Memo No: IEDCR.2025.237 **Date: 16/03/2025**

Report on after action review of Nipah virus outbreak investigation and responses in Bangladesh, 2024

Date of after action review: 29-30 September 2024

IEDCR

Submitted to:
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1. EXECUTIVE SUMMARY

Brief Description of the Event:

Nipah virus (NiV) is an enveloped RNA virus of the Paramyxoviridae family that can cause severe disease. In Bangladesh the first case was identified in 2001 and till now 343 Nipah cases have been identified. Nipah positive cases have a high mortality rate and Pteropus Medius (common fruit bats) have been identified as the environmental reservoir in Bangladesh. Consumption of raw date palm sap is the primary mode of transmission of Nipah virus in Bangladesh, and there is also history of person-to-person transmission. December to April is the country's Nipah season because of harvesting date palm sap. All Nipah survivors are under surveillance and monitoring. A media briefing is done before the start of every Nipah season.

In 2024 the first Nipah case was diagnosed on 21 January in Manikganj district and the fifth and last case on 19 March in Khulna district. Nipah outbreak investigations were conducted in Manikganj Sadar, Naria upazila Shariatpur, Porsha upazila Naogaon and Dacope upazila Khulna. Case notification was done by hospital based Nipah sentinel surveillance, event based notification and enhanced surveillance network. Verification and preliminary assessment included obtaining preliminary demographic, clinical and exposure information. There was coordination between the Nipah dedicated laboratory of IEDCR and One Health laboratory of icddr,b to compare, contrast and document the ELISA and PCR results. This information was provided to the Director IEDCR who then declared the outbreak by informing the authority of health services (DGHS and/or MoH&FW) and local health authority about the event. Then a multi-disciplinary rapid response team was formed as per the guidance of Director IEDCR in collaboration with icddr,b, EcoHealth Alliance and relevant stakeholders for further investigation. IEDCR issued a government order by including the names of multi-disciplinary team members and informed the local health, administrative authority and higher authority (MoH&FW, DGHS, etc.). Field preparation was organized by communication with the affected healthcare facility, local health and administrative authority with arrangement of necessary logistics, transport & accommodation for the outbreak response team. Field investigations included clinical and epidemiological investigation, anthropological and behavioral exploration, zoonotic and ecological exploration, risk communication and community engagement with contact study. After completion of each outbreak investigation, a report was prepared by the outbreak investigation team and shared with relevant stakeholders.

Summary of Discussions with Best Practices & Challenges:

Through group and plenary discussions in the after action review (AAR) a number of best practices and challenges were identified for the 2024 Nipah response. IEDCR and partners have been responding to Nipah outbreaks for many years, and some of the best practices include an established surveillance system that enables early detection and rapid response, effective stakeholder coordination, existing guidelines and standard operating procedures, and Nipah awareness programs. Some of the key challenges identified include unavailability of point of care testing, limited ICU support, absence of effective screening and triage systems, limited surge capacity, lack of a national Nipah prevention and control strategy, and too-short duration of TV scroll news. A list of best practices and challenges identified by technical pillar is provided in the table below:

Table 1. Best Practices and Challenges by Technical Pillar

Technical Pillar	Best Practices	Challenges
Surveillance & Laboratory	· Effective stakeholder coordination · Case confirmation within 24 hours of notification · Established Nipah surveillance system and immediate response · Use of liquid nitrogen during specimen transport	· Unavailability of point of care testing · Inadequate awareness of suspected cases in hospitals · Inadequate ICU support for Nipah · Appropriate handling of body fluids must be done by trained personnel
Coordination & Emergency Response	· One Health (OH) Approach · Dedicated Resources (logistics and finance) · Inter and intra agency coordination · Engagement of trained manpower · Regional sentinel surveillance sites · Seasonal hospital awareness program, school awareness program	· Notification and verification is not institutionalised · Nipah prevention and control strategies are not available · Field preparation · Surge Capacity · Lack of onsite testing and verification · Coordination of activities with local health authority · RCCE challenges
Community Engagement & Risk Communication	· Hospital awareness program · Community awareness during outbreaks · Awareness building among the Gachhis · Seasonal awareness programs in schools/ madrashas · Formulation of specific guidelines and strict adherence to them	· The too-short duration of TV scroll news · Language barriers during community awareness programs · Difficulties in collaboration among local stakeholders · Inadequate funds · Lack of awareness among healthcare providers and managers
Case Management	· Surveillance and Early Detection · Infection Prevention and Control (IPC) · Guidelines and Standard Operating Procedures	· Surveillance and Detection · Clinical Care and Support · Healthcare Provider Preparedness · Screening and Triage · Specialised Care for High-Risk Patients · Sequelae Management and Long-Term Care · Access to Essential Treatments and Supportive Care

Several activities were proposed to institutionalize best practices and to address challenges. The following activities were identified as highest priority:

- Nipah Awareness Day celebration
- Finalization and dissemination of Nipah outbreak SOP
- Provide an additional follow-up visit 14 days after outbreak investigation
- Update guideline for management of Nipah survivors
- Development of rapid diagnostic test
- Establishment of One Health surveillance approach for Nipah
- Development of national strategy for Nipah prevention and control
- Awareness program for hospital staff
- Community engagement with religious leaders before Nipah season
- Provision of ICUs in district hospitals

Conclusions and Recommendations:

During the AAR, IEDCR and partners objectively examined what was in place before the 2024 Nipah response, what happened during the response, what went well, and what went less well during the response. Through collaborative discussion, participants identified best practices that should be maintained, discussed challenges that need to be addressed, and proposed activities to promote the best practices and overcome the challenges. The next step is to take these lessons learned and implement the recommended activities to strengthen preparedness and response to Nipah in Bangladesh. It is recommended that implementation of the action plan be monitored continuously and reviewed on at least a quarterly basis by the Nipah surveillance team and the public health emergency operations center (PHEOC). The PHEOC may serve as a coordination center to ensure follow through on the recommendations of this AAR and to conduct future AARs.

Table 2. Key Milestones of the 2024 Nipah Response

Key Milestones	Case 1	Case 2	Case 3	Case 4	Case 5
date of start of outbreak or event (date of onset of symptoms)	11.01.2024	12.01.2024	25.01.2024	08.03.2024	12.03.2024
date of detection of outbreak or event	21.01.2024	22.01.2024	30.01.2024	13.03.2024	17.03.2024
date of notification of outbreak or event	21.01.2024	22.01.2024	30.01.2024	13.03.2024	17.03.2024
date of verification of outbreak event	21.01.2024	22.01.2024	30.01.2024	13.03.2024	17.03.2024
date of laboratory confirmation	21.01.2024	-	31.01.2024	14.03.2024	19.03.2024
date of outbreak or event intervention	21.01.2024	23.01.2024	31.01.2024	15.03.2024	20.03.2024
date of public communication	22.01.2024	23.01.2024	01.02.2024	16.03.2024	21.03.2024
date outbreak or event declared over	28.01.2024	25.01.2024	04.02.2024	17.03.2024	22.03.2024
Response timeline start (often the beginning of the response)	21.01.2024	21.01.2024	21.01.2024	21.01.2024	21.01.2024
Response timeline end (often the end of the response)	22.03.2024	22.03.2024	22.03.2024	22.03.2024	22.03.2024

2. BACKGROUND ON EMERGENCY

Nipah virus (NiV) is a deadly emerging zoonotic paramyxovirus of the genus Henipavirus that can cause acute respiratory distress, severe encephalitis and death in humans. NiV is primarily carried by bats. Nipah virus disease is considered a global health priority by the World Health Organization and has pandemic potential because of its zoonotic nature, human-to-human transmissibility, wide geographic distribution of bat reservoir species, high case-fatality rate in humans, and lack of available vaccines or therapeutics.

The first human Nipah outbreak occurred in Malaysia and Singapore in 1998-1999, resulting in 283 cases and 109 deaths. The outbreak was linked to severe encephalitis in people who had close contact with infected pigs. In Bangladesh, the first case of Nipah encephalitis was identified in the Meherpur district in 2001. Since then, cases have been reported almost every year. Consumption of raw date palm juice contaminated by bats was found to be the mode of transmission in 2004. Since 2001, cases have been reported in Bangladesh from around 34 districts. Till April 2024, a total of 343 cases of Nipah infection were identified and among them 245 (71.4%) of whom died, indicating a very high mortality rate. Human-to-human transmission of Nipah virus has been reported among family members and healthcare providers of infected patients. In 2024, 4 confirmed Nipah cases and 1 probable case were identified in Bangladesh, and all 5 (100%) died. In 2024 the first Nipah case was diagnosed on 21 January in Manikganj district and the fifth and last case on 19 March in Khulna district.

3. SCOPE AND OBJECTIVE OF REVIEW

Scope: Function(s) reviewed:

The after action review (AAR) of the Nipah response in Bangladesh analysed the following pillars of the response undertaken by IEDCR and other health partners:

1. Surveillance and laboratory systems
2. Coordination and emergency response
3. Risk communication and community engagement
4. Case management and infection prevention and control

The review covered the period from the detection of the first case of 2024 to the end of the last case investigation of the outbreak.

Overall Objective:

To identify best practices and challenges encountered during the response to Nipah virus outbreaks in 2024, to identify and evaluate preparedness and response mechanisms for emerging public health threats, and to provide opportunities to validate existing mechanisms and identify areas for enhancement.

2.1. Specific Objectives:

1. To assess the functional capacity of existing systems to prevent, detect and respond to Nipah outbreaks in Bangladesh.
2. To identify challenges and best practices encountered during the response.
3. To document and share experiences of responses with stakeholders.
4. To identify practical actions for improving existing capacities and capitalising on best practices.
5. To improve preparedness and response plans for future outbreaks.
6. To share experiences and lessons learned.
7. To advocate for support for preparedness actions for future Nipah outbreaks.

4. METHODS

Structured planning for the AAR was initiated on 26th June 2024. A series of four planning meetings were held to determine the objectives and format of the AAR, assign roles and responsibilities of planning team members, identify facilitators, and complete other necessary tasks for organising this event. Following 3 months of planning, the AAR was conducted on 29th and 30th September 2024.

The AAR was conducted in working group format in accordance with the WHO Guidance for After Action Review (AAR) and the WHO working group AAR toolkit. The approach involved an interactive, structured methodology with user-friendly material, group exercises, plenary discussions, and interactive facilitation techniques. Groups worked in their pre-identified function and shared cross learning with other groups through world café rotations and plenary discussions. The AAR was conducted in 2 days and was divided into the following sessions:

Introduction: The AAR began with introductory presentations on the AAR methodology, the objectives, agenda and an introduction to the Nipah outbreak investigation and responses being reviewed.

Session 1 – What was in place before the response? The purpose of the first session was to establish the baseline for the review by answering the question: what was in place to support a health response? Participants were split into working groups organised by function, and together worked to identify the systems, plans, policies, and resources that were in place to support a response prior to the emergency. The groups then came together in plenary and placed what they identified on a chart on the board, identifying synergies between the functions.

Session 2 –What happened during the response? By identifying key milestones, achievements and activities in the health response, the same working groups developed a timeline of the event. Then together the whole group worked to build a physical timeline on the wall, discussing and agreeing upon key events of the response. The purpose of this session was to have a common operating picture amongst participants and agree on key facts related to the emergency being reviewed.

Session 3 – What went well? What went less well? Why? On the basis of what was supposed to happen (Session 1) and what did happen (Session 2) working groups started to dig deeper into what worked, what did not and why. Through this session, the working groups collectively analysed actions taken to respond in order to identify the best practices and challenges encountered during the response, their impact on the response and why they occurred (the enabling/limiting factors). The discussion focused on what happened and why, not on who did it. At the end of this session, the groups participated in viewing and adding content to all of the other working groups.

Session 4 – What can we do to improve for next time? Working groups worked to identify and develop key activities in order to address the best practices and challenges, and their causes, arising during the response. Working group developed the activities to the timeline of implementation, responsibility, support needed and indicators. All participants contributed to the work of other groups through a world café to ensure that they were harmonised, realistic and achievable.

Session 5 – Way forward - The final session involved collective prioritisation of activities identified during the AAR workshop through a voting process. Through plenary and panel discussion, participants decided together how the activities identified would be taken forward including the immediate next steps for ensuring implementation.

AAR participants included IEDCR team from PHEOC and Nipah surveillance, EcoHealth Alliance, Department of Forest, and icddr,b. A group of technical experts from WHO and US CDC participated and provided an outsider perspective during the AAR.

5. FINDINGS

5.1 Timeline of outbreak

The first two Nipah cases were detected from Manikganj Sadar on 21st and 22nd January 2024, respectively. The outbreak investigation started after laboratory confirmation of the first case on the same day and continued up to 28th January 2024. The second case is considered probable, as it was not lab confirmed. Meanwhile the third case was detected on 30th January 2024 from Naria upazila, Shariatpur District. This case was laboratory confirmed on 31st January 2024, and the investigation continued up to 4th February 2024. The fourth case was identified from Porsa upazila, Naogaon District on 13th March 2024. After laboratory confirmation on 14th March 2024, the outbreak investigation started and was declared over on 17th March 2024. The fifth & last case of the season was detected on 17th March 2024 and laboratory confirmed on 19th March 2024. This outbreak was declared over on 22nd March 2024.

Upon detection of the first Nipah in January, the PHEOC coordinated the outbreak investigation and response. PHEOC IEDCR core committee arranged a meeting for activation of PHEOC for Nipah response in February 2024. After that meeting the PHEOC activated for the Nipah response. An incident manager was appointed by the core committee for Nipah response who coordinated the response by following the incident management system. An incident action plan was developed for the response with an operational period up to 30 April 2024. After each outbreak investigation PHEOC updated the situation report for every Nipah positive case. After the end of the Nipah season a core committee meeting was held, and the committee decided to deactivate the PHEOC and return to watch mode.

5.2 Pillar 1

Surveillance and Laboratory

STEP 1: What was in place before the response?

Resources: Before the outbreak there was availability of human resources, logistics, equipment & infrastructure. There was an existing SOP for laboratory diagnosis that was followed. The outbreak response was performed following the National guideline for surveillance management, prevention & control. Logistics were lined according to the Digital inventory system for logistics, and diagnosis of obtained samples were done by serology, PCR & sequencing.

Plans/Policies: A sentinel hospital based surveillance system was in place for Nipah. Real time data were collected using electronic devices and data was shared through interface between icddr,b & IEDCR. Samples were shared with US-CDC for quality control.

Coordination mechanisms: It has been maintained by following One Health Approach. The stakeholders are DGHS, IEDCR, icddr,b, US-CDC, CEPI, Eco Health Alliance. The coordination is maintained by monthly meetings between IEDCR, icddr,b, US-CDC & CEPI and is documented. There is a documentation referral system. Enhanced activities are ongoing in 471 health facilities from where designated persons collected samples from the site and coordinated with IEDCR & icddr,b.

Preparedness activities: There is an existing hospital awareness programme, enhanced surveillance activities during pre-season and season, Outbreak investigation & response material, Media awareness session & School awareness campaign.

The working group discussed that Japanese encephalitis virus surveillance & Event based surveillance also support preparedness activities.

STEP 2: What happened during the response?

Refer to the timeline in section 5.1 and the detailed timeline table in the Executive Summary.

STEP 3: What went well? What went less well? Why?

Table 3. Pillar 1 Surveillance and Laboratory - Challenges

	CHALLENGES	IMPACT(S)	LIMITING FACTORS (What were the limiting factors which led to this challenging)
1	Point of care testing is not available because rapid diagnostic tests are still in the process of development.	If point of care testing becomes available, it will result in quick identification of Nipah cases and a rapid response.	No RDT available
2	Lack of awareness regarding suspected cases among healthcare personnel in hospitals	Cases may be missed	Limited knowledge and lack of training, limited human resources, lack of awareness program in some facilities, lack of awareness of communication process for reporting a suspected case.
3	Improper handling of body fluids	Chance of spread of infection	Lack of trained personnel in healthcare facilities (cleaners lack proper training)

Table 4. Pillar 1 Surveillance and Laboratory - Best Practices

	BEST PRACTICES	IMPACT(S)	ENABLING FACTORS (What were the enabling factors which led to this good practice)
1	Good coordination among stakeholders	Early case identification	• Routine monthly meeting with all stakeholders • Routine field visits • Readiness of logistics
2	After notification cases are typically confirmed within 24 hrs	Prevention and control of human to human transmission	• Good sample transport system • Good quality laboratory
3	Established Nipah surveillance system and immediate response	• Strengthening IPC activity in hospitals • Source identification • Outbreak mitigation	• Donor funds • Experienced HR • Adequate IPC & logistics supplies • Well sensitized local administration at surveillance sites
4	Use of liquid nitrogen to transport the samples	Ensures quality of samples	Availability of logistics support
5	Event based surveillance	Identification of cases at locations other than Nipah surveillance sites	Existing EBS platform at IEDCR

5.3 Pillar 2

Coordination and Emergency Response

STEP 1: What was in place before the response?

Plans and Policies:

1. Nipah Guideline for Management, Prevention and Control of Nipah Virus Infection including Encephalitis
2. Outbreak Investigation and Response Manual including Climate Sensitive Diseases
3. Outbreak Investigation and Response Manual (2014)
4. Handbook on Public Health Emergency Operations Center (PHEOC)
5. International Health Regulations (2005)
6. Standard Operating Procedure (SOP) on Public Health Emergency Operations Center, IEDCR (Draft)
7. Nipah Outbreak and Cluster Management SOP (Draft)
8. Minimally Invasive Tissue Sampling (MITS) SOP (Draft)

Resources:

1. Multi stakeholder engagement- IEDCR, icddr,b, Eco Health Alliance, DLS, Forest Department, OHS
2. Budget allocation (GoB, WHO, US-CDC and NIH(US))
3. Human resources (IEDCR, icddr,b, Eco Health Alliance)
4. Outbreak data management and presentation
5. Nipah outbreak investigation and response reports and data archive
6. One Health Event Based Surveillance Dashboard
7. Nipah Virus Transmission Dashboard

Other:

1. Follow up of Nipah cases and contacts
2. Learning of FETP,B fellows through field activities of Nipah outbreak response
3. SIMEX - 2022 (WHO, IEDCR)
4. Dissemination and scientific communication (Publication of outbreak findings)
5. Nipah enhanced surveillance
6. Nipah awareness program

Coordination Mechanisms:

1. Pre-outbreak online briefing
2. Intersectoral coordination (PHEOC guideline, IHR guideline)
3. Coordination with other stakeholders
4. Daily reporting, meeting and contingency planning (as required)
5. Coordinated collection of samples for event- based surveillance
6. Referral system is coordinated
7. Awareness program including enhance activities (9,417 health care facilities from last 2 years)

Preparedness Activities:

1. Event verification
2. Outbreak investigation team formation as per official procedure
3. Resource mobilisation
4. Training and refresher training
5. NRRT roster
6. Event based and hospital based surveillance
7. Enhanced surveillance activity

STEP 2: What happened during the response?

A media briefing and orientation was held during the last week of November 2023.

Nipah surveillance team identified the first two cases through event based surveillance. The PHEOC met to consider whether to activate to support the Nipah response. After a briefing on the situation, the Director IEDCR activated the PHEOC and appointed an Incident Manager. The PHEOC subsequently met to prepare the incident action plan and to initiate SITREPs.

STEP 3: What went well? What went less well? Why?

Table 5. Pillar 2 Coordination and Emergency Response - Challenges

Challenges		**Impact(s)**	**Limiting Factors** **(What were the limiting factors which led to this challenging)**
1	1.Notification and verification is not institutionalised 2. Nipah prevention and control strategies are not available	1.Sustainability of system uncertain 2. Proper roles & responsibilities unclear.	1. Inadequate PHEOC human resources 2. PHEOC operational limitation
2	1.Field preparation	1.Difficulty in team formation 2.Inexperienced human resources	1. Insufficient human resource. 2. Multitasking activities of IEDCR staff. 3. Multiple outbreaks occurring simultaneously.
3	1. Surge Capacity	1.Lack of manpower during multiple/frequent outbreak at a time 2. Logistic shortage	1.Specific policy for surge capacity does not exist.
4	1. Lack of onsite testing and verification	1. Delayed diagnosis 2. Delayed response	1.Regional lab facilities not available. 2. RDT not available.
5	1. Coordination of activities with local health authority	1.Difficulty in health care centre access 2.Difficulty in community access	1.Insufficient coordination with local public & private health authorities.
6	1. RCCE challenges	1.Lack of awareness on Nipah at the community level	1.Distribution of communication material

Table 6. Pillar 2 Coordination and Emergency Response - Best Practices

Best Practices		Impact(s)	Enabling Factors (What were the enabling factors which led to this good practice)
1	1. One Health (OH) Approach	1. Better coordination 2. Comprehensive investigation	1.OH Secretariat 2. IEDCR leadership
2	1. Dedicated Resources (logistics and finance)	1. Efficiency in outbreak response 2. Timeliness	1. Continuous support from GoB and Donors.
3	1. Inter and intra agency coordination	1.Timeliness of notification and response	1. IEDCR leadership at NRRT and PHEOC helps in dissemination
4	1. Engagement of trained manpower	1.Efficient coordinated response 2. Scientific writings	1. Government initiatives 2. Technical guidance from US-CDC, WHO and other international agencies.
5	1. Regional sentinel surveillance sites	1. Availability of resources/logistics across the country 2. Availability of HR across country 3.IPC	1. Strategic placement of sentinel sites
6	1.Seasonal hospital awareness program, school awareness program	1. Awareness on Nipah to HCWs. 2. Awareness on Nipah to school children & family members.	1.Sustainable funding and resources. 2. Plan for awareness program.

5.4 Pillar 3

Community Engagement and Risk Communication

STEP 1: What was in place before the response?

Before the response to Nipah outbreaks of 2024 in Bangladesh, the following elements were in place:

Plans/Policies

- Nipah Guideline for Management, Prevention & Control
- Media Campaign at the national level (TV, social media, Facebook, Newspaper)
- Nipah Awareness Program
- Communication with public health & medical communities
- Outbreak risk communication
- Planning for health messages based on risk factors

Resources

- Outbreak Investigation and Response Manual
- Human resources (IEDCR, icddrb, DGHS)
- Audio-visual materials
- Video animation message
- Leaflet
- Audio message (miking)
- Courtyard meeting (community level, district, and subdistrict level)
- Question-answers session

Coordination Mechanisms

- National level: DGHS, IEDCR, icddrb
- District level: Civil Surgeon
- Sub-district level/Upazila level: UHFPO, Local Government

Preparedness Activities

- Dissemination program at the national level from IEDCR before Nipah season (December)
- Provide messages before and during the Nipah season
- Hospital awareness program before & during outbreak
- School awareness program before & during an outbreak
- Community awareness program during an outbreak

Other

- Less or no involvement from other stakeholders like livestock and environmental health
- Engage journalists
- To avoid stigma, social discrimination
- Local leaders' involvement
- Dissemination and holistic approach

STEP 2: What happened during the response?

Date	Location	Activity
23-Jan-24	Manikganj Sadar	Community awareness program
23-Jan-24	Manikganj Sadar	Hospital awareness program
24-Jan-24	Manikganj Sadar	Community awareness program
2-Feb-24	Shariatpur Sadar	Hospital awareness program at district hospital
2-Feb-24	Shariatpur sadar	Community awareness program
2-Feb-24	Shariatpur sadar	Hospital awareness program at upazila hospital
3-Feb-24	Noria, Shoriartpur	Community awareness program
3-Feb-24	Noria, Shoriartpur	Miking in the locality
4-Feb-24	Shariatpur Sadar	Miking in the locality

STEP 3: What went well? What went less well? Why?

Several challenges emerged during the implementation of community engagement and risk communication. One major issue raised was the too-short duration of TV scroll news, which made it difficult for the general population to notice important messages. This was due to TV channels prioritising multiple simultaneous scrolls as part of their business policies.

Language barriers during community awareness programs also posed significant challenges, as many participants struggled to understand key messages. This was exacerbated by a lack of community participation.

Collaboration among local stakeholders proved difficult, leading to less effective meetings. This challenge stemmed from stakeholders being engaged in multiple initiatives simultaneously.

Additionally, inadequate funding hindered the organisation of awareness programs and media publicity, which was a result of insufficient financial planning and complex approval protocols.

Lastly, a lack of awareness among healthcare providers and managers complicated case management efforts. This challenge was rooted in inadequate training and supervision of healthcare personnel, highlighting the need for improved capacity-building initiatives.

Table 7. Pillar 3 Community Engagement and Risk Communication - Challenges

Challenges		Impact(s)	Limiting factors (What were the limiting factors which led to this challenging)
1	The too-short duration of TV scroll news	Mass people cannot notice properly	Multiple scrolls run at a time due to the business policy of the TV channels
2	Language barriers during community awareness programs	Facing difficulties in understanding the appropriate message	Lack of community participation
3	Difficulties in collaboration among local stakeholders	Less effective meetings	Multiple engagement of the local stakeholders
4	Inadequate funds	Difficulties in arranging awareness programs and media publicity	Absence of financial planning and complex protocol
5	Lack of awareness among healthcare providers and managers	Difficulties in managing cases	Inadequate training and supervision of the health care personnel.

Several best practices were observed during the 2024 Nipah responses. One of the key practices was the hospital awareness program, which directly involved healthcare providers in Nipah patient management and prevention strategies.

Community awareness during outbreaks also proved to be a crucial strategy, helping to reduce stigma, blame, and rumours, as well as easing the stress experienced by affected families. This was made possible through increased cooperation from the community and local administration. Similarly, raising awareness among Gachhis (date palm sap collectors) helped reduce the risk of transmission. This initiative benefited from government support, including financial assistance and training programs specifically targeting Gachhis.

Another best practice was the implementation of seasonal awareness programs in schools and madrasas, which helped foster awareness and prevention behaviours among children. Their enthusiasm not only enhanced their understanding of Nipah but also encouraged them to disseminate messages within their families and communities.

Finally, the formulation of specific guidelines and strict adherence to them strengthened the workforce's capacity to prevent Nipah transmission. This was underpinned by a strong national-level commitment and the dedication of field-level workers to providing better services to the community.

Table 8. Pillar 3 Community Engagement and Risk Communication - Best Practices

Best practices		Impact(s)	Enabling factors (What were the enabling factors which led to this good practice)
1	Hospital awareness program	1. Involving risk groups (health care providers) for patient management & prevention	1. Relationship with healthcare workers 2. Willingness of HCW for better patient management & prevention
2	Community awareness during outbreaks	1. Reduce stigma, blame & rumours 2. Reduce the stress of the affected family	More cooperation from the community and local administration
3	Awareness building among the Gachhis	Reduce the risk of transmission	More support from the govt authorities in terms of financial support and training of gachhis
4	Seasonal awareness programs in schools/ madrashas	Favourable for awareness development and prevention of Nipah transmission	Children are more enthusiastic to know about Nipah which later on disseminating Nipah message to friends and family
5	Formulation of specific guidelines and strict adherence to them	Building a more competent workforce in preventing Nipah transmission	National-level commitment and endurance of ground force for better service to the community.

5.5 Pillar 4

Pillar 4: Case management and countermeasures

Major Milestones:

Establishment of ICU and isolation facilities in selected hospitals, enhancing capacity to manage severe cases and contain transmission.

Availability of a National Nipah Guideline, ensuring standardised protocols across diverse healthcare settings as well as inclusion of Burial Guideline for control and prevention of infection post-mortem in the community.

Implementation of training programs for healthcare staff in infection prevention and control (IPC) practices to protect personnel and reduce transmission risks.

Designation of focal persons in selected health facilities to ensure early detection and timely management of cases, supported by established SOPs of the surveillance system.

Issues Encountered

- Delayed detection due to limited testing capacity and low public awareness.
- Shortage of ICU beds and supportive care in most facilities, restricting effective treatment options.
- National Nipah Guideline last updated in 2016, failing to reflect current clinical management trends, which may lead to gaps in care.
- Insufficient healthcare provider training and resources across non-surveillance hospitals, leading to variability in preparedness for case management.
- Limited availability of essential medications and equipment, impacting overall patient outcomes and care quality.

Best practices, impacts and enabling factors

1. Surveillance and Early Detection

Key issues in surveillance include the need for quick identification and reporting of cases, facilitated by trained focal personnel within health facilities. Best practices here include assigning designated focal persons to enhance detection and management, with impacts seen in the timeliness of intervention. Enabling factors, such as clear standard operating procedures (SOPs) and staff training, support the effectiveness of this practice.

2. Infection Prevention and Control (IPC)

IPC practices are crucial for containing infections. The availability of isolation facilities in designated hospitals ensures the protection of healthcare staff and limits infection spread. The national IPC guideline, supported by the IPC Act 2018, provides a structured framework for safe handling and treatment, bolstered by trained staff in critical locations.

3. Guidelines and Standard Operating Procedures

National guidelines and SOPs for Nipah and encephalitis provide essential frameworks for consistent response across facilities. These guidelines improve treatment quality and protocol adherence, facilitated by accessible, up-to-date documents and regular training for healthcare providers.

Challenges, impacts and limiting factors:

1. Surveillance and Detection

Delays in case detection often stem from non-specific symptoms, limited awareness, and inadequate testing capacity, which hinder timely intervention and contribute to the spread of infections. Observations indicate that these challenges significantly impact infection containment efforts. Limiting factors include a lack of rapid testing facilities and public awareness.

2. Clinical Care and Support

Limited ICU facilities and supportive care infrastructure outside select hospitals challenge effective management of severe cases, resulting in poor outcomes and increased complications. The scarcity of ICU beds, skilled manpower, and critical care resources exacerbates these challenges, highlighting infrastructure limitations as primary limiting factors.

3. Healthcare Provider Preparedness

Fear among healthcare providers regarding infection risks leads to delays and inadequate patient management, impacting overall response efficacy. Observations reveal that limited training and infection control support create challenges in managing cases promptly and safely. Training availability only in select hospitals serves as a major limiting factor.

4. Screening and Triage

The absence of effective screening and triage systems results in delays in identifying and isolating cases, thus impacting timely intervention. Observations suggest inadequate manpower and resources are critical barriers to efficient screening processes.

5. Specialised Care for High-Risk Patients

Patients with additional risk factors, such as pregnancy or comorbidities, require specialised care, which remains limited, impacting outcomes for these vulnerable groups. Key limiting factors include a shortage of trained staff and a lack of coordination between departments.

6. Sequelae Management and Long-Term Care

Lack of management for post-infection sequelae limits support for long-term health impacts, which are critical for full recovery. Observations highlight the need for rehabilitation services to mitigate these challenges.

7. Access to Essential Treatments and Supportive Care

Limited availability of antiviral drugs, ICU facilities, oxygen, and ventilators constrains effective treatment, contributing to poor outcomes and increased complication rates. Observed limiting factors include shortages of medical supplies and unavailability of vaccines, which challenge comprehensive care delivery.

A major capacity developed during this year's response was the designation of the Infectious Diseases Hospital in Dhaka as the official referral centre for Nipah cases. This designation established a dedicated facility for specialised care, centralising resources, expertise, and rapid response for Nipah case management. It enabled more streamlined patient referrals and focused resources, improving overall response coordination and patient outcomes in Dhaka.

6. KEY ACTIVITIES

After identification and discussion of best practices and challenges encountered during the 2024 Nipah response, the working groups developed specific activities to institutionalize best practices and overcome challenges. During the Way Forward session, participants identified the activities that should be priorities. Each participant received 6 stickers and used those stickers to vote for priority activities. In the sections below, proposed activities are described and listed in priority order by pillar based on the number of votes received.

Pillar 1: Surveillance & Laboratory

A few activities were identified that can improve the surveillance and outbreak investigation. Among them, the development of a rapid diagnostic tool was voted as a priority need. The development is under process, and the expected date of achievement is June 2026. The supports required for the challenge to be met are development of the device, qualification and validation, trial, and approval.

Another activity that gained a similar number of votes was the establishment of One Health surveillance, and the expected date for achievement is set to June 2027. The activity is being monitored by IEDCR, icddr, b, Department of Livestock Services, & Bangladesh Forest Department. The supporting activities are protocol development and then the signing of the MoU (Memorandum of Understanding). Training individuals and implementing one health surveillance according to the developed protocol are required.

The next prioritised activity was identified as development of a national Nipah prevention and control strategy, with a desired achievement date of December 2025. The responsible organisations are IEDCR & DGHS. The support required for the documentation is the arrangement of a workshop.

Strengthening of event-based surveillance linked with strategic documents was voted as another challenge that needs to be met up. The estimated date for fulfilment is set June 2025. The organisations responsible are IEDCR & icddr,b. Required support is a workshop for protocol development.

Regional One Health Laboratory establishment at divisional level/tertiary level was detected as another activity that needs to be accomplished, and the approximate date for this achievement was noted as June 2027. IEDCR & DGHS are the responsible organisations, and the support required to complete this activity was noted as assessment of regional laboratories, HR training, availability of logistics, & ensuring calibration & maintenance of instruments. It was assumed to be highly difficult to establish, and it will be of high impact.

Maintenance of biosafety & biosecurity was another activity that can help to establish strong surveillance and response. The estimated date for achievement is June 2027, and the organisations involved are IEDCR & icddr,b. Workshop for training modules, training, and SOP preparation are needed to fulfil the task. It was marked as a high-impact task with minimal difficulty.

To link existing & updated SOPs between strategic documents was the next desired activity. It was marked to be less difficult to achieve and to have a serious impact. Responsible organisations are IEDCR & icddr,b and the estimated date of execution is June 2025. The resources needed were workshops, training, & SOP preparation.

Table 9. Pillar 1 Surveillance and Laboratory - Proposed Activities

Activities		**Date of Desired Achievement**	**Responsible and Focal Point**	**Required Support**	**Indicators**
1	Establishment of One Health Surveillance	June 2027	IEDCR, icddr, b, DLS, BFD	Signing MoU- Workshop Protocol Development	MoU signed
				Training	Protocol Developed
2	RDT Development	June 2026	IEDCR, icddr, b, DGDA	Development	RDT developed and secured approval
				Qualification Validation	
				Trial Approval	
3	National Nipah prevention & control strategy	December 2025	DGHS IEDCR	Workshop	Strategic documents development
4	Strengthening of event based surveillance linked	June 2025	IEDCR, icddr, b	Workshop for protocol development	Event based surveillance for Nipah established
5	Regional One Health lab at divisional level/Tertiary level	June 2027	DGHS IEDCR,	Assessment of regional labs HR training	Regional lab established & functional

				Ensure logistics	
				Ensure calibration & maintenance of instruments	
6	Biosafety & Biosecurity	June 2026	IEDCR, icddr, b	Workshop for training module	Training Manual Development
				Training	SOP Development
				SOP Preparation	Training Completion
7	Linked existing & updated SOP between strategic document	June 2025	IEDCR, icddr, b	Workshop	All SOPs available
				Training	Training completed
				SOP preparation	Training Completion

Pillar 2: Coordination and Emergency Response

Better coordination & comprehensive investigation efficiency in outbreak response are the key activities of emergency response while timeliness of notification and response is also very important. An efficient, coordinated response saves lives. Availability of resources/logistics across the country is one of the positive parts in outbreak response. Also availability of HR across the country and infection prevention and control programs are an efficient part of coordination. Besides this, awareness programs on Nipah for HCWs, school children, and family members are ongoing.

Key activities for coordination and emergency response include finalisation and dissemination of the Nipah outbreak SOP, preparation of a strategic document for Nipah prevention and control specifying roles and responsibilities, roster finalisation and refresher training for potential outbreak response staff, update of Nipah management guideline, meetings with stakeholders to ensure strong collaboration for outbreak response and management activities, sensitization and refresher training of district and upazila RRTs, planning for Nipah specific simulation exercise and drill, Nipah awareness day celebration and advocating for enactment of a law to ban RDPS.

Table 10. Pillar 2 - Coordination and Emergency Response - Proposed Activities

Activities		Date of Desired Achievement	Responsible and Focal Point	Required Support	Indicators
1	Nipah Awareness Day celebration Invite survivors for experience sharing	November 2025	Director, IEDCR	Planning for meeting (monthly) Declare as an agenda Fixed a date for celebration	A fixed date with consensus activity
2	Finalisation and dissemination of Nipah outbreak SOP	31st October 2025	Director IEDCR	Holding a day/two days long discussion session among stakeholders togo through the sections and finalisation of document	Endorsed and printed SOP Necessary dissemination (Pressbrief, website, Email)
3	Nipah specific simulation exercise and drill Recommended to take place in real field setting	31 December 2024	Director IEDCR, CDC, DGHS, icddrb, forest department, DLS	Through capacity build up	Pre test, post test and documentation
4	Enacting law to ban RDPS	October 2025	IEDCR		Act of law
5	Sensitization and refresher training of District RRT and Upazila RRT, specific for Nipah	Before the Nipah season of 2026	Director IEDCR CDC DGHS	Inclusion in yearly training plan for DRRT, URRT SME, Budget, Plan	Planning document Learning material(PPT), Trained manpower
6	Roster finalisation and refresher training for potential outbreak response staff (Combined team management) One health approach	13 November 2024	Director IEDCR	Finalisation of roster from IEDCR and partners Organising training for the responders (2 days long)	Updated roster (combined) endorsed and circulated
7	Preparing a strategic document for the Nipah activity specifying roles and responsibilities Lab test coordination strategy	31 October 2025	Director IEDCR, NRRT chairperson, PHEOC, CDC, DGHS, Forest department	Planning meeting of all stakeholders Series of workshop with all stakeholders	Endorsed and published strategic document of the Nipah activity
8	Update of Nipah management guideline	1st December 2025	Director IEDCR	Multiple workshops with key takeholders to update the document Proofreading and finalisation with endorsement from MOHFW	Draft of the document Endorsed final version Published guideline
9	Meetings with stakeholders to ensure strong collaboration for outbreak response and management activities for 2025 season	To be done from Nov-24 through Apr-25	Led by director IEDCR with support from focal person from other relevant institutes	Pre- season discussion among stakeholders (including PHEOC) Arrangement of monthly ad-hoc meeting during season	Meeting minutes Activity list

Pillar 3: Community Engagement and Risk Communication

Several activities have been proposed for improving community engagement and risk communication for Nipah virus outbreaks through targeted engagement and education. Key initiatives include training religious leaders to spread prevention messages, replacing traditional scroll news with engaging TVCs and animations, and conducting awareness programs for hospital staff. Follow-up visits will address rumours and stigma, while inter-ministerial collaboration will ensure Nipah content is included in school textbooks. Stakeholder coordination in every outbreak investigation and the development of SOPs for community engagement are also planned. These efforts aim to reduce transmission risks, improve health practices, and foster community involvement in Nipah prevention.

Table 11. Pillar 3 Community Engagement and Risk Communication - Proposed Activities

Activities		Date of desired achievement	Responsible and focal point	Required support	Indicators
1	Provide an additional follow-up visit after 14 days of outbreak investigation	Within 20 days of an outbreak	PI of surveillance team	Meeting with affected families	Reduce rumour/ stigma
				At least 2 awareness meeting in the community	Follow-up visit smooth
2	Awareness program for support staff in hospital setting Nurses/ward boys/ayas	Prior to season	DGHS Director, IEDCR	Hands on training to IPC	Improve IPC management
				Awareness of Nipah transmission and risk factors	
3	Community engagement with religious leaders (imam) before Nipah season	October 2025	DGHS DG, Islamic Foundation Director, IEDCR	Train Imams about Nipah transmission & prevention	Knowledge about Nipah transmission and prevention.
				Involve central decision-making body (Islamic Foundation)	
				Arrange motivational speech delivered during weekly prayer.	
4	Introduction of chapter on Nipah in textbook of primary/ secondary school	Next 3 years	Secretary, Ministry of Education DGHS	Inter-ministerial cooperation and collaboration	Minutes of meeting
					Resolution
5	Ensure collaboration of stakeholders or their representatives in community engagement	Every outbreak investigation	Investigation lead	Formation of working groups	Participation of local administration, Health care personnel, Community leaders and religious figures.
				Inform key person	
				Arrange meetings	

6	TVC/ cartoons/ animation video in mass media replacing scroll news	Before this upcoming season	DGHS Director, IEDCR	Develop TVC/ cartoons Create content/ blogs for social media	Video materials Social Media Platform
7	Include at least one community key person in each outbreak investigation	Each outbreak investigation	Outbreak investigation lead	Inform details about Nipah Describe responsibility	Message received by the community Reduce rumour/ stigma
8	Develop SOP for community engagement program	15 December 2024	Director, IEDCR PI of Nipah	Collect and review documents Draft SOP Finalise the SOP	One document of SOP

Pillar 4 : Case Management and Countermeasures :

This pillar focuses on the coordinated management of cases and deployment of countermeasures to control disease impact and spread. It encompasses multiple functions, including patient care, infection prevention, ICU and isolation facilities, healthcare worker protection, and support for high-risk groups.

Table 12. Pillar 4 Case Management and Countermeasures - Proposed Activities

Activities		**Date of desired achievement**	**Responsible and focal point**	**Required support**	**Indicators**
1	Management and Guideline for Nipah survivors	One Year	IEDCR	Updated guideline Stakeholders and expert meetings Baseline study on existing survivor monitoring	Section and monitor Nipah guideline
2	Provision of ICUs in District Hospitals	Three Years	HSM	Infrastructure Skilled manpower Training SOP	The percentage district hospitals with an ICU and its impact

3	Update National Guideline (Newer Antiviral, Referral System, IPC Management)	September 2025	IEDCR,CDC, BFD	Technical working group meeting	Workshop Complete guideline
4	Triage and screening initiation	December 2025	IEDCR, Hospital Management, DGHS, MoHFW	Include triage and screening section in the training of health professional Govt order	Percentage of the facilities implementing triage and screening
5	Training of healthcare workers at District and Upazila Health Complex level	September 2025	IEDCR, CDC, HM, DGHS	Trained the health Workers	Training and awareness among health workers
6	Promote multidisciplinary action regarding case management	September 2025	IEDCR, CDC, HSM	Orientation and sensitization at different department	Training Workshop
7	Provision of oxygen supply to hospitals	November 2025	Hospital Authority	Supply if needed Monitoring and identifying the availability	Supply chain management Monitoring and quantifying the need

7. NEXT STEPS

Participants in the after action review identified practical and realistic activities that will advance best practices and respond to challenges. The next step is to implement the recommended activities. When considering all technical pillars combined, the following activities were identified as highest priority, receiving at least 10 votes each:

1. Nipah Awareness Day celebration
2. Finalization and dissemination of Nipah outbreak SOP
3. Provide an additional follow-up visit 14 days after outbreak investigation
4. Update guideline for management of Nipah survivors
5. Development of rapid diagnostic test
6. Establishment of One Health surveillance approach for Nipah
7. Development of national strategy for Nipah prevention and control
8. Awareness program for hospital staff
9. Community engagement with religious leaders before Nipah season
10. Provision of ICUs in district hospitals

While all activities listed in the tables of the previous section are important, this "top ten" list may help to focus efforts with respect to next steps. A consolidated post-AAR action plan is provided in Appendix 1.

Members of the Nipah surveillance team and PHEOC will meet on a quarterly basis to review implementation of the action plan, and progress will be reported to the Director IEDCR.

Before concluding, participants considered risks that could affect implementation of priority activities and discussed potential mitigation measures. Some of these risks are outlined in the tables below.

Table 13. Pillar 3 Community Engagement and Risk Communication - Risks and Mitigation Measures

Pillars/ Functions	**Priority activities**	**Possible risks that can hamper the implementation of priority activities**	**Mitigation measures (solutions)**
Community Engagement & Risk Communication	Provide an additional follow-up visit after 14 days of outbreak investigation	1. Limited manpower and logistics support 2. Reluctant community participation 3. Scarcity of fund 4. Inadequate training of the investigation team	1. Resource mobilization 2. Motivation of the community 3. Allocation and utilisation of funds 4. Arrangement of proper training of the team.
	Community engagement with religious leaders (imam/purohit) before the Nipah season	1. Lack of willingness of the religious leaders to participate 2. Intellectual and perception barrier 3. Inappropriate attitude of the community to the religious leaders	1. Adequate motivation, training, and rumination of the religious leaders 2. Motivate religious leaders according to their level of educational and social background. 3. Community engagement and motivation

Table 14. Pillar 4 Case Management and Countermeasures - Risks and Mitigation Measures

Pillars/ Functions	Priority Activities	Possible Risks That Can Hamper The Implementation of Priority Activities	Mitigation Measures (Solutions)
Case Management and Countermeasures	Management and guideline for Nipah survivor	1. Survivors may face mental health challenges such as anxiety, depression, or PTSD due to the severity of the disease and social stigma.	1. Incorporate mental health counseling and support as part of the post-infection care. .
	Provision of ICU in District hospital	1. Inadequate infrastructure 2. Inadequate skilled manpower 3. Inconsistent electricity and oxygen supply	1. Explore government funding, donor programs, or public-private partnerships to finance the ICU setup.
	Triage and screening initiation	1. Inadequate infrastructure 2. Inadequate resource	1. Optimize resource use 2. Collaboration with NGO 3. Infrastructure building

During the final panel discussion it was recommended that the Nipah outbreak SOP should be finalized as soon as possible before the next Nipah season that begins 1 December 2024. It was agreed that Nipah Awareness Day should be observed from next year. It is not easy to convince people to stop consuming raw date palm sap, and observing this day should bring commitment to the government. There was discussion around strengthening local laboratory capacity and ensuring biosafety and biosecurity. Nipah expertise is currently lacking at sub-national level. It was identified that local healthcare system strengthening along with secure funding for detection of Nipah may be helpful for Bangladesh. A suggestion was made to build up a "Nipah Disease Containment Network". There was discussion on developing a common protocol for management and prevention of all infectious diseases like Nipah, COVID-19, Mpox, dengue, etc. It was also recommended to incorporate a chapter in school curriculum for prevention of infectious diseases. Participants agreed that for any new or updated guideline documents, there should be more soft copies and less hard copies.

8. CONCLUSIONS

This is the first formal AAR conducted for a PHEOC activation and for a Nipah response in Bangladesh. IEDCR and partners have many years of experience responding to Nipah, and participants identified several best practices that should be maintained. Participants also identified challenges and limiting factors that led to the challenges. With this information, practical activities were developed to reinforce best practices and address challenges. Collectively, these activities form an action plan, with identification of a target date, focal point, required support, and indicators for each activity. The activities are achievable, but it will be necessary to monitor implementation of the action plan in order to measure success and make adjustments as necessary if challenges are encountered. IEDCR and partners plan to meet on a quarterly basis to review implementation of this action plan.

The working group format was appropriate for this AAR. The format was interactive and encouraged engagement of participants. This permitted participants from several different stakeholders to work together in a collaborative manner and provide their input. The mix of working group, plenary, and world cafe sessions promoted technical pillar-focused work in a manner that gave all participants the opportunity to contribute to each pillar. Independent facilitators who were not directly involved in the Nipah response were recruited from WHO and US CDC. WHO guidance for AARs recommends engaging independent facilitators who can promote objective discussion without injecting their own views, and based on our experience in this AAR we recommend that this practice be continued in the future. It is important to have at least one lead facilitator and a co-facilitator for each working group. This AAR was conducted over a 2-day period, but some sessions were rushed. It is recommended in the future to plan for 2 and a half or 3 days for a working group AAR.

It is a recognized best practice to conduct an AAR within 90 days after each PHEOC activation. The PHEOC at IEDCR plans to incorporate AARs as a best practice.

9. ACKNOWLEDGEMENT

We would like to acknowledge the following individuals for their contribution for writing this report:

Dr. Sazzad Hossain, Dr. Mintu Chowdhury, Dr. Mithun Rudra, Dr. Kyaw Thowai Prue Prince, Dr. Anika Farzin, Dr. Barnali Sen, Dr. Immamul Muntasir, Mr. Tonmoy Sarkar, Dr. Sharmin Sultana, Dr. Gretchen Cowman.

We would also like to acknowledge the following individuals for taking comprehensive notes during the workshop:

Dr. Tariqul Islam Limon, Dr. Sumaya Sachi, Dr. Jannatul Ferdous, Dr. Asma Jamal Antara.

10. ANNEXES

Annex 1: Post-AAR action plan

Annex 1: Action Plan for AAR on Nipah Response Final Report							
Pillar	**Sl No**	**Activities**	**Date of Desired Achievement**	**Responsible and Focal Point**	**Required Support**	**Indicators**	**Status**
Surveillance and Laboratory - Proposed Activities	1	Establishment of One Health Surveillance	June 2027	IEDCR, icddr, b, DLS, BFD	Signing MoU-Workshop Protocol Development	MoU signed	
					Training	Protocol Developed	
	2	RDT Development	June 2026	IEDCR, icddr, b, DGDA	Development	RDT developed and secured approval	
					Qualification Validation		
					Trial Approval		
	3	National Nipah prevention & control strategy	December 2025	DGHS IEDCR	Workshop	Strategic documents development	
	4	Strengthening of event-based surveillance linked	June 2025	IEDCR, icddr, b	Workshop for protocol development	Event based surveillance for Nipah established	
	5	Regional One Health lab at divisional level/ Tertiary level	June 2027	DGHS IEDCR	Assessment of regional labs HR training	Regional lab established & functional	
					Ensure logistics		
					Ensure calibration & maintenance of instruments		
	6	Biosafety & Biosecurity	June 2026	IEDCR, icddr, b	Workshop for training module	Training Manual Development	
					Training	SOP Development	
					SOP Preparation	Training Completion	
	7	Linked existing & updated SOP between strategic document	June 2025	IEDCR, icddr, b	Workshop	All SOPs available	
					Training	Training completed	

					SOP preparation	Training Completion	
Coordination and Emergency Response - Proposed Activities	1	Finalization and dissemination of Nipah outbreak SOP	31st October 2025	Director of IEDCR	Holding a day/two days long discussion session among stakeholders to go through the sections and finalization of document	Endorsed and printed SOP	
						Necessary dissemination (Press brief, website, E mail)	
	2	Nipah Awareness Day celebration Invite survivors for experience sharing	November 2025	Director, IEDCR	Planning for meeting (monthly)	A fixed date with consensus activity	
					Declare as a agenda		
					Fixed a date for celebration		
	3	Nipah specific simulation exercise and drill Recommended to take place in real field setting	31 December 2024	Director IEDCR, CDC, DGHS, icddrb, forest department, DLS	Through capacity build up	Pre test, post test and documentation	
Coordination and Emergency Response - Proposed Activities	4	Enacting law to ban RDPS	October 2025	IEDCR		Act of law	
	5	Sensitization and refresher training of District RRT and Upazila RRT, specific for Nipah	Before the Nipah season of 2026	Director IEDCR, CDC, DGHS	Inclusion in yearly training plan for DRRT, URRT SME, Budget, Plan	Planning document Learning material (PPT), Trained manpower	
	6	Roster finalization and refresher training for potential outbreak response staff (Combined team management) One health approach	13 November 2024	Director IEDCR	Finalisation of roster from IEDCR and partners	Updated roster (combined) endorsed and circulated	
					Organising training for the responders (2 days long)		

	7	Preparing a strategic document for the Nipah activity specifying roles and responsibilities Lab test coordination strategy	31 October 2025	Director IEDCR, NRRT chairperson, PHEOC, CDC, DGHS, Forest department	Planning meeting of all stakeholders Series of workshop with all stakeholders	Endorsed and published strategic document of the Nipah activity	
	8	Update of Nipah management guideline	1st December 2025	Director IEDCR	Multiple workshops with key stakeholders to update the document	Draft of the document	
					Proofreading and finalisation with endorsement from MOHFW	Endorsed final version	
						Published guideline	
	9	Meetings with stakeholders to ensure strong collaboration for outbreak response and management activities for 2025 season	To be done from Nov-24 through Apr-25	Led by director IEDCR with support from focal person from other relevant institutes	Pre- season discussion among stakeholders (including PHEOC)	Meeting minutes	
					Arrangement of monthly ad-hoc meeting during season	Activity list	
Community Engagement and Risk Communication - Proposed Activities	1	Provide an additional follow-up visit after 14 days of outbreak investigation	Within 20 days of an outbreak	PI of surveillance team	Meeting with affected families	Reduce rumour/ stigma	
					At least 2 awareness meeting in the community	Follow-up visit smooth	
	2	Awareness program for support staff in hospital setting Nurses/ward boys/ayas	Prior to season	DGHS, Director IEDCR	Hands on training to IPC	Improve IPC management	
					Awareness of Nipah transmission and risk factors		

Community Engagement and Risk Communication - Proposed Activities	3	Community engagement with religious leaders (imam) before Nipah season	October 2025	DGHS DG, Islamic Foundation Director, IEDCR	Train Imams about Nipah transmission & prevention	Knowledge about Nipah transmission and prevention.	
					Involve central decision-making body (Islamic Foundation)		
					Arrange motivational speech delivered during weekly prayer.		
	4	Introduction of chapter on Nipah in textbook of primary/ secondary school	Next 3 years	Secretary, Ministry of Education DGHS	Inter-ministerial cooperation and collaboration	Minutes of meeting	
						Resolution	
	5	Ensure collaboration of stakeholders or their representatives in community engagement	Every outbreak investigation	Investigation lead	Formation of working groups	Participation of local administration, Health care personnel, Community leaders and religious figures.	
					Inform key person		
					Arrange meetings		
	6	TVC/ cartoons/ animation video in mass media replacing scroll news	Before this upcoming season	DGHS, Director, IEDCR	Develop TVC/ cartoons	Video materials Social Media Platform	
					Create content/ blogs for social media		
	7	Include at least one community key person in each outbreak investigation	Each outbreak investigation	Outbreak investigation lead	Inform details about Nipah	Message received by the community	
					Describe responsibility	Reduce rumour/ stigma	
	8	Develop SOP for community	15 December 2024	Director, IEDCR	Collect and review documents	One document of SOP	

		engagement program		PI of Nipah	Draft SOP		
					Finalise the SOP		
Case Management and Countermeasures - Proposed Activities	1	Management and Guideline for Nipah survivors	One Year	IEDCR	Updated guideline	Section and monitor Nipah guideline	
					Stakeholders and expert meetings		
					Baseline study on existing survivor monitoring		
	2	Provision of ICUs in District Hospitals	Three Years	HSM	Infrastructure Skilled manpower Training SOP	The percentage district hospitals with an ICU and its impact	
	3	Update National Guideline (Newer Antiviral, Referral System, IPC Management)	September 2025	IEDCR, CDC, BFD	Technical working group meeting	Workshop	
						Complete guideline	
	4	Triage and screening initiation	December 2025	IEDCR, Hospital Management, DGHS, MoHFW	Include triage and screening section in the training of health professional Govt order	Percentage of the facilities implementing triage and screening	
Case Management and Countermeasures - Proposed Activities	5	Training of healthcare workers at District and Upazila Health Complex level	September 2025	IEDCR, CDC, HM, DGHS	Trained the health Workers	Training and awareness among health workers	
	6	Promote multidisciplinary action regarding case management	September 2025	IEDCR, CDC, HSM	Orientation and sensitization at different department	Training	
						Workshop	
	7	Provision of oxygen supply to hospitals	November 2025	Hospital Authority	Supply if needed	Supply chain management	
					Monitoring and identifying the availability	Monitoring and quantifying the need	

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Annex 3: Agenda

Agenda

Day-1

Date: 29 September 2024

Time: 9:00 AM To 05:00 PM

Venue: Room 222, IEDCR (Old Building), Mohakhali, Dhaka.
Session Chair: Director, IEDCR

Time	Activity	
09:00-9:30	Registration	
9:30-10:00	Welcome Address and Inaugural Session	Prof Dr Tahmina Shirin PhD Director, IEDCR Dr. Anthony Eshofonie Team Lead, EHA, WHO Prof Dr Mahmudur Rahman Country Head, EMPHNET Lt Col Dr. Syed Hassan Abdullah (Rtd) Country Head, SAFETYNET Dr. Gretchen Cowman Epidemiologist US-CDC

10:00-10:15	Overview on After Action Review	Dr. Gretchen Cowman Epidemiologist US-CDC Dr. Md. Omar Qayum Curator IEDCR
10:15-10:30	Overview on Nipah Virus Outbreak	Dr Sharmin Sultana Asst Prof IEDCR Dr Sazzad Hossain Project Coordinator
10:30-10:45	Tea	
10:45-11:00	Working Group Distribution	Dr Sazzad Hossain Project Coordinator Dr Mithun Rudra Coordinator PHEOC
11:00-11:45	Identification of what was in place prior to the response	Group Work
11:45-12:45	Consolidation of what was in place before the response	Plenary Session
12:45-01:30	Lunch and Prayer	
01:30-02:15	Building a timeline for what happened during the response	Group Work
02:15-03:00	Building a timeline for what happened during the response	Plenary Session
03:00-04:00	Identify the challenges and best practices	Group Work
04:00-05 :00	Sharing challenges and best practices with other working groups	World Cafe

Day-2

Date: 30 September 2024

Time: 9:00 AM to 05:00 PM

Venue: Room 222, IEDCR (Old Building), Mohakhali, Dhaka.

Session Chair: Director, IEDCR

Time	Activity	
09:00-9:15	Recap of Day-1	Dr. Gretchen Cowman Dr Sazzad Hossain
9:15-10:15	Identify key activities to overcome challenges and learn from best practices	Group Work
10:15-10:30	Tea	

10:30-11:00	Define level of difficulty and impact	Group Work
11:00-12:00	Sharing key activities with other working groups	World Cafe
12:00-01:00	Prioritization of activities	Plenary Session
01:00-02:00	Lunch and Prayer	
02:00-03:00	Next steps	Group Work & Plenary Session
03:00-04:00	Panel Discussion and Recommendation Session	Prof Dr Tahmina Shirin PhD Director, IEDCR Dr. Abu Hussain Md. Moinul Ahsan Director, Hospital and Clinics (DGHS) Dr. Ariful Bashar Superintendent, IDH Dr. Gretchen Cowman Epidemiologist US-CDC Dr. Syed Moinuddin Satter Associate Scientist icddrb Dr. Mohammed Ziaur Rahman Scientist (One Health Lab) icddrb
04:00-04:30	Debriefing of AAR Workshop Activities	Dr. Mahbubur Rahman Asst. Professor IEDCR Dr Sharmin Sultana Asst Professor IEDCR
04:30: 05:00	Closing Remarks	Dr. Ahmed Nawsher Alam Principal Scientific Officer

Prof. Dr. Tahmina Shirin, PhD
Director, IEDCR