



# THIRD EXPERT ROUNDTABLE ON INDIA'S HEALTH SECURITY

## BIOLOGICAL THREAT RISKS FROM STATE AND NON-STATE ACTORS

### Event Report

*Organised by  
Centre for National Security Studies  
in collaboration with  
Asia Centre for Health Security at National University of  
Singapore, and SAFETYNET Inc.  
**04 July 2025, Bengaluru***



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## Executive Summary

Biosecurity, a key aspect of India's non-traditional security, has become increasingly intertwined with traditional security concerns. In response to the emerging biosecurity challenges, the Centre for National Security Studies (CNSS), in collaboration with the Asia Centre for Health Security (ACHS) at National University of Singapore, and South Asia Field Epidemiology and Technology Network (SAFETYNET) Inc., convened the third and the last high-level expert roundtable in the series titled, 'Biological Threat Risks from State and Non-State Actors' on 4<sup>th</sup> July 2025 at Ramaiah Medical College, Bengaluru. This report synthesises insights from a multi-part simulation exercise conducted at the roundtable that aimed to identify critical gaps and opportunities in the domains of early detection, biosecurity response, inter-agency coordination, and crisis containment.

### Key Themes of Discussions:

- **Expertise in Biothreat Prevention, Detection, and Response across Multiple Sectors and Government Agencies:** The roundtable and simulation exercise highlighted the continued need to build expertise and crisis management skills related to novel biothreats.
- **Distinguishing natural outbreaks from biothreats:** A key concern was the need for clear mechanisms to identify whether a virus is of natural origin or a result of deliberate manipulation.
- **Institutional gaps in decision-making:** The simulation exercise revealed a lack of clarity and experience with accurately assessing a potential crisis situation involving novel biothreats. Downplaying a potential biothreat risk to India or sounding alarm bells unnecessarily are both risky and potentially catastrophic. Thus, the ability to identify and comprehend various biothreats



and their societal repercussions as they evolve is fundamental to an effective national biothreat detection and response system.

- **Pandemic preparedness and stockpiling:** There is a need for timely public health and clinical readiness for a broad array of biothreat pathogens and toxins. This includes stockpiles of essential supplies such as vaccines, therapeutics, oxygen cylinders, PPE, and hospital beds. These stockpiles need to be well researched and planned in terms of both the qualities required and the quality (or effectiveness) of the stockpile items.
- **Robust data and surveillance to base decisions on:** All 4 sections of the simulation exercise require accurate, timely, and targeted data and surveillance in order to properly assess the situation and make quality decisions on. Incorrect assessment and response decisions vs. correct decisions are frequently the result of inaccurate or incomplete data which leads to making assumptions and guessing. To overcome this, better and more complete data is needed which comes from investing in better surveillance and monitoring systems.
- **Preparedness means being able to conduct timely research and field studies before and during a biological crisis:** As the simulation exercise attempts to convey, responding to a perceived bioterrorism threat and an actual crisis event is a process that requires leaders to accept high levels of uncertainty and confusion. This cannot be avoided but can be addressed by investing in the ability to learn and adapt quickly.

#### **Recommended Actions:**

1. Identify and empower a nodal agency for national-level biosecurity coordination, with representation from health, science, defense, and home ministries.
2. Develop interim SOPs for early warning, classification, and containment of biothreats, including zoonotic and synthetic pathogens.



3. Identify a multi-sectoral cadre of future health security and bioterrorism response leaders and experts. Invest in training and career development opportunities for this cadre.
4. Develop and conduct frequent simulation-based exercises and roundtables at the national and state levels involving various novel pathogens and toxins under different situations. Focus on current leaders and managers involved in crisis management.
5. Launch a nationwide lab biosafety audit, prioritizing facilities engaged in gain of function (GoF) or high-consequence pathogen research.
6. Prioritize smart investments in national stockpiles for a potential large poorly controlled biothreat outbreak crisis. Develop surge capacity in tools such as vaccines, therapeutics, diagnostics, masks and PPE, and crisis communication platforms.
7. Invest in data infrastructure and decision support tools, including AI-enabled early warning systems, to improve decision making and ultimately mitigate biothreats. Invest in lab safety monitoring systems to reduce the risk of lab-originated outbreaks, especially in high-containment and research-intensive facilities.

India's biosecurity resilience depends on shifting from a reactive, outbreak-focused approach to a proactive, integrated system capable of detecting, attributing, and containing both natural and deliberate biological threats. Implementing the proposed measures would lay the foundation for a coordinated, science-led, and security-aware national framework, improving both preparedness and deterrence capabilities.



## Introduction

Biosecurity, a key aspect of India's non-traditional security, has become increasingly intertwined with traditional security concerns. The evolving biological threat landscape, driven by advances in biotechnology, rising zoonotic spillovers, and dual use risks, demands urgent, coordinated inter-agency frameworks. Given India's infectious disease burden, scientific capabilities, and growing geopolitical role, integrating scientific and policy expertise is critical to strengthening bio-risk governance.

To address the growing spectrum of biosecurity challenges, the Centre for National Security Studies (CNSS) partnered with the Asia Centre for Health Security (ACHS) at the National University of Singapore and the South Asia Field Epidemiology and Technology Network (SAFETYNET) Inc. to organise the concluding session of a three-part high-level expert roundtable series. This final meeting focused on 'Biological Threat Risks from State and Non-State Actors', brought together senior representatives from government, defense, health, science, and security sectors, alongside international experts. Through a series of structured simulation exercises and panel discussions, the roundtable aimed to contribute to government policy dialogues, strengthen intersectoral coordination, and highlight key gaps in India's preparedness for biological threats.

## Domains of Discussion and Key Insights

### **Simulation Exercise Session 1: Monitoring and understanding laboratory biosafety and biosecurity in India (especially labs involved in gain of function research activities)**

**Scenario 1:** Gain of Function work on various viruses is being conducted in laboratories in the region under high-risk conditions. There is some evidence that Nipah virus is one of these viruses but it is unclear to what extent the Nipah virus has been successfully made more transmissible and virulent. It is also unclear to



what extent other viruses are being modified and made more transmissible, virulent or resistant to current vaccines.

**Key issues to probe:**

1. What information is most important to confirm or disprove? (i.e., what information is needed to assess the overall potential risk of this bio-threat)
2. How best to confirm or disprove this?
3. What additional information would be most important to attempt to gather and analyze in these crises?
4. Who should be aware of these developments and why?
5. What would you fear most in such a scenario?

**Key Underlying Question:** What does this scenario and discussion tell us about India's current level of information gathering and risk analysis?

This session aimed to explore India's preparedness to monitor and govern laboratories conducting high-risk biological research, particularly gain-of-function (GoF) research on various viruses. A hypothetical scenario was presented in which emerging evidence suggested that research was being conducted on the Nipah virus and potentially other viruses as well, to possibly increase its transmissibility and virulence. This simulation exercise was conducted with the intention of understanding India's current level of information gathering and risk analysis.

**Group's discussion points :**

- **Credibility of information:** Determining what constitutes credible information in such scenarios, including laboratories' location, is crucial. It is also essential to have detailed knowledge of the intelligence agencies and



institutions involved in genome sequencing and surveillance, as this facilitates rapid coordination, verification, and response during potential bio-threat events. In this scenario, it is unclear what the current capacity in India is to monitor and assess potential high-risk laboratories and research projects. Does a database of all laboratories conducting gain of function research in India exist? Is it updated regularly and does the database contain other important information about these laboratories and the work being conducted in them.

- **Verification of the virus' identity:** It is important to confirm whether the virus is indeed Nipah or a variant of Nipah. This process would require rapid genome sequencing and comparison with existing pathogen databases to detect anomalies or signs of engineering. In this first scenario, no specific pathogen is identified. What was unclear to the participants was whether an active database of genetic profiles of any potential high consequence pathogen such as Nipah virus found in India over the past 20+ years exists. This could be a database of pathogens found in nature, identified in outbreaks/clusters of illness, or modified in laboratories. The key here was that it was unclear if such a database and a system to collect and analyze pathogens exists in India or other South Asian countries.
- **Response Action Decisions:** While some participants felt that decisions should be made only after scientific verification, others supported taking precautionary measures even before formal confirmation, especially when dealing with potentially high-consequence pathogens. There was a general hesitation among participants in viewing the situation as alarming.
- **Framework for biothreat classification:** At this point in the simulation exercise, there are no identified pathogens or clusters of illness that require investigation and response. This may be because specific biothreat pathogens have not yet been created in the South Asia region or if could be



due to a lack of ability to detect and identify these high consequence pathogens. The roundtable participants agreed that there is a need in India for formal criteria to classify viruses as biothreats based on factors such as transmission rate, mortality, and the presence of diagnostics or vaccines. However, no framework was proposed, and no agency was identified as responsible for making such classifications.

- **Operational response and top-down coordination:** In a suspected outbreak scenario, particularly in rural areas, a top-down operational model would be most effective. Involving the National Institute of Epidemiology (NIE) at the earliest, along with the deployment of trained field epidemiologists to conduct rapid field operations would be apt. These professionals could support surveillance, facilitate safe sample collection, and enable an informed response. However, in this scenario, there is no known outbreak. There is only the risk associated with conducting gain of function research in an unmonitored and unsafe setting.

#### **What was overlooked or underexplored:**

- The main aim of this first simulation exercise session was to prime the participants to reflect on India's existing systems and capabilities to monitor potentially high risk viral research being conducted in India or neighboring South Asia countries. This was discussed by the participants but was not explored in much depth. In this scenario, a claim is made that dangerous research is likely happening somewhere in the South Asia region. The most appropriate response is to verify or dismiss this claim using existing biomedical laboratory monitoring tools and systems. If those tools or systems do not exist or are incomplete, this greatly complicates the scenario and any effective response to the scenario.

- The scenario is also meant to get stakeholders and policymakers to consider what kind of laboratory monitoring systems does India need and can realistically employ and sustain. The scenario intentionally focused on laboratories conducting gain of function research since this is likely the most dangerous form of research currently being conducted globally and is thus a very good place to start a “laboratory monitoring system” across India’s government laboratories, military laboratories, university laboratories, and private biotech laboratories.
- Stakeholders and leaders in health security need to consider the details of India’s “Laboratory monitoring systems”. Which laboratories must be included even if their work is considered “sensitive” or “classified”? How should these laboratories be assessed and accredited from a health security standpoint? What type of laboratory research should be considered biosecurity related and thus included in this monitoring system? These details were not explored by the participants in this session likely due to a lack of time and a lack of clarity on what this 1st session was trying to highlight and sensitize them to.
- While it was noted that early verification was essential for initiating measures, there was little clarity on how the verification would be done in the Indian context. There was no discussion regarding the mechanisms currently in place to audit or monitor laboratories conducting GoF research in India, nor how biosafety protocols are enforced.
- While a top-down approach was suggested, there was no detailed discussion on which agencies or institutions should be approached first, or how responsibilities are currently organised at the national or state level to verify and respond to potential GoF-related bio-threats.



- The concluding question of what the participants would fear the most in such a scenario was not taken up, leaving out insights into perceived gaps, psychological preparedness, or institutional vulnerabilities.

#### **Points of Divergence:**

- **Need for Response Actions:** Some participants advocated for waiting until a high risk pathogen was scientifically confirmed before initiating a full-scale response. Others argued for early intervention based on preliminary signals, especially when dealing with high-risk pathogens.
- **Current Capabilities to Detect High Risk Laboratories and High-Risk Laboratory Practices:** Some participants believed that robust laboratory accreditation and monitoring systems already exist and are well functioning in India and cover biosecurity and biosafety issues sufficiently. Others believe that the current laboratory and research monitoring systems do not focus enough attention on high risk research and high-risk laboratories and the methods used to regulate and monitor these advanced biotech heavy laboratories are outdated and incomplete.
- **Need for India to Engage with Neighboring Countries on High Risk Laboratory Research Practices and Systems outside of India:** There was uncertainty as to the degree to which India should actively engage in regional platforms to monitor high risk laboratories and high-risk research and also conduct its own biosecurity surveillance through the NSCS or the Indian Armed Forces.



## **Simulation Exercise Session 2: Understanding and acting on biosecurity threats in the region from state and non-state actors**

**Scenario update:** The Government of India has been able to confirm that Gain of Function research is being done on Nipah virus in high-risk labs in neighboring countries in close geographic proximity to the area of operations of known terrorist groups and their state sponsor. It also confirms that progress in making the Nipah virus more transmissible is likely. It is not clear what other viruses are being manipulated but experts believe that attempts to synthesize Smallpox may be happening.

**Main Question:** Given this information, what actions should India take immediately to reduce the threat and prepare for a potential biological attack/virus release on Indian soil. Please consider both offensive and defense options as well as how traditional strategic concepts of deterrence and escalation/de-escalation pathways may or may not apply in this type of unconventional scenario.

### **Sub-questions to probe:**

1. What are some of the actions to be considered to reduce the risk of this threat reaching India? Is there an option for offensive operations?
2. What are the key actions to be taken to prepare for a virus release on Indian soil? In other words, how can India strengthen its response capacity and systems effectively and quickly?
3. Who specifically should be involved in the response capacity building and potential stockpiling efforts?
4. To what degree should states and civil society be involved at this stage?
5. Which of these response actions are most important and which are most difficult to achieve?



This session focused on how India might assess and respond to emerging biosecurity threats arising from deliberate acts by hostile state actors or terrorist groups. Building on the hypothetical scenario from the earlier simulation exercise, this session introduced a new development: confirmed intelligence reports that high-risk labs in neighboring countries, in close geographic proximity to the area of operations of known terrorist groups and their state sponsor, was conducting gain of function research to make the Nipah virus more transmissible and potentially working on similar modifications to the smallpox virus. Participants were asked to reflect on whether traditional strategic frameworks such as deterrence and escalation or de-escalation pathways remain relevant or effective in responding to such unconventional biological threats.

**Group's discussion points :**

- **Institutional gaps in crisis decision making:** Existing national response structures such as the National Disaster Management Authority (NDMA) may not be adequately equipped to lead decision-making in a biothreat scenario, especially one involving cross-sectoral coordination. There is a need for a dedicated national authority or high-level task force for biosecurity.
- **Complexity of attribution and intelligence sharing:** India lacks a clear legal and strategic framework for responding to intentional biothreats. The importance of integrating domestic intelligence with regional and international networks was highlighted, though specific mechanisms for this integration were not detailed. Intelligence agencies, including the National Technical Research Organisation (NTRO) and the Research and Analysis Wing (RAW), would need to work closely with public health and scientific institutions. However, such coordination remains largely aspirational rather than operational.



- **Potential interventions:**

- Sentinel surveillance in sensitive border zones was proposed as a possible intervention, but the discussion did not explore how such systems would be designed or implemented.
- India's current disease surveillance infrastructure may not be well equipped to distinguish between naturally occurring outbreaks and those potentially linked to deliberate release. There is a significant challenge of attributing the origin of a suspected biothreat to a state or non-state actor as biological events rarely come with a clear signature, making attribution difficult without robust forensic capabilities.
- Engaging neighboring countries through diplomatic and regional health channels, particularly the WHO South-East Asia Regional Office would be helpful. However, the discussion leaned more toward internal containment and security responses than collaborative regional action. The points discussed in this regard are summarised under the sections on Simulation Exercises 3 and 4.

**What was overlooked or underexplored:**

- **Comprehensive Risk Assessment:** The first step in a scenario like this is to develop some consensus as to whether the risk is credible and the likely timeline until an actual bioterrorism event might take place. The subsequent step is to assess how catastrophic of a risk this could be and the likelihood of that happening. These assessments and consensus building will never be 100% accurate since information will be secondhand and often speculative. This needs to be built into the assessment process and decision response capacities of those involved.

- **Crisis Management Leadership Under a Potential Bioterrorism Risk Elevation Event:** A structured discussion on how and who should be involved in building a emergent preparedness and response strategy did not take place perhaps due to a lack of time or due to a lack of prioritization of this aspect of preparedness and response. This is a complex issue and it is easy to understand why this would be difficult to organize during a compressed simulation exercise timeframe and structure. However, failure to develop and agree to a crisis management leadership structure and decision-making process ahead of an actual crisis would make addressing a sudden and unexpected biological crisis potentially involving bioterrorism even that much more challenging to confront and make smart decisions on.
- **Preparedness for a Bioterrorism Event and Potential Community Spread:** The discussion should have partially focused on what actions should be taken immediately to strengthen early detection and response systems. While the group briefly discussed the need for airport screening or port-of-entry screening, there wasn't any discussion on a structured course of action on preventing the threat reaching India or the early detection and response if it did reach India. There should have been more discussions on stockpiling of key therapeutics and non-pharmaceuticals like masks, gowns, gloves, oxygen, and isolation centers. Newly developed Nipah vaccines for example should be immediately field tested for safety and efficacy (using immunological surrogate markers). Smallpox vaccine should be procured internationally and a mandate issued from the Government of India to Indian vaccine companies to rapidly begin Smallpox vaccine development and manufacturing (with financial backing of the Government of India).
- **Uncertainty Regarding the Likelihood and Timing of a Bioterrorism Event:** The key challenge to this scenario is that it remains unclear if a bioterrorism event will take place and if so, when this might happen. It is



possible that nothing will happen for the next 12-24 months or may never happen. So, the response needs to be balanced between immediate preparedness and response and long-term preparedness and response. In many ways, this scenario is a wakeup call for longer term investments in bioterrorism detection and response capabilities and decision-making processes. However, these investments cannot take too long as the risks are already high.

#### **Points of divergence:**

- **Preparedness versus attribution priority:** While some participants stressed that India must focus on universal preparedness measures regardless of origin, others argued that the response should be tailored based on clear attribution whether the event was natural, accidental, or deliberate.
- **Civilian versus military leadership in response:** A few participants leaned toward a civilian led public health response framework, while others believed the gravity of a biothreat from state or non-state actors might require leadership from national security or defense institutions.

#### **Simulation Exercise Session 3: identification and early response to possible bioterrorism events in India**

**Scenario Update:** Cases of unknown encephalitis are being reported in Punjab and Delhi. There are at least 15 suspected cases and with 5 fatalities. The other 10 are all in the ICUs. None of the cases have recent travel to Kerala or Bangladesh. Bacterial cultures are all negative. A viral encephalitis panel is being run on 10 living suspected cases. Today, 3 of these cases have been confirmed to be Nipah virus. NCDC is leading the investigation along with the Delhi municipal corporation and the Punjab state health department.



**Main Question:** Now that this is confirmed to be Nipah without a clear source or reason for infection, what emergency steps should be taken immediately?

**Sub-questions to probe:**

1. What is the leadership role of the NSC and MoD? How does it coordinate with the MoH and Disaster Management Ministry?
2. What information is most essential to gather in the next 7-10 days which will help identify the level of risk, appropriate response and etiology of the outbreak?
3. What immediate control measures, if any, should be enacted in Delhi and Punjab?
4. What messages should be shared with the public and media? What messages should be shared with hospitals and the medical community nationally?
5. Should the focus be on Delhi and Punjab only? What should be done in other states and cities?

This session focused on India's ability and systems to respond to a new biological threat, one that may be man-made and intentionally released as an act of bioterrorism. Participants were to incorporate the information and actions taken in the 2nd session of the simulation exercise which revolved around the suspicion that regional state actors and/or organizations associated with acts of terrorism were studying high consequence pathogens as possible new bioterrorism agents. The scenario depicted a new Nipah virus outbreak in cities bordering the neighbouring country and in the Indian capital, involving individuals with no travel history to regions where Nipah outbreaks typically occur, such as Kerala or Bangladesh. Putting this all together, the suspicion that this represents an actual bioterrorism event and a very dangerous disease outbreak should be extremely high but falls



short of being confirmed. The real question and challenge to the participants was how best to respond.

**Group's discussion points :**

- **Biothreat measures**

- Rapid inter-agency coordination is key to responding to bioterrorism. Intelligence agencies and defense personnel are key actors, especially in discerning intentional release versus natural outbreaks. Operational guidelines should come from domain specialists, especially those within biodefense, infectious disease, and epidemiology units, and not be left to generic public health authorities. The NDMA and its Rapid Response Teams (RRTs), though typically focused and trained on natural disasters, could be key actors in biothreat scenarios as well.
- Metagenomic tools could be used to distinguish between naturally occurring pathogens and engineered strains. However, clinical symptoms alone often fail to provide enough clarity, and real-time sequencing data would be critical.
- AI-based models could be potential tools for early warning and anomaly detection. This requires databases containing genetic sequences of known biothreat agents for comparison and pattern recognition.
- In suspected bioterrorism scenarios, "forced preservation" such as preventive treatment and isolation are necessary to contain illness and reduce exposure.

- **Pandemic preparedness and outbreak measures**

- Pandemic preparedness should be strengthened through robust manufacturing infrastructure for vaccines, diagnostics, and

therapeutics. There is a need for multi-platform technological capabilities such as VLPs and mRNA to enable early market deployment of medical countermeasures. Preparedness should be oriented towards managing endemic threats and not only pandemics. While India may have the technological know-how for rapid vaccine development and diagnostics, its current production capacity is geared more toward timely response rather than high volume.

- Local authorities, including the District Magistrate and district-level police, were highlighted as the first responders. Their collaboration with clinicians to trace contacts and gather symptom profiles was considered essential.
- Local laboratories and field workers play a critical role in responding to early warning signs. District level teams would be expected to manage initial containment and safe sample handling, before escalating the case to higher biosafety level laboratories (BSL 3 or BSL 4) for advanced analysis. However, there are gaps in coordination between local and national facilities.
- Well-rehearsed standard drills, including immediate treatment of exposed or infected individuals, environmental sampling (e.g., water sources), and timely notification of health authorities, are needed.
- Considering the disparity in resources between public and private sectors, formal mechanisms are needed to bring private hospitals and laboratories into the national surveillance and response framework, especially during large outbreaks. However, given existing disparities in funding and capacity between public and private healthcare systems, there is less clarity on the feasibility of equitable resource sharing.



- **Curriculum and capacity building:** Pandemic and bioterrorism modules should be included in medical education and disaster preparedness training. Specialised task force committees should be formed to build capacity.

**What was overlooked or underexplored:**

**Rapid Situational Assessment Capacity:** Despite the escalation of the hypothetical scenario, the hesitation in acknowledging the possibility of a deliberate biothreat continued. The fact that the affected regions of Punjab and New Delhi are closer to the neighboring country's border and are not typical Nipah-affected areas did not raise any particular concern or trigger further scrutiny. The participants wanted to treat the scenario as if it were a natural outbreak, mainly because of the comfort and familiarity of this approach. However, the scenario calls for a more honest and aggressive assessment of the current situation and the potential to develop into a massive national crisis.

**Crisis Management Leadership Structures and Decision Making During a Bioterrorism Event:** The participants did not clearly outline who would be responsible for key response decisions and communication and who would lead coordination efforts across ministries in the event of a confirmed or suspected bioterror attack. The fact that nobody could reference a national bioterrorism crisis response strategic plan or operational plan is important to recognize and address. It was also unclear who within the Government of India has the current and updated capacity to understand and address a high consequence bioterrorism act that has the potential to grow and spread.

**Decisive and Effective Containment Measures:** Another key aspect of this scenario is deciding on which containment measures to employ immediately. The best time to contain a biological threat is early in an outbreak. Unfortunately, this is also when accurate information on the pathogen's severity, contagiousness, and



modes of transmission are missing or incomplete. In a bioterrorism event, there is also the concern that the biothreat may have been released in multiple locations across a wide geographic area and at different time points. All of this point to the need for very aggressive case detection/surveillance systems in areas both known and unknown to have the biothreat present in. It also means aggressive case isolation and quarantine of anyone likely exposed to the biothreat. Consideration also needs to be given to possible lockdowns or closures of events or settings with a high risk of pathogen spread.

**Decisive and Effective Mitigation Measures:** Besides containment, mitigation of the impact on people that are infected or exposed to the biothreat needs to be considered and acted upon. This includes supportive medical care, psychological support to families and community affected, and potential use of vaccines and advanced therapeutics to prevent illness in those exposed or likely to be exposed to the biothreat.

**Decisive and Effective Security and Political Actions:** This is not only a health crisis but also a security crisis. It can easily turn into a political crisis as well. The participants were not as aggressive about addressing this as they perhaps should have been. More discussion on what would be an optimal security response and a political response in the Indian context was needed. To what degree should retaliation against foreign actors and collaborators in this bioterror act be the focus? This could be a topic of detailed discussion in regards to this particular scenario and for suspected bioterrorism events in general.

**Crisis Communication Messages and Strategies:** Part of the security and political response also involves crisis communication. What should the public be told at this point in the evolving scenario and who should say it. These are not easy decisions and thus should be discussed and practiced repeatedly.



**Role of the Police and Security Sectors in Investigating and Confirming Bioterrorism:** The chain of custody for clinical and environmental samples in a criminal investigation context was not mentioned, though it is central to bioterrorism response. The required information for the identification of level of risk, appropriate response and etiology of the outbreak was not clearly discussed. In a broader sense, the scenario serves to underscore the importance of deciding how to divide up manpower and other resources between the criminal investigation aspects of the crisis and the public health containment and mitigation aspects of the crisis.

**Role of Researchers and Medical Epidemiologists in a Bioterrorism Event:** Medical researchers, virologists, and epidemiologists are even more crucial in a suspected bioterrorism event than in a natural outbreak or epidemic. This is because there are more unknowns and potential risks with a bioterrorism agent that could be human or AI designed or changed from its natural form. Therefore, deliberate efforts need to be made to prepare this expert workforce to learn quickly and accurately from an evolving bioterrorism event and get them access to the information they need (blood samples, clinical information, behavioral data, community surveillance data, etc.). Thought should be given to having pre-arranged study protocols in humans, animals, and virology laboratories so that the new pathogen can be quickly studied and assessed.

**Points of divergence:**

- **Use of private sector for surveillance:** Some participants advocated for a strong partnership with private laboratories and hospitals to support early detection, while others raised concerns about standardization, data privacy, and the risk of information leaks.



- **Scope of NDMA in biothreats:** There was disagreement on whether existing NDMA protocols could be adapted for bioterrorism, or if a new, dedicated national response unit was required.
- **Precautionary isolation vs. confirmation-based action:** As in previous simulations, opinions differed on whether drastic measures (e.g., quarantine, environmental lockdowns) should be initiated based on preliminary suspicion or delayed until full laboratory confirmation.

#### **Simulation Exercise Session 4: Containment strategies and overall crisis management for a deadly and contagious bioterrorism event**

**Scenario Update:** The Nipah virus outbreak continues to spread in Delhi, Punjab, and even other states and cities with a 50% mortality rate so far. The public is beginning to panic. The stock market is crashing. Countries are beginning to cancel flights to and from India.

Genetic sequencing of the virus from patients confirms that this is one strain and that the strain is different from known strains in past outbreaks in Kerala and Bangladesh. However, in-depth knowledge of Nipah virus genotypes and phenotypes is very limited.

Indian outbreak investigation teams are working to determine transmission factors and level of contagiousness. Current best guesses are that this strain is highly contagious since community and household spread is happening easily. Medical staff have also been infected with some deaths. This is causing panic in hospital emergency departments and among first responders.

Currently, there is no known effective vaccine and no known effective treatments. Serum institute has 200,000 (2 lakhs) doses of an experimental Nipah vaccine in its freezers in Pune. However, the vaccine has not yet gone through human safety and efficacy trials. A monoclonal antibody treatment against Nipah is also in early



development without any safety or efficacy data available. Very few doses of this monoclonal antibodies have been produced and stored.

Basic infection control with N95 masks and gowns seems to be effective in limiting spread to healthcare workers and caregivers, at least among those who are able to use this PPE properly. However, hoarding of PPE (especially N95 masks) is happening across the country.

**Main Question:** What are the key containment strategies at this point?

**Sub-questions to probe:**

1. Do you recommend emergency lockdowns at this point in time? If yes, across the whole countries or in certain states and cities, or only in specific neighborhoods/districts? Why?
2. What do you fear most at this stage in the crisis/outbreak and what can be done to address that specific fear?
3. Specifically, what can be done to help India maintain law and order, maintain political stability, maintain essential services, maintain the overall economy, maintain hospital services, etc.?
4. What steps should be taken to rapidly develop and evaluate potential vaccines, therapeutics, and rapid diagnostics?

The fourth and the last part of the hypothetical scenario focused on strategies for containing a high-fatality, high-transmissibility bioterrorism event, with particular emphasis on crisis management beyond immediate biomedical response. Participants discussed frameworks for lockdowns, risk communication, logistics management, healthcare system strengthening, and cross-sector coordination in the Indian context. Needless to say, this stage of the crisis is extremely concerning and overwhelming. There may not be clear right and wrong response answers at



this stage except to focus on overall national security, mitigation of morbidity and mortality, and mitigation of the economic and social consequences of the crisis.

**Group's discussion points :**

- **Administrative roles in rural contexts:** Decentralization is important for rapid action, but comes with concerns regarding the lack of scientific capacity at the local level, and the risk of inconsistent responses. For example, District Magistrate and Superintendent of Police would likely be the first officials notified of an outbreak. While they would be the first to convene emergency meetings, they may have limited technical capacity to understand or manage biosafety risks. There were differing views on the extent of authority that should rest with district-level officials.
- **Containment through lockdowns:** Geography and time-bound lockdowns could be initial containment strategies, but lockdowns alone would not suffice. Intra-household transmission, lack of enforcement capacity, and economic vulnerabilities (e.g., daily wage workers) limit lockdown effectiveness. Some participants supported immediate and strict lockdowns to limit spread; others cautioned against premature restrictions that could backfire, advocating instead for targeted and phased containment. A better way would be to enforce cluster containment, dividing affected areas into smaller zones to deploy focused strategies. This would require district-level expertise and quick decision-making supported by precedents from past outbreaks.
- **Public health communication:** Clear and credible communication, both to the public and healthcare workers, is essential. Messaging must address practical issues such as hoarding, misinformation, food access, transport of patients, what to expect from healthcare facilities, and what *not* to do.



- **Healthcare system preparedness:** Clinical readiness with stockpiles of essentials such as oxygen cylinders, ICU beds, personal protective equipment (PPE), and other emergency health infrastructure to respond swiftly to emerging threats should be present. Consider measures such as expanding emergency medical use protocols, strengthening supply chains without fully cutting them off, and preparing immunomodulator-based therapies and vaccines.
- **Use of data and AI:** Rapid diagnostics, early warning systems (e.g., chatbots), and pre-developed datasets are vital tools for real-time decision making. There is a need to build such systems in advance and to train response teams on using them.
- **Learning from global experiences:** Adapt global best practices to the Indian context, particularly around response timelines, community-based health management, and scalable infrastructure for outbreak control.

**What was overlooked or underexplored:**

**Rapid Situational Assessment Capacity:** Similar to the previous session, the participants tended to underestimate the severity of the current situation and the likelihood that this could evolve quickly into a national security crisis. There was no discussion on what participants feared most in such a crisis scenario, an important aspect that, if addressed, could help shape more targeted preparedness and response strategies. Of course, there is little precedent for such a crisis in India's recent history or even world history (the 2014 Ebola crisis might be the closest thing to this) and thus, thinking it through in terms of all of the consequences of crisis as it continues to evolve is very challenging. It points to the need to train experts to think through such crises through simulation exercises and discussions



and in learning deeply from past health crises (COVID, Plague, Smallpox in India's past).

**Crisis Management Leadership Structures and Decision Making During a Bioterrorism Event:** Again, the participants did not clearly outline who would be responsible for key response decisions and communication and who would lead coordination efforts across ministries in a crisis as complex as this one. The fact that nobody could reference a national crisis response strategic plan or operational plan (not a national disaster response plan which is different in many ways) is important to recognize and address. There was minimal discussion on legal frameworks required for deploying emergency protocols such as forced quarantine, compulsory treatment, or commandeering of private sector resources. It was also unclear who within the Government of India has the current updated capacity to understand and address a high consequence bioterrorism act that is beginning to spread unchecked. Few in the world do but that does not mean that it is not an unmet need for India.

**Decisive and Effective Containment Measures:** Another key aspect of this scenario is deciding on which containment measures to employ immediately. The best time to contain a biological threat is early in an outbreak. Unfortunately, at this point in the scenario, that window of opportunity has likely passed. This needs to be honestly recognized and addressed. When a high consequence biothreat begins spreading across multiple states, cities, communities, within hospitals, etc., the time for containment may be over and mitigation perhaps should be prioritized. Lockdowns and closure of events or settings of high risk of pathogen spread should strongly be considered in the hope that it can slow down spread and eventually stop the growth of the outbreak. Efforts to identify a vaccine or other therapeutic agents that can prevent infection should be prioritized. But the science of proving efficacy and real-world effectiveness must be placed ahead of wishful thinking.



**Decisive and Effective Society Mitigation Measures:** Mitigation of the impact of this crisis is now the priority for the Government of India. Mitigation can mean slowing down the spread of the pathogen and identifying effective treatments and preventative medicines/vaccines. Mitigation should also include how to keep hospitals open and functional for other urgent medical issues, how to keep the essential economy running and people able to earn for their livelihood, and how to keep society safe and resilient.

**Decisive and Effective Security and Political Actions:** At this stage, the situation could easily turn into a security and/or political crisis. The participants were not as aggressive about addressing this as they perhaps should have been. More discussion on what would be an optimal security response and a political response in the Indian context was needed. To what degree should retaliation against foreign actors and collaborators in this bioterror act be the focus? Should India ask for international assistance? This could be a topic of detailed discussion in regards to this particular scenario and for suspected bioterrorism events in general.

**Crisis Communication Messages and Strategies:** Part of the security and political response also involves crisis communication. The media and public would be well aware of the nature and severity of the crisis at this point. There could be no hiding of the biothreat crisis in an open society like India. But the question remains, “What should the public be told at this point in the evolving scenario and who should say it?”

**Role of Researchers and Medical Epidemiologists in a Bioterrorism Event:** There should be a continued emphasis on this with fully Government of India fiscal and leadership support. There will be a long term need for effective vaccines and therapeutics against this bio-agent and future bio-agents. There will be a need to better understand this new biothreat pathogen, how it spreads, what kind of immunity do survivors have, and how it was created and released. The 2 lakh doses



of experimental Nipah vaccine should be tested for safety among a group of health volunteers who are at high risk of being infected. This could be health workers, police/security forces, or other essential workers. By using the vaccine on high risk workers, it becomes more ethical and potentially useful in terms of studying its effectiveness in preventing infection or severe disease.

## Reflections and Way Forward

### Cross-cutting themes identified:

The simulation surfaced several recurring challenges and opportunities that cut across all thematic discussions. These include:

- **Expertise in Biothreat Prevention, Detection, and Response across Multiple Sectors and Government Agencies:** The roundtable and simulation exercise highlighted the continued need to build expertise and crisis management skills related to novel biothreats. Capacity to effectively respond to bioterrorism related issues and crises are an important sub-set of this and should be one of the priorities. This capacity can be strengthened through the development of subject matter experts, use of simulation exercises, and creation of national strategic operational plans. Engagement with global experts and counterparts from other countries is also useful.
- **Distinguishing natural outbreaks from biothreats:** A key concern was the need for clear mechanisms to identify whether a virus is of natural origin or a result of deliberate manipulation. Setting up systems and protocols and the use of metagenomic tools to distinguish between naturally occurring pathogens and engineered biothreats is a priority. There is an urgent need for a comprehensive national framework that outlines protocols for detection, reporting, attribution, and response in the case of both natural and



engineered biological events. Such a framework would help align roles and responsibilities across sectors, agencies, and levels of governance.

- **Institutional gaps in decision-making:** The simulation exercise revealed a lack of clarity and experience with accurately assessing a potential crisis situation involving novel biothreats. Downplaying a potential biothreat risk to India or sounding alarm bells unnecessarily are both risky and potentially catastrophic. Thus, the ability to identify and comprehend various biothreats and their societal repercussions as they evolve is fundamental to an effective national biothreat detection and response system. Clarity is needed on who takes responsibility for initiating the threat verification process, which institutions to engage, and how assessments are to be conducted. Data and experiences from previous biothreat outbreaks (both domestic and international) should be organized, analysed, and shared to inform detection and response strategies and plans. These resources are invaluable for forecasting, decision-making, and adapting strategies based on what has worked or failed in similar contexts.
- **Pandemic preparedness and stockpiling:** There is a need for timely public health and clinical readiness for a broad array of biothreat pathogens and toxins. This includes stockpiles of essential supplies such as vaccines, therapeutics, oxygen cylinders, PPE, and hospital beds. These stockpiles need to be well researched and planned in terms of both the quantities required and the quality (or effectiveness) of the stockpile items.
- **Robust data and surveillance to base decisions on:** All 4 sections of the simulation exercise require accurate, timely, and targeted data and surveillance in order to properly assess the situation and make quality decisions on. Incorrect assessment and response decisions vs. correct decisions are frequently the result of inaccurate or incomplete data which



leads to making assumptions and guessing. To overcome this, better and more complete data is needed which comes from investing in better surveillance and monitoring systems. We know this is the case when it comes to a country's economic policies, public health, and defence and will be true in biosecurity as well.

- **Preparedness means being able to conduct timely research and field studies before and during a biological crisis:** As the simulation exercise attempts to convey, responding to a perceived bioterrorism threat and an actual crisis event is a process that requires leaders to accept high levels of uncertainty and confusion. This cannot be avoided but can be addressed by investing in the ability to learn and adapt quickly. Many of the bioterrorism response decisions revolve around science (understanding of the pathogen and how to treat it or become immune to it) and public health (understanding how it spreads and how to contain it at a population level). The ability and need to conduct rapid, smart, and creative laboratory and field research is one common theme across all biothreat scenarios.

#### **Immediate steps to be taken:**

- Identify and empower a nodal agency for national-level biosecurity coordination, with representation from health, science, defense, and home ministries.
- Develop interim SOPs for early warning, classification, and containment of bio-threats, including zoonotic and synthetic pathogens.
- Conduct regular simulation exercises involving civil, defense, and public health institutions at the state and national levels to improve readiness for biothreats.



- Launch a nationwide lab biosafety audit, prioritizing facilities engaged in GoF or high-consequence pathogen research.

### Proposed Roadmap

- Constitute a permanent inter-ministerial national task force on biosecurity with decision-making authority to coordinate efforts on biosafety, pandemic preparedness, and bioterrorism. Encourage state governments to integrate bio-threat preparedness into their public health emergency planning, with access to centrally developed tools and guidance.
- Build capacity at national, state, and district levels and across multiple sectors effectively anticipate, interpret, and respond to complex biological threat scenarios. Identify a multi-sectoral cadre of future health security and bioterrorism response leaders and experts. Invest in training and career development opportunities for this cadre.
- Develop and conduct frequent simulation-based exercises and roundtables at the national and state levels involving various novel pathogens and toxins under different situations. Focus on current leaders and managers involved in crisis management. But also Introduce health security concepts and strategies to young potential leaders in India (i.e., IAS trainees, military and police academy students, IIM/IIT students, post graduate medical trainees, etc.).
- Prioritize smart investments in national stockpiles for a potential large poorly controlled biothreat outbreak crisis. Develop surge capacity in tools such as vaccines, therapeutics, diagnostics, masks and PPE, and crisis communication platforms.
- Invest in data infrastructure and decision support tools, including AI-enabled early warning systems, to improve decision making and ultimately mitigate



bio-threats. Invest in lab safety monitoring systems to reduce the risk of lab-originated outbreaks, especially in high-containment and research-intensive facilities.

- Develop a comprehensive white paper based on simulation findings to inform legal and institutional reforms on biosecurity policy. This could guide the drafting of new legislation or revision of the current Disaster Management Act.

These coordinated efforts will enable India to build a resilient biosecurity architecture that is capable not only of responding to threats, but of preempting them through surveillance, preparedness, and global cooperation.



## Annexure 1: Concept Note

### **Third Expert Roundtable on India's Health Security: Biological Threat Risks from State and Non-State Actors**

Biosecurity is a critical subtext of India's non-traditional security (NTS), which, along with traditional security (TS), is an expression of India's comprehensive national power. The fine line between NTS and TS has blurred significantly. NTS comprises subjects such as human security, climate, water, environment, animal husbandry, marine resources, and agriculture. Cybersecurity, asymmetrical warfare, and evolving technology are new frontiers that cannot be ignored. Further, these need to be tackled in a 'whole of community' approach. In recent years, the risk landscape of biological threats has evolved in both complexity and consequence, shaped by rapid advances in biotechnology, increasing frequency of zoonotic spillovers, and the growing strategic risks posed by dual-use biotechnologies. In this context, India's distinct infectious disease burden, combined with its increasing geopolitical footprint and scientific advancements, calls for the urgent need for coordinated, inter-agency frameworks that can effectively integrate scientific and policy expertise to strengthen bio-risk governance.

In response to the emerging biosecurity challenges, the Centre for National Security Studies (CNSS), in collaboration with the Asia Centre for Health Security (ACHS) at National University of Singapore, and South Asia Field Epidemiology and Technology Network (SAFETYNET) Inc., is convening a high-level expert roundtable titled "*Biological Threat Risks from State and Non-State Actors*". Through structured simulation exercises and panel discussions, the roundtable seeks to inform government policy dialogues, facilitate inter-sectoral coordination, and identify critical capability gaps in India's biological threat preparedness. The event is scheduled to take place on 04<sup>th</sup> July 2025 from



09:30 AM to 05:30 PM, at Ramaiah Medical College, Gnanagangothri Campus, Bengaluru.

The key agenda items of the roundtable event include:

1. Current Evidence and Risk Assessment of Bio-threats in South Asia
2. Simulation Exercise Part I: Unverified Gain-of-function Research in Regional Labs
3. Simulation Exercise Part II: Confirmed Engineering of Nipah virus by Hostile Actors
4. Simulation Exercise Part III: Detection of Unexplained Nipah Outbreak in India
5. Simulation Exercise Part IV: Full-scale Spread and Panic - National Containment Challenges
6. Strategic Reflections and Formulation of Next Steps

As the nature of threats to national security expands beyond traditional military domains, India must have anticipatory approaches to counter bio-threats, whether from state actors, non-state actors, or unprecedented accidents. In this regard, this expert roundtable aims to generate a range of substantive outcomes that will contribute meaningfully to India's national biosecurity architecture and broader strategic planning in health security. The event, therefore, marks a significant step toward creating a whole-of-government and whole-of-community response to emerging biosecurity challenges.



## Annexure 2: Agenda and Simulation Scenarios

**Host Organisation:** Centre for National Security Studies (CNSS), M S Ramaiah University of Applied Sciences, Bengaluru.

**Location:** Board Room, Ramaiah Medical College, Gnanagangothri Campus, Mathikere, Bengaluru

**Participants:** A mix of 20 to 30 experienced leaders in government at the national level in the security, defence, disaster management, health, and biotechnology sectors. Non-governmental experts in national security, health, crisis management, and biotechnology/vaccine R&D.

### **Background:**

#### **Strategic Rationale**

The objective of this roundtable event on the 4<sup>th</sup> of July 2025 is to convene key strategic thinkers, defence planners and other doers in India to begin to determine what immediate and long-term biologic threats are facing India and therefore what investment actions are needed. This roundtable will be organised as an open simulation discussion. It will begin with what we know and do not know about specific regional and global biologic threats and building on that to decide what should be done now in response in terms of:

- Intelligence strategy
- Target development
- Counter-measure development
- Overall crisis preparedness
- Pharmaceutical and non-pharmaceutical stockpiling and readiness
- Vaccine testing and evaluations
- Strategic investments in biotech research



The best way to help participants understand all this is to conduct a few simulations throughout the day. This makes the dialogue and critical thinking debates real, on target, and very practical, thereby assisting the Government of India (GoI) to develop an actionable response plan for emergent biosecurity risks.

A biological event, whether due to an intentional attack or an accidental lab leak, may or may not occur within the next 3 to 5 years. Hopefully, it won't happen. But hope is not a substitute for preparedness. Investments by the GoI in preparing as best as possible for this unlikely reality are highly recommended. The consequences of not doing so are too risky and the benefits to the health, security and disaster management sectors are very real even if current particular threats never happen. Other threats will emerge, and so preparedness is essential.

### **Overview of Current Bio Threats in the Region**

After having spent the period of 2020-2025 surfacing fundamental fact patterns, enumerating transnational networks, and identifying high-risk virology research that is being conducted in China and across other Western and Asian nations, the collected data is now sufficiently mature enough to be converted into practical risk assessment and emergency response applications. There are, of course, a range of sound risk assessment methods and models from domains ranging from epidemiology, finance, to defence sector that are field validated and work well under many circumstances.

However, recent events related to SARS-CoV-2 have demonstrated that these methods do face difficulties when dealing with 'high velocity' pathogens.



These traditional models also struggled considerably when attempting to scale up to capture all the key elements of the health and public health systems value chains, especially in a large complex country like India. There remains an open frontier in new risk assessment methods and risk data model development with regards to high-velocity/high-lethality rate pathogens in complex country environments such as India, which play a leading role in global health security and pandemic preparedness.

### **India's Unique Infectious Disease Risk Profile, Healthcare Systems Complexity and Critical Capability Gaps**

India faces one of the most challenging infectious disease risk profiles with the full spectrum of Nipah virus, multiple bat coronaviruses/filoviruses, dengue, scrub typhus, melioidosis, leptospirosis, avian influenza, swine flu, tuberculosis, drug resistant bacteria, and a range of other pathogens that generate continuous zoonotic spillover and/or water/foodborne spillover events across India. Amplifying these risks is the fact that some of these pathogens are being artificially enhanced in several laboratory environments in Asia and across the West. The latter risks are especially acute with regards to avian influenza, swine flu, bat coronaviruses and Nipah virus. India faces a kaleidoscope of zoonotic spillover and man-made infectious disease risks, chemical agent risks, and climate-related risks. No set of risk assessment methods and/or risk data model methods have been developed from first principles for the Indian environment, a substantial gap in capability that generates material biosecurity risks for India but also globally, given India's high degree of international connectivity. We are going to directly address and remedy that gap.



**The Power of Crisis Management Simulations to Generate New Methods and Findings: ‘Controlled Experiments’ in Low-Consequence Settings across India**

Working with GoI at the National and State levels, dedicated to developing an advanced biodefence capability across India, the CNSS Team and Dr. Michael Friedman from ACHS will partner together to design, execute, and capture the key findings and new methods developed by crisis management exercises. The new risk assessment/risk model data development methods and key findings that are generated across the key phases of these crisis management exercises will be captured in strategic net assessment form and will form the critical foundation upon which additional layers of the Indian biodefence and emergency response capability will be added as our understanding and the situation evolves.



## **AGENDA**

**9:30 AM: Registration, Seating, and Introductions**

**10:00 AM: Briefing on Current Evidence of Biological Threat Risks in the South Asia Region, Followed by Group Discussion (60 minutes)**

**Main Question:** What specific biological threats are we aware of, and what are the perceived risks of these threats at this time

Sub-questions to probe:

- i. Can a biological threat event in India lead to temporary destabilization (economic and political unrest, closure of key institutions, failure of essential services, long term economic hardship and business loss, major setbacks to India's growth and reforms, etc.)? If yes, what are the characteristics of a future biological crisis event that would cause this?
- ii. List out the potential biological threats that are of significant concern to India
- iii. Discuss which of these threats seems credible and have the potential for real damage and/or destabilization in India
- iv. Discuss what threat may exist that are currently unknown and how likely they are real
- v. Discuss methods for gathering additional reliable information on potential biological threats

**11:00 AM: Coffee/Tea Break (20 minutes)**

**11:20 AM: Simulation Exercise - Part 1 (50 minutes)**

**Scenario 1:** Gain-of-function work on various viruses is being conducted in laboratories in the region under high-risk conditions. There is some evidence that Nipah virus is one of these viruses, but it is unclear to what extent the Nipah virus has been successfully made more transmissible and virulent. It is also unclear to what extent other viruses are being modified and made more transmissible, virulent or resistant to current vaccines.

**Key issues to probe:**

1. What information is most important to confirm or disprove? (i.e., what information is needed to assess the overall potential risk of this bio-threat)
2. How best to confirm or disprove this?
3. What additional information would be most important to attempt to gather and analyse in these crises?
4. Who should be aware of these developments, and why?
5. What would you fear most in such a scenario?

**Key Underlying Question:** What does this scenario and discussion tell us about India's current level of information gathering and risk analysis?

**12:10 PM: Simulation Exercise - Part 2 (60 minutes)**

**Scenario update:** The Government of India has been able to confirm that Gain of Function research is being done on Nipah virus in high-risk labs in neighboring countries in close geographic proximity to the area of operations of known terrorist groups and their state sponsor. It also confirms that progress in making the Nipah virus more transmissible is likely. It is not clear



what other viruses are being manipulated but experts believe that attempts to synthesize Smallpox may be happening.

**Main Question:** Given this information, what actions should India take immediately to reduce the threat and prepare for a potential biological attack/virus release on Indian soil. Please consider both offensive and defence options as well as how traditional strategic concepts of deterrence and escalation/de-escalation pathways may or may not apply in this type of unconventional scenario.

Sub-questions to probe:

- i. What are some of the actions to be considered to reduce the risk of this threat reaching India? Is there an option for offensive operations?
- ii. What are the key actions to be taken to prepare for a virus release on Indian soil? In other words, how can India strengthen its response capacity and systems effectively and quickly?
- iii. Who specifically should be involved in the response capacity building and potential stockpiling efforts?
- iv. To what degree should states and civil society be involved at this stage?
- v. Which of these response actions are most important and which are most difficult to achieve?

**1:10 PM: Lunch (50 minutes)**



**02:00 PM: C. Simulation Exercise - Part 3 (30 minutes)**

**Scenario Update:** Cases of unknown encephalitis are being reported in Punjab and Delhi. There are at least 15 suspected cases and with 5 fatalities. The other 10 are all in the ICUs. None of the cases have recent travel to Kerala or Bangladesh. Bacterial cultures are all negative. A viral encephalitis panel is being run on 10 living suspected cases. Today, 3 of these cases have been confirmed to be Nipah virus. NCDC is leading the investigation along with the Delhi municipal corporation and the Punjab state health department.

**Main Question:** Now that this is confirmed to be Nipah without a clear source or reason for infection, what emergency steps should be taken immediately?

Sub-questions to probe:

- i. What is the leadership role of the NSC and MoD? How does it coordinate with the MoH and Disaster Management Ministry?
- ii. What information is most essential to gather in the next 7-10 days which will help identify the level of risk, appropriate response and etiology of the outbreak?
- iii. What immediate control measures, if any, should be enacted in Delhi and Punjab?
- iv. What messages should be shared with the public and media? What messages should be shared with hospitals and the medical community nationally?
- v. Should the focus be on Delhi and Punjab only? What should be done in other states and cities?

**2:30 PM: D. Simulation Exercise - Part 4 (60 minutes)**



**Scenario Update:** The Nipah virus outbreak continues to spread in Delhi, Punjab, and even other states and cities with a 50% mortality rate so far. The public is beginning to panic. The stock market is crashing. Countries are beginning to cancel flights to and from India. Genetic sequencing of the virus from patients confirms that this is one strain and that the strain is different from known strains in past outbreaks in Kerala and Bangladesh. However, in-depth knowledge of Nipah virus genotypes and phenotypes is very limited. Indian outbreak investigation teams are working to determine transmission factors and level of contagiousness. Current best guesses are that this strain is highly contagious since community and household spread is happening easily. Medical staff have also been infected with some deaths. This is causing panic in hospital emergency departments and among first responders.

Currently, there is no known effective vaccine and no known effective treatments. Serum Institute has 200,000 (2 lakhs) doses of an experimental Nipah vaccine in its freezers in Pune. However, the vaccine has not yet gone through human safety and efficacy trials. A monoclonal antibody treatment against Nipah is also in early development without any safety or efficacy data available. Very few doses of this monoclonal antibodies have been produced and stored.

Basic infection control with N95 masks and gowns seems to be effective in limiting spread to healthcare workers and caregivers, at least among those who are able to use this PPE properly. However, hoarding of PPE (especially N95 masks) is happening across the country.

**Main Question:** What are the key containment strategies at this point?



Sub-questions to probe:

- i. Do you recommend emergency lockdowns at this point in time? If yes, across the whole countries or in certain states and cities, or only in specific neighborhoods/districts? Why?
- ii. What do you fear most at this stage in the crisis/outbreak and what can be done to address that specific fear?
- iii. Specifically, what can be done to help India maintain law and order, maintain political stability, maintain essential services, maintain the overall economy, maintain hospital services, etc?
- iv. What steps should be taken to rapidly develop and evaluate potential vaccines, therapeutics, and rapid diagnostics?

**3:30 PM: Coffee Break (20 minutes)**

**3:50 PM: E. Reflections on Scenario and Bio-Threat Prevention and Response Capacity Building (60 minutes)**

**Main Question:** What did you learn from this simulation that can help India better prepare for future biologic threats?

Sub-questions to probe:

- i. Looking at the current bio-threat situation in India, what should India do now to help prevent a future biological attack?
- ii. Looking at the current bio-threat situation in India, what should India do now to better prepare for a biologic threat crisis and potentially effectively contain a biological threat?
- iii. What do you fear most in terms of future biological attacks or an unintentional lab leak of a highly contagious and deadly agent?
- iv. Specifically in terms of Nipah virus, what steps should be taken to better



prepare India for a widespread Nipah outbreak?

- v. Specifically in terms of Smallpox, what steps should be taken to better prepare India for a Smallpox release or importation from another country?

**4:50 PM: F. Next Steps and Closing of Meeting (15 minutes)**



## Annexure 3: Speaker Bios

### **Dr Michael Friedman**

Lead, Public Health Response at the Asia Centre for Health Security (ACHS), National University of Singapore (NUS)



Dr. Michael Friedman is the Lead of Public Health Response at the Asia Centre for Health Security (ACHS) at the National University of Singapore. He is a dual-board-certified physician in Paediatrics and Internal Medicine. Dr. Friedman has over 30 years of experience in global public health leadership, including 25 years with the U.S. Public Health Service and the CDC. At ACHS, he focuses on finding key gaps in public health capacity, refining response strategies, and turning evidence into practical policy.

### **Dr Mohan Kumar**

Senior Technical Officer, SAFETYNET



Dr. Mohan Kumar is a Senior Technical Officer at SAFETYNET. He helps build field epidemiology capacity and develops the public health workforce across India. With a background in medicine and applied epidemiology, Dr. Kumar has worked to improve outbreak response systems and support One Health approaches through the India Field Epidemiology Training Program (FETP). He has been instrumental in mentoring frontline and intermediate FETP officers, guiding investigations into communicable disease outbreaks, and promoting evidence-based public health actions.

## **Dr Nivedita Gupta**

Scientist G & Head of Communicable Diseases (CD), Division, ICMR



Dr. Nivedita Gupta is Scientist G and Head of the Communicable Diseases Division at the Indian Council of Medical Research (ICMR). She leads national strategies for dealing with emerging and re-emerging infectious diseases. As a respected epidemiologist and virologist, she played a crucial role in improving COVID-19 testing infrastructure and led studies on high-risk outbreaks. Dr. Gupta holds a PhD in Molecular Medicine and completed her MBBS at Lady Hardinge Medical College. She has also overseen the establishment of Virus Research and Diagnostic Laboratories (VRDLs) across India, enhancing the country's capacity to detect and respond to biological threats.

## **Dr Anoop Velayudhan**

Scientist E (Medical), Epidemiology and Communicable Disease Division, ICMR



Dr. Anoop Velayudhan is Scientist E (Medical) at the Epidemiology and Communicable Diseases Division of the Indian Council of Medical Research (ICMR). He plays a key role in investigating outbreaks, monitoring diseases, and supporting One Health initiatives. With a background in public health and epidemiology, Dr. Velayudhan has led and contributed to several important studies on acute encephalitis syndrome, foodborne outbreaks, and healthcare-associated infections in India.



## **Dr Umesh Shaligram**

Executive Director, R&D, Serum Institute of India, Pune



Dr. Umesh Shaligram is the Executive Director and Board Member of the Serum Institute of India Pvt. Ltd. (SIPL), where he leads R&D in vaccines, biosimilars, and next-generation biologics. He played a pivotal role in developing and manufacturing billions of doses of COVISHIELD® and Covovax, India's first indigenously produced COVID-19 vaccine. Under his leadership, SIPL has advanced disease elimination strategies for TB, malaria, pertussis, and HPV, and is pioneering point-of-care CAR-T cell therapies.

## **Dr Vinay Tergaonkar**

Professor, Department of Pathology, Yong Loo Lin School of Medicine, National University of Singapore



Dr. Vinay Tergaonkar is the Research Director at the Institute of Molecular and Cell Biology (IMCB), A\*STAR, Singapore. He is also a Professor at the Yong Loo Lin School of Medicine, National University of Singapore. He is well known for his groundbreaking work on NF- $\kappa$ B signaling, telomerase regulation, and cancer biology. His research has shed light on the links between chronic inflammation and cancer while identifying new therapeutic targets. He is part of the editorial boards for Science Advances, Molecular and Cellular Biology, and Biochemical Journal.



## **Dr Varsha Sridhar**

Director, Molecular Solutions Ltd., Bengaluru



Dr. Varsha Sridhar is a molecular biologist, entrepreneur, and diagnostics innovator. She holds a Ph.D. in Molecular Virology and Microbiology. Dr. Sridhar is the Director and Co-founder of Molecular Solutions Care Health, where she develops accessible and scalable diagnostic technologies for public health. She also works as the Lead Molecular Biologist at *Dhee* Hospitals in Bangalore, leading the Laboratory Medicine department. Her work connects clinical diagnostics, bio-surveillance, and health system improvements. She places strong importance on ensuring fair access to molecular tools

## **Dr Mrinmayee Bhushan**

Distinguished Fellow, Strategic Research and Growth Foundation, Pune



Dr. Mrinmayee Bhushan is the co-founding Director of Mindfarm Novatech Pvt. Ltd. and serves as a consultant for IP and innovation at APT Research Foundation, a recognized not-for-profit organization. She is also a Subject Matter Expert at the Centre for Joint Warfare Studies (CENJOWS) and a Distinguished Fellow at the Strategic Research and Growth Foundation, Pune. Dr. Bhushan has written extensively on cyber- biosecurity, focusing on hybrid threats at the crossroads of biotechnology and digital infrastructure. She is the author of the book *“Silent Weapons, Deadly Secrets: Unveiling the Bioweapons Arms Race.”*



## **Dr Asima Banu**

Nodal Officer, BMRCI



Dr. Asima Banu is the Principal and Nodal Officer at Bangalore Medical College and Research Institute (BMCRI). As a skilled microbiologist and public health leader, Dr. Banu played a key role during the COVID-19 pandemic. She acted as the Nodal Officer of the Victoria Hospital Trauma Care Centre and introduced patient-focused innovations that gained national attention. Her work includes infection control, medical education, and biosafety.

## **Dr Nanda Kumar BS**

Professor, Department of Community Medicine, Ramaiah Medical College (RMC)



Dr. Nanda Kumar BS holds an MD in Community Medicine and currently serves as Associate Dean for Research & Innovation at M.S. Ramaiah University of Applied Sciences (MSRUAS). He is also the Head of the Division of Research & Intellectual Property Rights and an Associate Professor in the Department of Community Medicine at M S Ramaiah Medical College. As a technical consultant to both the government and private agencies, he has contributed to national COVID-19 response efforts, policy consultations, and evaluation of e-health systems.



## **Dr Ashwin Kulkarni**

Associate Professor, Department of General Medicine, RMC



Dr. Ashwin Kulkarni, MD is an Associate Professor in the Department of General Medicine at MS Ramaiah Medical College and MSRUAS. Since 2013, he has contributed to medical education and clinical care, focusing on lifestyle and infectious diseases. His research includes studies on COVID-19 severity markers, metabolic syndrome, hypertension, and respiratory illness, earning national recognition for his work on neutrophil-to-lymphocyte ratio as a prognostic marker during the pandemic.

## **Dr Beena**

Professor, Department of Microbiology, RMC



Dr. Beena is a Professor in the Department of Microbiology at MS Ramaiah Medical College with over 20 years of teaching and research experience. She serves as Head of the Mycology Section and Secretary of the Hospital Infection Control Committee (HICC), where she has led initiatives including antibiotic stewardship, infection control policy development, hospital-acquired infection surveillance, and NABH accreditation support. Her main areas of expertise include mycology, hospital infection control, and microbiological safety.



## **Dr Hariprasad KV**

Associate Professor, Department of Emergency Medicine, RMC



Dr. Hariprasad KV, MD, DNB, is an Associate Professor in the Department of Emergency Medicine at MS Ramaiah Medical College. As faculty for the American Heart Association, he is an instructor in Basic and Advanced Life Support and Pediatric Advanced Life Support. Dr. Hariprasad leads initiatives in point-of-care ultrasound, trauma care quality improvement, emergency simulation training, and legal medicine education. He has played a key role in establishing monthly academic forums and school-based CPR programmes.

## **Dr Babitha Rajan**

Associate Professor, Department of Community Medicine, RMC



Dr. Babitha Rajan, MD, serves as Associate Professor in the Department of Community Medicine at MS Ramaiah Medical College. She is also the Medical Officer in charge of the Rural Health Training Centre (RHTC). Her professional focus encompasses reproductive and child health, sports medicine, public health ethics, infectious diseases, and the integration of technology in public health delivery.

## **Brig MM Ramachandra (Retd.)**

Director, National Security Council Secretariat, New Delhi



Brig MM Ramachandra served as the Director at the National Security Council Secretariat (NSCS), New Delhi. With over three decades of distinguished service in the Indian Army, he played a crucial role in national security planning, strategic coordination, and inter-agency intelligence integration. Following his retirement, he has continued to contribute to defence and security policy thought leadership, particularly in areas intersecting with biosecurity, counter-terrorism, and crisis preparedness.

## **Shri Rajeev Ranjan Verma**

Member, National Security Advisory Board, New Delhi



Shri Rajiv Ranjan Verma is a 1990-batch Indian Police Service officer of the Uttar Pradesh cadre and currently serves as Special Director in the Intelligence Bureau (IB), Ministry of Home Affairs, Government of India. Elevated in situ to this position in June 2023, he has held several key leadership roles within the IB. Over three decades of service, he has contributed to India's internal security, intelligence coordination, and strategic threat assessment.



## **Dr Swetha Raghavan**

Project Scientist, Dengue Vaccine Programme, NCBS, Bengaluru



Dr. Swetha Raghavan is a Project Scientist at the National Centre for Biological Sciences (NCBS-TIFR), Bengaluru, working within the Dengue Vaccine Program funded by Shri Narayana Murthy. She holds a Ph.D. in Biological Sciences from the Indian Institute of Technology (IIT) Madras and has completed her postdoctoral training at NCBS. Her research focuses on deciphering fundamental molecular mechanisms with the goal of enabling effective disease interventions. She currently leads efforts in the development of mRNA-based vaccines against the dengue virus, integrating cutting-edge RNA biology with translational vaccine design.

## **Dr Prabhdeep Kaur**

Isaac Centre for Public Health, Division of Medical Sciences, IISc



Dr. Prabhdeep Kaur is a Professor at the Isaac Centre for Public Health, Division of Medical Sciences, Indian Institute of Science (IISc), Bengaluru. She leads research on public health systems and infectious disease control. As a physician-epidemiologist with over twenty years of experience, Dr. Kaur has directed large implementation science projects across India. Her work focuses on hypertension, diabetes, cervical cancer, and outbreak investigations. She connects clinical medicine, epidemiology, and health systems research, emphasizing

## Prof Sudhir Krishna

Professor (Retd.), National Centre for Biological Sciences, Bangalore



Dr Sudhir Krishna completed his MBBS from St John’s Medical College, Bangalore and his PhD from University of Cambridge prior to starting his career at National Centre for Biological Sciences -TIFR, Bangalore in the year 1992. Here, his lab focused on understanding Notch signaling, HPV and cervical cancer for over three decades. Closer to 2016, movement towards Dengue began with a “fever of unknown origin “study that set the stage for the development of the Dengue DNA vaccine and later Dengue mRNA- based vaccine. Dr Sudhir has since held the position of Distinguished faculty, IIT Goa (2021-23) and Professor Emeritus at Transdisciplinary University, Bangalore (2024- present).

## Dr Anita Jain

Director, Usanas Foundation, Jaipur



Dr. Anita Jain is the Director of Usanas Foundation, a non-profit focused on higher education and research since 2018. With a background in public health and institutional leadership, her work includes educational program development, health sciences advocacy, and inter-sectoral research collaborations. Her role in advancing evidence-based health education and institution-building connects directly with the symposium’s themes of preparedness, capacity-building, and strategic public health engagement.



## **Dr Suryesh Namdeo**

Senior Research Analyst, Centre for Policy Research, IISc



Dr. Suryesh Kumar Namdeo is a scientist at the Centre for Policy Research at the Indian Institute of Science (IISc) in Bengaluru. He leads projects that focus on biosecurity, science diplomacy, and new technologies. Dr. Namdeo is trained as a molecular biologist and holds a PhD from the Max Planck Institute for Biology in Germany. Previously, he worked as a science and technology consultant for the Biological Weapons Convention at the United Nations Office for Disarmament Affairs. He has co-authored important UN declarations on biosecurity and disarmament.

## **Dr Soma Chaki**

Professor, Faculty of Life and Allied Health Sciences, and Associate Dean – Academics, MSRUAS



Dr. Soma Chaki holds a PhD in Immunology and currently serves as Professor and Associate Dean – Academics in the Faculty of Life and Allied Health Sciences at M S Ramaiah University of Applied Sciences (MSRUAS). Her research focuses on immunology, proteomics, molecular biology, and cell signalling with applied relevance in cancer biology and metabolic disorders. She has led initiatives in curriculum development, interdisciplinary teaching, and institutional research planning.



## **Dr Sahadev Shankarappa**

Professor, Faculty of Life and Allied Health Sciences, MSRUAS



Dr. Sahadev Shankarappa holds a PhD in Neuroscience and is currently a Professor in the Department of Biotechnology at M S Ramaiah University of Applied Sciences. His research integrates neural engineering, tissue regeneration, drug delivery systems, and biomaterial-based therapeutics. His lab focuses on translational neurobiology and biomedical engineering, including defence-health interfaces.

## **Dr Shashank Tripathi**

Professor, Faculty of Life and Allied Health Sciences, MSRUAS



Dr Shashank Tripathi is an Associate Professor in the Department of Microbiology & Cell Biology at the Indian Institute of Science's Centre for Infectious Disease Research (CIDR) in Bengaluru. His commitment spans cutting-edge basic science to translational research, including the identification of COVID-19 severity markers and the testing of antiviral interventions. His laboratory investigates RNA virus–host interactions, spanning influenza A, SARS-CoV-2, and flaviviruses, with the long-term aim of developing broad-spectrum antivirals and vaccines,



## **Col (Dr) Santosh Karade**

Associate Professor and Senior Advisor Microbiology, Department of Lab Sciences, Army Hospital Research and Referral, Delhi



Col (Dr) Santosh Karade, MD, PhD, is Associate Professor and Senior Advisor in Microbiology at the Department of Laboratory Sciences, Army Hospital (Research & Referral), Delhi Cantt. A medical microbiologist and virologist by training, he holds an MD from AFMC Pune and a PhD in Virology from the National AIDS Research Institute (ICMR), Pune. His research focuses on antimicrobial resistance, hospital-acquired infections, and the development of low-cost diagnostics. Dr Karade has led several AFMRC-funded projects on HIV drug resistance and tuberculosis, and has published widely in peer-reviewed journals.

## **Air Commodore Sunil Agrawal**

Commodore Adm, Command Hospital Air Force, Bengaluru



Air Commodore Sunil Agrawal is the current Commanding Officer of the Command Hospital Air Force, Bengaluru. With a rich background in military medicine and command leadership, he oversees a 300+ bed super-specialty facility serving Air Force personnel and their families. As a senior Air Force medical leader, his expertise spans trauma care, hospital administration, readiness planning, and integrated health support during crises.

## **Sh. Hans Ram Chandawat**

Commandant, Central Reserve Police Force (CRPF)



Sh. Hans Ram Chandawat currently serves as the Commandant of the Central Reserve Police Force (CRPF), Karnataka Sector Headquarters, Bengaluru. A decorated officer with over 25 years of dedicated service, he has held key operational roles across some of the most challenging terrains and conflict zones in India. His vast experience includes tenures in the North East region, Left Wing Extremism (LWE) areas, Jammu & Kashmir, and with the elite CoBRA (Commando Battalion for Resolute Action) unit, where he made significant contributions to counter-insurgency and anti-terrorism operations.

## **Dr. Sridevi C**

Specialist Medical Officer, Central Reserve Police Force (CRPF)



Dr. Sridevi C is a Specialist Medical Officer (Second-in-Command) currently serving at the Composite Hospital, Central Reserve Police Force (CRPF), Yelahanka, Bengaluru. She holds an MBBS and an MD in Pathology from Dr. NTR University of Health Sciences. Prior to joining CRPF, Dr. Sridevi served as an Assistant Professor in the Department of Pathology at MRMCW, Hyderabad, where she contributed to both academic and diagnostic advancements. She joined the CRPF in 2018 as a Specialist Medical Officer at the Composite Hospital in Hyderabad and has since continued to provide exemplary medical services within the force.



## **Dr Prabhavathy Devan**

Scientific Manager, Mol Bio Lab, Biocon Biologics R&D



Dr Prabha obtained her doctoral training from IIT Madras in cancer biology where her novel work defined new molecular path for early cervical cancer detection of human papilloma virus, with chronic cervicitis patients. Her findings have been adapted in the community outreach activities for the early screening of cervical cancer using colposcopy method and PCR by the Tamil Nadu govt. In her postdoctoral training, she spear-headed exosome-based research that paved ways to understand stem-cell based treatment options for muscular dystrophies.

## **Maj Gen J.V. Prasad**

Director, Centre for National Security Studies (CNSS)



Major General Jyotula Venkat Prasad (Retd.) is a distinguished army officer, recipient of the Vishisht Seva Medal, and the founding Director of CNSS. He is preceded by a staggering 38 years' service record in the Indian army spanning combat roles, counterterrorism operations, natural disaster management, and various leadership positions. His leadership role as the Managing Director of the Ex-servicemen Contributory Health Scheme during the COVID-19 pandemic is well recognised. He has significant international experience in his prior role, having the responsibility of training, equipping, and monitoring India's UN Peacekeeping contingents.

## **PM Heblikar**

Member, CNSS Council



PM Heblikar is a respected national security expert with a long and distinguished career in government service. He served the Government of India for 38 years, retiring in 2010 as Special Secretary. Since then, he has worked tirelessly to bridge the worlds of national security, academia, science and technology, and business. A key figure in founding the Centre for National Security Studies (CNSS) in Bangalore, Heblikar also leads the Institute of Contemporary Studies Bangalore (ICSB).



## **Dr KC Belliappa**

Advisor, CNSS Council



Dr. KC Belliappa, Director Maxgrid Securicor (India) Private Limited and Advisor and Permanent Invitee, Governing Council of CNSS is a qualified medical doctor who served with a Special Unit of the French Foreign Legion and comes with over two decades of experience spanning specialized security operations, business development and consultancy in India, West and East Africa, Nepal, Taiwan, Sri Lanka, UK and Myanmar.

## **Lt Col Pavithran Rajan**

Advisor, CNSS Council



Mr. Pavithran Rajan is a military veteran with over two decades service in the Indian Army. He is a tech entrepreneur and academic, dabbling in multiple spheres of work. As a former Advisor at the MHA, GoI and Adjunct Faculty at the Cyber Security Research Centre, Punjab Engineering College, his expertise in cybersecurity and strategic planning is noteworthy.. He is also actively involved in volunteering efforts, including his advisory role at Cyber Peace Foundation, contributing to social and economic empowerment. He also sits on the Boards of two private limited companies.

## Annexure 4: Event Photos





