Center for Health Security

United States–India Strategic Dialogue on Biosecurity

Report from the Seventh Dialogue Session, Focused on COVID-19 Responses in India and the United States: Lessons Learned and Path Forward

March 2021

Johns Hopkins Bloomberg School of Public Health
Center for Health Security

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Co-hosted by the Johns Hopkins Center for Health Security and the Regional Centre for Biotechnology of the Department of Biotechnology in the Indian Ministry of Science and Technology

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Executive Summary

On January 26 and 27, 2021, the Johns Hopkins Center for Health Security hosted a virtual dialogue discussion, focused on coronavirus disease 2019 (COVID-19) responses in India and the United States. The session explored lessons learned thus far and the path forward for both nations in responding to the pandemic. The meeting was held in collaboration with the Regional Centre for Biotechnology of the Department of Biotechnology in the Indian Ministry of Science and Technology.

The dialogue focused on a range of emerging issues related to COVID-19, including national response efforts, security implications of COVID-19 with respect to bioterrorism/biodefense preparedness, biosafety and biosecurity, vaccine and therapeutics development and use, diagnostic and surveillance approaches, use of nonpharmaceutical interventions, health misinformation in the context of the pandemic, and political influence in response operations and policies. Through the discussion, participants gained an increased understanding of shared challenges in the responses of both the United States and India to COVID-19, which may be addressed to increase future preparedness.

The meeting convened senior thought leaders, scientists, public health practitioners, and medical experts from the United States and India. In accordance with the dialogue format, participants offered insights based on personal expertise and did not represent the government of either country in an official capacity.

Participants from India were:

- Deepanwita Chattopadhyay, IKP Knowledge Park
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The next dialogue meeting has not yet been scheduled, but information will be forthcoming to all participants.

COVID-19: Challenges and Lessons for Public Health

The virtual dialogue opened with a discussion about each nation's response to coronavirus disease 2019 (COVID-19), centered on specific efforts to curb infections and the effect of nonpharmaceutical interventions on viral transmission. The session also included descriptions of the responsiveness and preparedness of each country's healthcare system. The challenges of care management, surge capacity, and protecting the healthcare workforce were illuminated. Supply chain challenges and research opportunities for better understanding the effects of COVID-19 were explored, as well as potential areas to increase future preparedness for health security threats.

Successes and Challenges Managing the Spread of COVID-19

The COVID-19 pandemic has been a challenge that has pushed the limits of both nations' healthcare systems. The group readily acknowledged that the downstream social and economic challenges stemming from the COVID-19 pandemic would have long-lasting impacts and that actions should be taken during the recovery process to better prepare each country for pandemic risks.

Following the first observed COVID-19 cases in late 2019/early 2020, India was quick to implement a screening protocol for travelers coming from China. India was one of the first countries to declare a nationwide lockdown to stop the spread of disease. According to participants, the early lockdown helped to control a wave of COVID-19 cases, giving the government time to develop a comprehensive response plan.

Health in India is typically considered a responsibility of individual states, so early in the pandemic, the nation invoked a central act through the National Disaster Management Agency. This act served to elevate the pandemic response from the state level to a federal level, opening doors for more coordination. Federal control held advantages, but responses faced "challenges given the diversity of the country. This is not a one size fits all process." Access to healthcare systems and testing was more limited in rural than urban areas, for example. The response also had to contend with social challenges; in the early days of the pandemic, there was a great deal of stigma, especially for medical professionals treating COVID-19 patients. Participants were relieved that the dire predictions of daily incidences projected for the fall of 2020 were not realized.

Participants from the United States were not complimentary of the US COVID-19 response. One said, "In general, there is a real paradox in the US response to COVID-19. The pandemic followed a path that had been modeled in preparedness exercises, but the response has been pretty clumsy. The ability to operate at the speed and scale of the pandemic has been really limited. How do we marshal data and make big

decisions quickly?" The resolve of the medical community and the speed of medical countermeasure development were cited as 2 successes in an otherwise tumultuous response. Participants felt that the lack of a federal plan had hamstrung the US response, leaving a fragmented, state-by-state approach without the resources to reach necessary goals.

Participants from both countries discussed the need to learn lessons from the pandemic and make meaningful changes to improve preparedness. Lastly, several US and Indian participants noted that the international response to the pandemic has been a major weakness in public health response, and that international trust-building exercises as a tool for pandemic preparedness were needed.

Healthcare System Response and Readiness

In India, it was noticed early on that oxygen supplies would be a major limiting factor in the ability to treat COVID-19 patients. New strategies were collaboratively developed to provide high-quality oxygen, especially to rural areas, where access to healthcare systems was more limited. India implemented an algorithm-based system dependent on disease severity to estimate oxygen needs within different regions, which helped their response. It was also realized that the number of beds would not be sufficient for a surge of COVID-19 cases. To address this challenge, India built care centers throughout the country, allowing for the isolation of mild and asymptomatic patients and reserving hospital beds for those who required more intensive care. The Indian government made substantial changes to their preexisting healthcare system to maximize both the number of available beds and the medical workforce. Despite this early foresight, India still had challenges in adapting as conditions changed.

In the United States, participants noted that there was surprise at the economic impact that a shutdown in some nonessential procedures had on domestic healthcare settings. That healthcare workers were furloughed during a pandemic exemplified the extreme economic vulnerability of US healthcare systems and led to discussions on the need for the nation to invest in a robust healthcare system.

Supply Chain Demands and Restraints

The COVID-19 pandemic increased the global demand for personal protective equipment (PPE) and diagnostic tests, leading to scarcity. A US participant shared that the lack of PPE affected not just the healthcare response but also the ability to do research on medical countermeasures. "Early in the research phase, researchers quickly ran out of PPE. We had to work through organizations to try and get supplies, crowdsourcing with local hospitals, since federal agencies would only ship PPE in incredibly large units." Both India and the United States explored alternative pathways

to meet this demand.

India faced a shortage of PPE, especially N95 masks, early in the pandemic, but industry stakeholders met to plan how to fill the gap. This early coordination warded off the worst projections of supply shortages. In the United States, after a delay, the private sector took similar actions to address gaps in PPE supply. While some constraints have continued throughout the pandemic, efforts in both countries may have prevented the most drastic outcomes projected.

Diagnostic testing is critical to pandemic response. Early in the COVID-19 pandemic, countries struggled to meet the demand of testing scale-up. Initially, the lack of a validated test created challenges for public health laboratories, but as more information was gathered about severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), the challenge shifted to throughput and supply. Neither India nor the United States had the requisite laboratory capacity to meet the demand of testing initiatives.

In India, the country now boasts 2,200 diagnostic laboratories, and 1.5 million tests a day are processed. Early on, private labs were enlisted in the effort, and the country expanded testing capacity in preexisting institutes. One major limiting factor was the supply of testing kits and reagents. The Indian industrial base addressed this challenge to meet the country's demands internally. The Department of Biotechnology sponsored the National Biomedical Resource Indigenisation Consortium, which enlisted all the industrial players on one platform to create an efficient work plan. Participants were complimentary of this plan's ability to maximize the collective effort and avoid duplication, with several members calling for exploring similar applications to other resources. Biosafety was a major concern early in the pandemic with the number of samples running through laboratories, but participants reported that training programs reduced this risk.

The United States faced similar challenges in their pandemic response. Representatives from various agencies, organizations, and companies in the private and public sectors shared that the laboratory community had to adapt rapidly to the challenge of meeting this new testing demand. This included public sector agencies and organizations partnering with the private sector to increase laboratory throughput. One participant said, "Our organization's mission is usually to look 5 to 10 years down the pipeline for new developments; the COVID-19 pandemic made us shift internally, asking, 'what can we do to help right now?'"

COVID-19 Vaccine, Diagnostic, and Therapeutic

Development Efforts

In this session, participants discussed national approaches to the development and use of COVID-19 medical countermeasures, vaccines, diagnostics, and therapeutics. They explored such topics as successes and challenges in the development of these medical countermeasures, the current national approach or strategy around diagnostic testing, public views on COVID-19 vaccines, issues of distribution and administration, and whether there will be changes made to the national industrial base for medical countermeasure development going forward. Participants shared thoughts about future preparedness in this area and what more needs to be done before confronting another health security crisis.

Diagnostic and Serology Testing

In the United States, early emphasis was put on serological testing because of a backlog in available molecular diagnostic tests. Many people in the United States tried to claim that they had had COVID-19 in the past and were therefore immune, in hopes of avoiding the constrictions of social distancing. In addition, many tests available on the US market were inaccurate or fraudulent. In India, serological tests also caused more problems than they solved. Originally, IgM and IgG testing were performed; the thinking at the time was that if those tests could be combined, it would help in diagnosing currently infected patients in the first 5 days of their illness, but it was not an effective strategy.

In general, in the United States there was a lack of preparedness to transfer to industrial-scale diagnostic testing, which hurt the response effort. By the time testing was widely available, the disease had spread considerably. Even now, tests are not available at the scale that they should be. The Biden administration has plans for more testing, especially asymptomatic testing for institutions like schools. Of course, there has been an uneven distribution of testing based on financial resources. The National Football League, for example, found a way to test all 2,500 players every day, even amidst critical shortages of testing capabilities elsewhere. In the future, a pathway is needed to make better decisions for testing, so that clinical support will go where it will provide most benefit. Underserved communities need "seats at the table."

For India, the costs of reverse transcription polymerase chain reaction tests have decreased ten-fold, and soon cost will not be the dominant factor in testing rates. However, the logistics of sample collection is a limiting factor. While the tests have been simplified, made safer and faster, and cost only 1 or 2 US dollars, self-collection of samples remains a challenge. Although polymerase chain reaction tests have been used in airports to test whether people are positive, that process simply takes too long.

Other surveillance measures have proven useful and could be expanded in the future. In India, SARS-CoV-2 viral load is being monitored by sampling the wastewater system. Sampling is occurring in 10 cities to monitor the trend of increasing cases, offering a somewhat different picture than the number of new positive cases reported from other sources. This has allowed public health agencies to have a better picture of the actual viral prevalence in a city. Monitoring air in public places (including restrooms) is also a valuable indicator of trends in COVID-19 cases.

Understanding diagnostic testing results requires more effort in information technology. There are ways that different streams of data can come together for the next generation of informative digital dashboards, which could be useful in the future. There is also the challenge of giving resources to new ideas so that they can be useful in a crisis. One successful effort in India was to set up an innovation diplomacy accelerator, to find people who are "almost there" in terms of their product but need resources to bring the technology "over the line." This effort brought through 1,100 innovations in a month, with 30 now scaling up and ready for the market to help the public.

Vaccines

The decision in the United States to launch a massive effort for domestic vaccine production was very important and successful. However, the deliberate process for prioritization made in the fall is now likely hurting vaccine distribution and slowing the process down. As a participant remarked, "complexity is the enemy of speed." Unfortunately, only a fraction of the investment put into making the vaccines was allocated to preparing the vaccine for distribution.

In India, vaccine distribution has been a tremendous challenge, given India's large population. A committee was formed to strategize the process of vaccine rollout, vaccinating people with a second dose and addressing questions about issuing vaccine certificates as proof of vaccination. Three groups were identified for vaccine prioritization. In the top priority group were people at high health risks from COVID-19, healthcare workers, and frontline workers managing COVID-19 at ground level including police, and individuals under 50 years old with comorbidities—about 300 million people. Scoring individuals for vaccine prioritization was difficult and complex, and the people who work at the ground level wanted a "yes or no" system for vaccine prioritization. There were "dry runs" at the state and national levels to help vaccine distribution run smoothly, and an app was made to coordinate vaccination, with an short message service message/text feature to provide reminders about receiving a second dose.

India faced challenges because not everything needed was available in India. For example, antibodies had to be imported from other countries. It was observed that

for the future, unless everything is available within the country, India will have a difficult time competing with other nations with more resources. A participant noted the need for more biosafety level 3 facilities, expanded future medical countermeasure development, and domestic mRNA platforms. They would like to expand the market for vaccine development, telemedicine, and resources for mental health.

In the United States, vaccine development faced supply problems as well. The completely novel mRNA vaccine technology, which called for a large supply of specific enzymes that had only been needed in smaller doses in the past, incurred unexpected shortages. For the future, new fermentation processes to scale adjuvants will be important to develop ahead of a health security crisis.

Biosafety and Biosecurity Implications for Future Health Security Threats

In this session, participants discussed the implications the pandemic will have for health security, biosecurity, and biosafety issues going forward. They discussed what changes should be made to improve the biosecurity of India and the United States in the wake of this pandemic, to what extent will the extraordinary vulnerabilities revealed by this pandemic encourage the deliberate use of biological weapons in the future, what changes to biosafety will need to be put in place to handle SARS-CoV-2, and what changes may need to be made to national biosafety systems or to international agreements as a result. The global consequences of pandemic pathogens and their effect on international security was also discussed.

While the US governmental response to COVID-19 has been marked by fragmentation and failure, India has seen a great deal of cooperation and coordination in their governmental response. They noted that in the face of big challenges, India's strength has been multiplied, the speed of their response has been "amazing," and there was a great deal of hope that the free sharing of information should not be relegated to the pandemic, but would be the operating condition going forward. There were discussions in the session about what ingredients led to India's relative success and the need to further examine it. One participant stated, "India did have a great COVID[-19] response—we did well. But did we plan for it, or did it just happen? We had no plan in place, and things evolved. We had not planned as we should have. We need sustainable commitment" to prepare for future events. Some prior planning, however, turned out to be fruitful, including investment in laboratory infrastructure: "Glad that we have the [biosafety level] 4 laboratory!" noted one participant, as well as recently standardized certifications of biosafety laboratories. Following Ebola virus disease, H1N1 influenza A virus, and Middle East respiratory syndrome outbreaks, there was some governmental response to boost health security preparedness, but investments waned. An investment

and an outbreak surveillance plan are needed, particularly for surveillance. In India, 19 medical centers have come together as a consortium that will have a One Health approach to surveillance.

For the United States, participants noted that government institutes built for the purpose of responding to a pandemic were not the institutes that responded effectively to COVID-19. Pharmaceutical companies, small biotechnology companies, academic laboratories, and data companies responded better than US federal agencies, and going forward, these entities should be considered the basis of a strong US bioeconomy. The experiences of the last year have been a "pressure test" to see how well institutions and entities can perform, but there is an ongoing need to get public/private partnerships in place, with exercises (not just tabletop exercises, but operational drills) to build a network for the future. The scale of the effort for US health security preparedness needs to be much greater, including in the policymaking process, and an organizing structure is needed to guide the efforts of responding organizations. Existing approaches to modeling and "wargaming" need to be revisited, and strategies for addressing the misuse of social media are needed. Approaches to how we "do biosecurity" must be updated, with a rolling approach to preparedness, surveillance, response, and recovery.

In the United States, measuring preparedness will be an ongoing struggle and a critical issue from a policy and financing perspective. The high cost of developing a vaccine can "take the air out of the room," but there is little focus on the return on investment. The return on investment is not just having a product or stockpile, it is also having the knowledge that can better prepare the country for potential future events. "We need to be really innovative not only in [science and technology] but also business," noted one participant.

With regard to future threats, the pandemic has laid bare how vulnerable every country is to health security threats. Concerns about deliberate construction of biological pathogens or accidental release will be ongoing issues, including so-called gain of function experimentation, as well as the diplomatic challenges involved in imposing limitations on other nations' scientific progress. While not every security problem can be solved with a technological solution, there are some areas where scientific exploration can be made safer, such as the use of safety switches and dedicated research on biosafety. It is undeniable that such work has value; if a system was in place to safely examine which variants might emerge from SARS-CoV-2, some elements of surprise in the pandemic might have been matched with better preparedness.

Going forward, the United States and India have opportunities for cooperation and collaborative work. A participant noted that a "big ticket" item is needed—similar to the nuclear deal—that can drive strategic partnerships. The Biological Weapons Convention

review conference this year may be an opportunity to engage in a larger project, but there are other ways—summits, for example, where major issues regarding biosafety, biosecurity, and scientific misuse challenges can be explored. There is more than 1 way to achieve progress in a multilateral fashion. Could the United States and India take the lead, with other G-20 countries? There are important conversations to be had regarding industrial supply chains and data sharing. Regardless, sustainability of biosecurity efforts will be very hard to protect, and we need to think creatively about how to achieve this. In addition to having dialogues, 1 participant suggested that young people be involved as well as people who are working in research collaboration between the United States and India. While all agreed that collaboration would be a desired goal, there was concern that in both India and the United States there has been "inward turning" that may make that more difficult, recently evidenced by vaccine nationalism.

Communication in an Era of Misinformation

Public communication during health emergencies is a difficult task. The scale and scope of the COVID-19 pandemic presented unique communication challenges in both the United States and India. From a traditional health communication perspective, the uncertainty inherent in the emergence of a novel virus, as well as the changes to guidance when new information became available, created many challenges for public health communicators. Unfortunately, the overarching social and economic impacts stemming from the COVID-19 pandemic response invited political commentary, further complicating the issue. Dialogue participants discussed the full range of these topics and provided comments on potential routes forward.

Public Communication About COVID-19

Participants acknowledged that the United States had struggled with a proportion of the population who held antiscience viewpoints and had a low level of scientific literacy. This issue compounded early challenges of communicating nuances associated with COVID-19. These challenges were not limited to the beginning of the pandemic; they continued with discussions around prioritization strategy, nonpharmaceutical interventions, and vaccine development. Participants noted that the press in the United States played a major role in their efforts as active messengers and that nontraditional media channels like social media played a large role in successful messaging.

In India, the public health communication effort faced similar challenges. The hardships of the pandemic also created a situation in which individuals would spread disinformation to make a profit: "The pandemic brought about a desperate situation for a lot of people; soon, everyone had a drug that could cure COVID-19."

One US participant noted, "When discourse on a scientific issue becomes political, you know you've failed. I think this is a huge failure that the [United States] made." Many acknowledged that messaging from the top of the US government often portrayed confusing or incorrect messaging. Several people noted that the US agencies, which traditionally carry a large amount of trust among the public, were often undermined with political messaging. Despite these challenges, several participants reinforced the idea that blame for the communication challenges should not be singular: "I want us all to be cautious of overinterpreting what one particular leader can do to influence 300 million people. Each year we only see 40% of the people get a flu vaccine."

In India, politics had less impact on the country's messaging effort. There were internal communication issues along the chain of command, but government spokespeople were able to build trust through sticking to what was currently known and providing frequent updates. All participants agreed that there should be an emphasis on developing mechanisms for sound science communication and that objective facts should be the driving factor behind public health decision making.

Actions to Improve Science Communication During Public Health Emergencies

Throughout the discussion on communication challenges and successes in the COVID-19 pandemic, participants pointed out the need to rethink public health emergency communication. The integration of social scientists more deeply into the pandemic response was frequently discussed, as was the need to change how the scientific community communicates. One participant remarked, "We need to acknowledge that information has really changed. People use different platforms. They fight narrative with narrative; it is really a battle of narratives out there. We need to work with hierarchies of trust." Others shared that there is a need to capitalize on the increased attention that the COVID-19 pandemic has placed on science and fulfill the goal of making science more mainstream. Scientific communication and literacy must start at younger ages, with a focus on ensuring that the next generation is well equipped to distinguish fact from fiction, not based on narrative but based on the credibility of the information supporting the claim. If public health is to earn the trust of the populace, people must be viewed not as something to manage but as a group to be informed. While next steps toward better public communication seemed clear, solutions for working in a tumultuous political state remained unanswered. The group agreed that substantive efforts are needed to rebuild the value of science in government.

About the United States–India Strategic Dialogue on Biosecurity

This meeting is an adapted and shortened version of the United States–India Strategic Dialogue on Biosecurity. The first 6 meetings of this Dialogue occurred in Washington, DC; New Delhi; and Hyderabad over the past 3 years. The meetings are organized by the Johns Hopkins Center for Health Security, with an award from the Biological Threat Reduction Program, supported by the US Department of Defense, Defense Threat Reduction Agency.

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