <https://www.mercatus.org/publications/covid-19-policy-brief-series/pandemic-policy-developing-countries-recommendations-india> (accessed May 25, 2021).
- Rajan, S. Irudaya, and K. S. James. 2008. "Third National Family Health Survey in India: Issues, Problems and Prospects." *Economic & Political Weekly* 43, (48): 33–38, November 29.
- Ramu, Swapnika. 2015. "MenAfriVac: A Novel Strategy for Building a Vaccine." *The Leap Blog*, May 10. Available at <https://blog.theleapjournal.org/2015/05/menafrivac-novel-strategy-for-building.html> (accessed May 25, 2021).
- Rivers, Caitlin, and Dylan George. 2020. "How to Forecast Outbreaks and Pandemics: America Needs the Contagion Equivalent of the National Weather

- Service.” *Foreign Affairs*, June 29. Available at <https://www.foreignaffairs.com/articles/united-states/2020-06-29/how-forecast-outbreaks-and-pandemics> (accessed May 25, 2021).
- Roy, Shubho. 2020. “Skepticism about Measurement: Hospital Beds Edition.” *The Leap Blog*, June 24. Available at <https://blog.theleapjournal.org/2020/06/skepticism-about-measurement-hospital.html> (accessed May 25, 2021).
- Roy, Shubho, Ajay Shah, B. N. Srikrishna, and Somasekhar Sundaresan. 2019. “Building State Capacity for Regulation in India.” In *Regulation in India: Design, Capacity, Performance*, edited by Devesh Kapur and Madhav Khosla. Oxford: Hart Publishing.
- Rukmini, S. 2020a. “ICMR Data Shows India’s COVID Testing Is Not in Right Shape—5 Things That Need Fixing.” *The Print*, June 1. Available at <https://theprint.in/opinion/icmr-data-shows-indias-covid-testing-is-not-in-right-shape-5-things-that-need-fixing/433077/> (accessed May 25, 2021).
- . 2020b. “Why Audits, Reconciled Death Data Are Still Missing COVID Deaths.” *IndiaSpend*, July 1. Available at <https://www.indiaspend.com/why-audits-reconciled-death-data-are-still-missing-covid-deaths/> (accessed May 25, 2021).
- Sadanandan, Rajiv. 2020. “Kerala’s Response to COVID-19.” *Indian Journal of Public Health* 4 (6): 99–101. Available at <http://www.ijph.in/downloadpdf.asp?issn=0019-557X;year=2020;volume=64;issue=6;spage=99;epage=101;aulast=Sadanandan;type=2> (accessed May 25, 2021).
- Sané, Renuka. 2020. “Isolation: A Weak Link in Indian Public Health.” *The Leap Blog*, March 20. Available at <https://blog.theleapjournal.org/2020/03/isolation-weak-link-in-indian-public.html> (accessed 25 May 2021).
- Sané, Renuka, and Ajay Shah. 2021. “Excess Deaths in the COVID-19 Pandemic in India.” *Preprint*. doi:10.2139/ssrn.3750679
- Sethi, Nitin, and Kumar Sambhav Shrivastava. 2020. “Frustration in National COVID-19 Task Force.” *Article 14*, January 27. Available at <https://www.article-14.com/post/no-action-taken-frustration-in-national-covid-19-task-force> (accessed May 25, 2021).
- Shah, Ajay. 2014. “Designing the Monetary Policy Committee.” *The Leap Blog*, January 25. Available at <https://blog.theleapjournal.org/2014/01/designing-monetary-policy-committee.html> (accessed May 25, 2021).
- . 2019. “Buy, Not Build, Spacecraft.” *Business Standard*, September 9. Available at http://www.mayin.org/ajayshah/MEDIA/2019/isro_spillovers.html (accessed May 25, 2021).
- . 2020a. “Responding to the New Coronavirus: An Indian Policy Perspective.” NIPFP Working Paper No. 309, March 11. Available at https://www.nipfp.org.in/media/medialibrary/2020/07/WP_309_2020.pdf (accessed May 25, 2021).
- . 2020b. “More Testing: From Concept to Implementation.” *The Leap Blog*, April 12. Available at <https://blog.theleapjournal.org/2020/04/more-testing-from-concept-to.html> (accessed May 25, 2021).

- Shah, Ajay. 2020c. "The de-Lockdown Needs a Better Institutional Foundation." *Business Standard*, May 4. Available at <http://www.mayin.org/ajayshah/MEDIA/2020/delockdown.html> (accessed 25 May 2021).
- . 2020d, June 15. "COVID-19 in India in the Coming Months: The Puzzles Faced by Leaders of Health Care Organisations." *The Leap Blog*. Available at <https://blog.theleapjournal.org/2020/06/covid-19-in-india-in-coming-months.html> (accessed May 25, 2021).
- Shah, Ajay, Sanhita Sapatnekar, Harleen Kaur, and Shubho Roy. 2019. "Financing Common Goods for Health: A Public Administration Perspective from India." *Health Systems & Reform*, 5 (4): 391–96.
- Sharma, Jeevan Prakash, and Siddharth Premkumar. 2020. "India's Coronavirus Data Is Infected with Flaws. Numerophobia?" *Outlook*, June 22. Available at <https://www.outlookindia.com/magazine/story/india-news-covid-19-special-why-indias-data-on-coronavirus-is-infected-with-flaws/303323> (accessed May 25, 2021).
- Sharma, Smriti. 2016. "Problems of the Health Management Information System (HMIS): The Experience of Haryana." *The Leap Blog*, June 13. Available at <https://blog.theleapjournal.org/2016/06/problems-of-health-management.html> (accessed May 25, 2021).
- Sinha, Amitabh. 2020. "Coronavirus Numbers Explained: Behind India's Unusual Spike in COVID-19 Deaths." *The Indian Express*, June 19. Available at <https://indianexpress.com/article/explained/coronavirus-numbers-explained-india-death-toll-mismatch-6462899/> (accessed May 25, 2021).
- Smith, Owen, Parul Naib, Pulkit K. Sehgal, and Sheena Chhabra. 2020. "PMJAY under Lockdown: Evidence on Utilisation Trends" (PM-JAY Policy Brief). New Delhi: National Health Authority. Available at https://pmjay.gov.in/sites/default/files/2020-06/Policy-Brief-8_PM-JAY-under-Lockdown-Evidence_12-06-20_NHA_WB.pdf (accessed May 25, 2021).
- Soucat, Agnes. "Financing Common Goods for Health: Fundamental for Health, the Foundation for UHC." *Health Systems & Reform*, 5 (4): 263–67.
- Srikrishna, B. N. 2013. *Report of the Financial Sector Legislative Reforms Commission*, Vol. 1. New Delhi: Union Ministry of Finance, Government of India. Available at https://dea.gov.in/sites/default/files/fslrc_report_vol1_1.pdf (accessed May 25, 2021).
- Sudhir, Amita, and Nachiket Mor. 2020. "Indicative Protocol for a First Level Oxygen Therapy Centre for Patients with Suspected or Confirmed COVID-19." *Preprint*. Available at <file:///C:/Users/amehta/Downloads/IndicativeProtocolforaFirstLevelOxygenTherapyCentreSudhirandMor300620> (accessed May 25, 2021).
- Thomas, Suja. 2020. "Covid-19 in the Tropics: How Will High Heat and Humidity Shape the Outcomes?" *The Leap Blog*, May 4. Available at <https://blog.theleapjournal.org/2020/05/covid-19-in-tropics-how-will-high-heat.html> (accessed May 25, 2021).

Triggle, Nick. 2020. "Coronavirus: Track and Trace System in Place from June—PM." *BBC News*, May 20. Available at <https://www.bbc.com/news/uk-52741331> (accessed May 25, 2021).

To view the entire video of this IPF session and the General Discussion that ended the session, please scan this QR code or use the following URL
https://www.youtube.com/watch?v=U1mmv_uUoYE



Comments and Discussion*

Chair: **Rajesh Bhushan**

Secretary, Ministry of Health and Family Welfare, Government of India

K. P. Krishnan

NCAER & former Secretary, Ministry of Skill Development and Entrepreneurship

Given my experience in government, the lesson that I want to start with is that for a number of complex questions of public policy, very often what is required is a good understanding of something as basic as information asymmetry and the two initial characteristics of public goods, namely, non-rival and non-excludable. Whether it is finance, urban development, land, skills, or cooperatives, these public good concepts can explain far more than what people realize. And not understanding or not applying them can also explain many egregious mistakes in public policy. The Kelkar–Shah book (2019), from which a lot of Ajay’s presentation today comes, applies these principles very sensibly.

This paper draws mostly the right conclusions. I want to go a little beyond the paper and relate my remarks to what I am observing of COVID-19 and the government’s response.

The first point I want to make is that public goods have a jurisdictional dimension, particularly important in a federal country. India’s Constitution provides for three levels of government and distributes responsibilities across them. As economists, we should study whether the principles of public goods and their jurisdictional dimension are embedded in that distribution of constitutional responsibilities. The Constitution’s 7th Schedule deals with the distribution of responsibilities between the Union and the states for both legislative and executive powers. The 11th and 12th Schedules, added in 1992, deal with the powers of rural panchayats and urban municipalities. The 7th Schedule has three lists: the Union, the State, and the Concurrent. The third is somewhat peculiar to India, as not many

* To preserve the sense of the discussions at the India Policy Forum, these discussants’ comments the views expressed at the IPF and do not necessarily take into account revisions to the conference version of the paper in response to these and other comments in preparing the final, revised version published in this volume. The original conference version of the paper is available on NCAER’s website at the links provided at the end of this section.

other countries have a concurrent list over which both the Union and the states have jurisdiction.

Where does public health figure on these lists? Item 6 on the State List includes public health, sanitation, hospitals, and dispensaries, so *prima facie* public health is a state responsibility. However, dig deeper and item 28 on the Union List mentions port quarantine, including related hospitals, in the context of shipping. In the present context, item 81 on the Union List is about inter-state migration and inter-state quarantine—it would appear that some founding father of the Constitution actually visualized a pandemic. Even more to the point, item 29 in the Concurrent List says, “Prevention of the extension from one State to another of infectious or contagious diseases....” Looking to the third tier of local government, the Constitution’s 11th Schedule contains item 23, referring to “health and sanitation, including hospitals, primary health centers, and dispensaries,” which leaves little doubt when read with Article 243G relating to panchayats. In parallel, item 6 of the 12th Schedule, when read with Article 243W of the Constitution dealing with urban municipalities, assigns public health and sanitation to urban municipalities.

I wanted to make the point that public health is allocated to state governments as well as local governments, but there are many elements of public health relating to contagious diseases and pandemics that are also in the Union and Concurrent Lists. So one could say either of the following: (a) there is confusion and a lack of clarity on this issue or (b) public health is indeed complex, and there are elements that are national, state-level, and local, requiring close coordination between them. These issues speak directly to the topic of the paper on state capacity and institutional design.

Second, let me turn to the Disaster Management Act of 2005, the lynchpin of the Government of India’s initial response to the pandemic using the Act’s provisions extensively. The Act defines a disaster as a catastrophe, a mishap, a calamity, or a grave occurrence arising from natural or man-made causes or by accident or negligence. But disaster management also includes prevention, mitigation, and reduction of the risk of any disaster or the severity of its consequences. The National Disaster Management Authority (NDMA) constituted under this Act under the Home Ministry has a large number of powers that include steps for disaster mitigation, prevention, and preparedness.

Section 11 of the Act mandates the NDMA to draw up a national plan for disaster management and has a requirement, again mandatory, that it needs to be reviewed and updated annually. I think that, at some point, this is something that should be looked at by all agencies concerned with public accountability.

In light of these constitutional and legislative issues concerning public health disasters, what are the questions we should pose for future research arising from Ajay Shah's paper? First, is fighting a pandemic a national public good, a regional public good, or a local public good—how do we unpack this? Clearly, there are elements of all three involved. Migration rights need to be dealt with nationally. However, ICU beds and oxygen supplies perhaps need to be dealt with at the state level. The examples that Ajay quoted of Tamil Nadu, Kerala, and subsequently Mumbai, which have been successful in contact tracing and enforcing quarantine, clearly show that this is best done at the municipal and panchayat levels. I think we have to break this broad entity called “public health” into its many constituent elements and do a more detailed analysis of their nature and characteristics in building state capacity.

Second, the NDMA clearly had its work cut out in preparing a national plan to combat COVID-19 in January 2020 when we formally reported cases that the Ministry of Health and Family Welfare was aware of, not in large numbers, but certainly the beginnings of what looked like a pandemic. By the end of the first lockdown, we clearly should have had a revised national plan ready. Monday morning quarterbacking is easy and in retrospect we all have excellent vision, but I think in terms of lessons to be learnt, not getting this right led to a lot of problems.

I want to highlight a final data problem before I conclude: the wrong unit or locus for decision-making clearly led to a lot of perverse behavior. One perversity that I am aware of is in a cross-roads district through which a lot of thoroughfare traffic passes. A large public charity was ready to set up an excellent mobile COVID-19 testing facility offering free testing. The district magistrate banned it under the Disaster Management Act since he was concerned that his district count of COVID-19 would go up. We have seen other districts and states doing this. The absence of more coherent planning and a deeper understanding of the public good nature of the fight against a pandemic led to many such perverse consequences.

Based on Ajay's paper and other data that are coming in, there is a good opportunity for us to research these serious public economics and public health questions.

Reference

Kelkar, Vijay, and Ajay Shah. 2019. *In Service of the Republic: The Art and Science of Economic Policy*. Gurgaon: Penguin Random House.

Randeep Guleria*Director, All India Institute of Medical Sciences*

I would like to start by complimenting Ajay Shah for an excellent paper. It is really good at flagging the challenges that we are facing on COVID-19. Let me start with the situation pre-COVID-19 and then see what the health sector did when COVID-19 came into India in a big way and what it should continue to do.

Prior to COVID-19, health care was dominated by the private sector roughly in a 70:30 ratio, with a lot of out-of-pocket expenditures. The government had a lot of schemes, including PMJAY and *Ayushman Bharat* that were making a difference, but a large section of the middle class had the problem of having to pay out of pocket—you could go into an ICU and really lose all your savings. We saw that a lot because we had to shift patients to the All India Institute of Medical Sciences not because the patients were not being managed properly, but because the families had just run out of money. Then there was public sector underinvestment and issues of the quality of care, especially in smaller cities and district hospitals. We were already facing an increasing burden of non-communicable diseases (NCDs). The disease burden in India shifted somewhere around 2003 from communicable diseases to NCDs, and now almost 60 percent of the Indian disease burden is NCDs, including diabetes, cancers, and chronic respiratory diseases.

There were also huge human resource challenges, such as a shortage of doctors and health personnel in both urban and rural India. Much effort was being made to increase medical colleges, to get the private sector hospitals to become teaching centers, to start Diplomate of National Board courses, and to get nurses to become nurse practitioners. We were also looking at the concept of family physicians, a concept that was missing in India with the move towards specialists, which was not working in smaller cities and district hospitals. So, this was the background when the SARS-CoV-2 pandemic hit us.

India faced immediate challenges. It is not that India was totally unprepared or that, in recent history, it had never anticipated a pandemic. In 2005, and even as early as 2000, there was talk in the government of planning for a pandemic. The Government of India had set up a joint monitoring group to look at outbreak management at the time of the Zika virus. We had discussions about this in 2003 after SARS, and in responding to H5N1 bird or avian flu, which caused a significant amount of poultry deaths in Maharashtra, West Bengal, and the Northeast. Luckily, the virus did not

exhibit sustained human transmission, though it had a case fatality rate of more than 60 percent. At that point of time, there was a huge pandemic concern in India and globally. We had the H1N1 pandemic in 2009. So there were lessons that we had learnt. But still, you are never really prepared for a pandemic until it really hits you.

The government was proactive early. We had early screening at airports and the very aggressive initial lockdown gave us time to prepare. We had COVID-19 care centers, COVID-19 hospitals, and COVID-19 ICUs. Oxygen facilities were actually made available and ventilators, to some extent, were also made available. There were issues on testing and training that we handled.

But there were a lot of downsides we faced, and those are the lessons that we need to really look at. First was the decline in private sector involvement. I mentioned that the private sector has been big in health care, but when it came to the pandemic, the involvement was much less, and this put a lot of stress on the already strained government health sector. A strategy needs to be developed to get more private sector involvement when it comes to outbreak management because the bulk of ICU and ventilator care still lies in the private sector. In a large number of district and smaller hospitals, we do not have oxygen supply, which can be easily made available. Second, on equipment and personnel, we did not have a large number of ventilators and critical care specialists, and this became one of the major issues.

Third, aggressive contact tracing, which the paper discusses very well, was another major challenge. The biggest problem was the stigma that got associated with COVID-19. We need an effective public outreach program to help people get over their stigma. I know many individuals who had classical COVID-19 symptoms—fever, cough, or shortness of breath—but refused to get themselves tested, and many then went into respiratory failure and had to be rushed to the hospital. Faced with this stigma, contact tracing cannot work well. I know that in certain areas of New Delhi, where stigma was prominent, this led to an increased disease burden and cluster formation in that area. So, under-reporting led to surges.

Fourth, testing was also a huge challenge, and the paper brings this out. When we started—and we had realized this way back in 2009 when looking at H1N1—there were very few, good quality virology labs in the country, and that became a big challenge. Our virology lab framework was designed initially with support from the US Centers for Disease Control and Prevention and the National Institute of Virology in Pune, but this was geared to influenza surveillance. Virology labs need a lot of investment in

infection control to come up to BSL2 (Biosafety Level-2) standards, and this was something which was not available at the beginning. This was upscaled during the lockdown. We got medical colleges to build labs and start testing, and from when we had just about 100–150 labs, we have now gone to over 1,000 labs and the number of tests from 10,000–20,000 to 200,000 per day. Here again, the challenge remains persuading the private medical colleges to invest in setting up testing labs and to ramp up testing. We need a public–private partnership arrangement here.

Finally, the paper mentions the need for good data on the pandemic: data on antibodies, those who have tested positive, the mortality rate, or even just hospital data. We have to look at what comorbidities are: we really have no idea. Does malnutrition serve as a risk factor for severe COVID-19? Does past history of tuberculosis serve as a risk factor? If you have underlying bad lungs, do you get more severe COVID-19? We have a younger population, but we have a higher number of diabetics; so are the younger people who are diabetic more prone to develop COVID-19? We need data to answer many of these research questions. We need to develop an electronic national health database that can be used even after the pandemic because it will help on disease surveillance.

The challenge will be to identify who will collect the data and ensure that they are collected correctly. Doctors, who are already overburdened, cannot do it. The paper notes that often states try to hide the data because they want to show that they are doing better than others. If fatalities are undercounted, infection rates are low because you are asked to test less people, then data credibility is the casualty, and we need to look at this. We also need to make sure the data are readily available to researchers in a timely way. If we have a national database that is available to all researchers, they can then do a deep dive into the data and help come up with solutions that could help save lives and help in better policy design and operational management. This is something that we really need to develop in the long term, not only for COVID-19 but also for post-COVID-19 management as we look to the shift toward NCDs that needs a lot of data if we are to respond effectively.

I will conclude by recapping the lessons we have learnt so far—we need to increase investment in health, we need to focus on primary health, we need aggressive surveillance, and we need to have a good public–private partnerships so that the private sector can come on board quickly. There has also been a lot of talk that we need an incremental, insurance-based approach so that health care becomes a right in India.

General Discussion

Participants in the General Discussion included **Karthik Muralidharan, Rohini Somanathan, Pankaj Shrivastava, C. N. Raghupati Cavale, and Subhomoy Bhattacharjee.**

To get a sense of the richness of this discussion, we invite you to view the video of the General Discussion segment of this IPF session. Please use the appropriate hyperlink on the IPF 2020 Program available at the links below.

The session video and all slide presentations for this IPF session are hyperlinked on the IPF Program available by scanning this QR code or going to



https://www.ncaer.org/IPF2020/Agenda/Agenda_IPF_2020.pdf