National Public Health Emergency Preparedness and Response Plan for Infectious Hazards in Bangladesh

2023-2028

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Directorate General of Health Services (DGHS)
Ministry of Health and Family Welfare (MoHFW)
Government of the People's Republic of Bangladesh

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MESSAGE FROM HONOURABLE MINISTER FOR HEALTH

MESSAGE FROM DIRECTOR GENERAL OF HEALTH SERVICES

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AIDS	Acquired Immunodeficiency Syndrome
AMC	Alternive Medical Care (DGHS)
AMC	Army Medical Corps
BMA	Bangladesh Medical Association
BSMMU	Bangabandhu Sheikh Mujib Medical University
CBHC	Community Based Health Care
CC	Community Clinic
CCF	Chief Conservator of Forest
CDC	Communicable Disease Control (Programme of DGHS)
CDC USA	Centres for Disease Control and Prevention of United States odf America
CFR	Case Fatality Rate
CONOPS	Concept of Operations
COVID-19	Coronavirus Disease 2019
DGDA	Directorate General of Drug Administration
DGHS	Directorate General of Health Services
DRRT	District Rapid Response Team
EID	Emerging Infectious Disease
EOC	Emergency Operation Center
FDMN	Forcefully Displaced Myanmar National
FETP,B	Field Epidemiology Training Program, Bangladesh
GO	Government Order
GoB	Government of Bangladesh
HCW	Healthcare Worker
HEB	Health Education Bureau
HPM	Honourable Prime Minister
HSIA	Hazrat Shahjalal International Airport
IEDCR	Institute of Epidemiology, Disease Control and Research
IHR	International Health Regulation
IMS	Incident Management System
INGO	International Non-Governmental Organization

IPC	Infection Prevention and Control
IPH	Institute of Public Health
IPHN	Institute of Public Health Nutrition
ITHC	Integrated Thana Health Complex
JEE	Joint External Evaluation
LNO	Liaison officer
LoA	Letter of Agreement
MCH	Mternal and Child Health
MDR TB	Multi Drug Resistant Tuberculosis
MERS-CoV	Middle East Respiratory Syndrome Coronavirus
MIS	Management Information System
MNCAH	Maternal Neonatal Child and Adoloscent Health
MSM	Men who have Sex with Men
NAPHS	National Action Plan for Health Security
NCDC	Non Communicable Disease Control
NFP	National Focal Point (of IHR)
NGO	Non Government Organization
NIPSOM	National Institute of Preventive and Social Medicine
NRRT	National Rapid Response Team
OHHLEP	One Health High Level Expert Panel
OHS	One Health Secretariat
PHC	Primary Health Care
PHE PRP	Public Health Emergency Preparedness and Response Plan
PHE	Public Health Emergency
PHEIC	Public Health Emergency of International Concern
PHEOC	Public Health Emergency Operation Center
PHW	Public Health Workforce
PIO	Public Information Officer
PMR	Planning Monitoring and Research (DGHS)
PMO	Prime Minister's Office
PPE	Personal Protective Equipment

RCCE	Risk Communication and Community Engagement
SARS-CoV-2	Severe Acute Respiratory Syndrome Coronavirus 2
SDG	Sustainable Development Goal
SEARO	South East Asia Regional Office (of WHO)
STAR	Strategic Toolkit for Assessing Risks
STAR-IH	Strategic Tools for Assessing Risks – Infectious Hazard
UHC	Universal Health Coverage
UHFPO	Upazila Health and Family Planning Officer
URRT	Upazila Rapid Response Team
UzHC	Upazila Health Complex
WB	World Bank
WBG	World Bank Group
WHO	World Health Organization
XDR TB	Extensively Drig Resistant Tuberculosis

List of Glossaries

Epidemic	The occurrence in a community or region of cases of an illness, specific health-related behavior, or other health-related event clearly in excess of normal expectancy. Epidemic usually refers to a larger geographic distribution of illness or health-related events. (US CDC)
National Focal Point (NFP) for International Health Regulations (IHR)	It means the national centre or office, designated by each State Party, which should be accessible at all times for communications with WHO IHR Contact Points under IHR Regulations. It is also responsibility for fulfilling event notification requirements under IHR.
One Health	One Health is an integrated, unifying approach that aims to sustainably balance and optimize the health of people, animals and ecosystems. It recognizes the health of humans, domestic and wild animals, plants, and the wider environment (including ecosystems) are closely linked and inter-dependent. The approach mobilizes multiple sectors, disciplines and communities at varying levels of society to work together to foster well-being and tackle threats to health and ecosystems, while addressing the collective need for clean water, energy and air, safe and nutritious food, taking action on climate change, and contributing to sustainable development (OHHLEP 2021).
Outbreak	It carries the same definition of epidemic, but is often used for a more limited geographic area. (US CDC)
Pandemic	It refers to an epidemic that has spread over several countries or continents, usually affecting a large number of people. (US CDC)
Public Health	Public health is the science of protecting and improving the health of people and their communities. This work is achieved by promoting healthy lifestyles, researching disease and injury prevention, and detecting, preventing and responding to infectious diseases. Overall, public health is concerned with protecting the health of entire populations. These populations can be as small as a local neighborhood, or as big as an entire country or region of the world. (CDC Foundation)
Public health emergency	Public health emergency may be defined as a significant increase of morbidity and mortality from adverse public health events, and challenge to capacity of health care facilities to cope with the situation.
Public Health Emergency of International Concern	Means an extraordinary event which is determined, as provided in these Regulations: (i) to constitute a public health risk to other States through the international spread of disease; and (ii) to potentially require a coordinated international response (IHR 3rd edition. 2016)

Public health emergency preparedness	Public health emergency (PHE) preparedness is the capability of the public health and health care systems, communities, and individuals, to prevent, protect against, quickly respond to, and recover from health emergencies, particularly those whose scale, timing, or unpredictability threatens to overwhelm routine capabilities. Preparedness involves a coordinated and continuous process of planning and implementation that relies on measuring performance and taking corrective action (Nelson et al. 2007).
Strategic Toolkit for Assessing Risk (STAR)	Strategic Toolkit for Assessing Risk (STAR) is a comprehensive toolkit that enables countries and regions to conduct a strategic, rapid, evidence- and expert-based assessment of public health risks for planning and prioritization of emergency and disaster management activities (WHO).
Strategic Toolkit for Assessing Risk - Infectious Hazards (STAR-IH)	Application of STAR for Infectious hazards

Preface

Since 2019, the World Bank Group (WBG) has provided technical support to the Government of the People's Republic of Bangladesh to **IMPROVE PANDEMIC PREPAREDNESS AND RESPONSE IN BANGLADESH**. The Senior National Consultant (SNC) was assigned from July 1, 2020; in January 2021 an International Consultant and a National Consultant joined the team. Together, the consultants were responsible for leading/supporting the following four key tasks:

a) Developing a generic Public Health Emergency Preparedness and Response Plan and public health risk mapping;
b) Strengthening the capacity of IEDCR including the PHEOC and the Infectious Disease Hospital (IDH) for rapid response to public health emergencies;
c) Strengthening the public health workforce Plan; and
d) Improving the diagnostic and laboratory network and data sharing.

The consultants worked closely with identified sector specialists and reported to the Director, Institute of Epidemiology, Disease Control and Research (IEDCR), with a dotted line to the Senior Health Specialist, World Bank. As per the Terms of Reference (ToR), IEDCR helped to facilitate the work by providing space for the SNC and all the relevant information as needed.

The Consultants carried out a desk review of all relevant information and consulted relevant stakeholders (through workshops, individual and group consultations) to capture primary data. During the COVID-19 pandemic, consultations were conducted virtually with few exceptions. Several workshops were conducted in hybrid mode (mixing virtual and physical presence).

Initially, the expectation was to develop a multihazard PRP including natural disaster and chemical, radiological and nuclear hazards. However, the desk review found that a National Health Emergency PRP had been drafted by the Non-communicable Disease Control (NCDC) program of the Directorate General of Health Services (DGHS) with technical support from WHO. Consequently, stakeholders advised the consultants to develop a generic Plan for infectious hazards. Accordingly a risk mapping was conducted for infectious hazards using WHO's Strategic Tool for Assessing Risks (STAR); WHO technically supported the STAR workshop. The strategies of PHE PRP have been detailed and a brief plan of action with monitoring and evaluation indicators presented. This Plan is a five-year (2023-2028) document, which can be updated as needed to account for changes in assumptions, risks, or vulnerabilities.

Keen interest was observed during workshops, group and one-to-one consultations with stakeholders. More detailed and in-depth consultations were requested from stakeholders on all the three documents, especially on the political roles and responsibilities of stakeholders and partners, for effective implementation of the Plan and developing follow up documents.

Thank you

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Bangladesh National Public Health Emergency Preparedness and Response Plan for Infectious Hazards

Executive Summary

Every year Bangladesh faces outbreaks such as Nipah encephalitis, dengue, cutaneous anthrax, cholera, and malaria. In the recent past Bangladesh responded to the 2009 H1N1 influenza pandemic along with most of the rest of the world. At the time of writing of this plan in 2022, the country is already more than two years into the COVID-19 pandemic, and this will not be the last pandemic. In the context of these threats Bangladesh took the initiative to begin developing a public health emergency preparedness and response plan (PHE PRP) even before the COVID-19 pandemic broke out.

On behalf of the Government of Bangladesh (GoB), the Institute of Epidemiology Disease Control & Research (IEDCR) took the responsibility to develop it, with technical support from the World Bank Group (WBG). This Plan addresses recommendations made by the Joint External Evaluation (JEE) (2016) for IHR Core capacity requirements in Bangladesh, which highlighted the importance of developing a national multihazard PHE PRP. As existing PRPs already addressed natural disasters and other non-infectious hazards, this Plan was deliberately scoped only towards infectious hazards, but with explicit links to the PRPs covering natural and accidental hazards (including manmade disasters) of the Directorate General of Health Services (DGHS) and the Ministry of Disaster Management and Relief (MoDMR). This Plan is a five-year (2023-2028) document, which can be updated as needed to account for changes in assumptions, risks, or vulnerabilities.

An important component of PHE PRP is assessing priority public health risks and vulnerabilities, which was achieved using the Strategic Tools for Assessing Risks – Infectious Hazard (STAR-IH) of the World Health Organization (WHO). The STAR-IH workshop was led by WHO, with representation from headquarters, the South East Asia Regional Office (SEARO) and the Bangladesh Country Office, and included representation from all relevant ministries and agencies within the Government of Bangladesh, as well as technical support and facilitation from the WBG. The Plan utilizes the findings of STAR-IH workshop.

Different possible scenarios have been presented in this Plan, drawing on the experience of past epidemics, including the 2009 H1N1 pandemic influenza and the COVID-19 pandemic. Pandemic preparedness and response represents a continuum comprising inter-pandemic, alert, pandemic, transition (recovery), and again inter-pandemic phases.

Pandemics may not always occur frequently, but disease outbreaks may occur quite frequently (in Bangladesh, there are usually several outbreaks in a year), and some of these may develop into epidemics. It is the public health authority of a country, which may declare a PHE, and also define the degree or designation of PHE, based on factors such as spread and severity. The importance of having a plan in place for all infectious hazards is to prevent outbreaks from becoming epidemics and epidemics from turning into public health emergencies. This Plan

defines the role of public health authorities, different tiers of government authorities, and other stakeholders during response to different degrees of PHE in the context of Bangladesh.

An outline for intra-ministerial (within MoHFW) and inter-ministerial (whole of government) coordination using a One Health (human-animal-ecosystem) approach have been presented to define the overall Command and Control Strucure for emergency operations. It is proposed for coordination not only between public health and security authorities, but to link the whole of the government with IEDCR, the focal institute for rapid response to PHE. The proposed structure is mostly similar to the Disaster Management Coordination mechanism:

- National Council for Public Health Emergency Management (chaired by HPM) at the apex,
- Inter-Ministerial PHE Management Coordination Committee (chaired by Minister, MoHFW),
- National PHE Management Advisory Committee (chaired by Chairperson, Parliamentary Standing Committee on MoHFW),
- Public Health Emergency Management Committee (chaired by Minister, MoHFW),
- National Platform for Preventing Pandemic (chaired by Secretary, Health Services Division, MoHFW),
- National PHE Response Coordination Group (chaired by DG, Health Services, DGHS),
- Civil Society and NGO Coordination Committee for PHE (chaired by DG, Health Services, DGHS),
- Committee for Implementing PHE Control and Preventive Measures (chaired by Director, Disease Control, DGHS),
- National Rapid Response Team (headed by Director, IEDCR),
- District Rapid Response Team (headed by Civil Surgeon),
- Upazila Rapid Response Team (headed by UHFPO).

A Standing Order on PHE (SOPHE) has also been proposed in brief and is similar to the existing Standing Order on Disaster (SOD). Responsibilities and functions of Committees and different Ministries are briefly described in this document (Tables 5 and 6).

This Plan briefly addresses Emergency Operation Centres (EOCs). A single Public Health Emergency Operation Center (PHEOC) as a component of National Emergency Operation Center (NEOC, operated by the Honorable Prime Minister) with EOCs at each division, district, and Upazila should be operationalized with skilled personnel. The Committees at the level of IEDCR, CDC program of DGHS and below remain active round the year to manage outbreaks of localized origin (i.e., Nipah outbreak). Committees at DG level (above IEDCR and below MoHFW) are fully activated during epidemics (i.e., nation-wide cholera epidemic), and the Committees above the level of DGHS (MoHFW and above) are only fully activated in a pandemic situation (i.e., COVID-19 pandemic).

An integral part of rapid response to public health emergency is an Incident Management System (IMS). When the public health emergency is a localized outbreak, which typically occurs several times per year, the IMS is led by NRRT/ DRRT/ URRT Chair (Director IEDCR/ CS/ UHFPO). The Incident Manager should be someone with a good situational understanding and authority to

perform decision-making at the operational level. Sometimes this means looking to one tier higher in the health system – i.e. a small outbreak confined to one Upazila would nevertheless call on the Civil Surgeon to serve as IM (and that person might delegate down to a deputy or the UHFPO, depending on the context). If the PHE develops into a nationwide epidemic it is led by the Director General, Health Services, DGHS. When a pandemic occurs, the IMS is led by the HPM. In each scenario of PHE (outbreak/ epidemic/ pandemic), the focal institute for rapid response and scientific investigation is IEDCR.

A section in this document mentions continuing essential health services, stockpiling, logistics, procurement during PHE, including an emphasis on medical countermeasures, personnel deployment, and ensuring surge capacity.

Risk communication across professionals, scientific community, whole of the government, and whole of the society is of paramount importance. Developing plans and guidelines is not the end; it is the beginning of implementing risk communication which, combined with community engagement, ensures compliance of the public health measures. RCCE should be conducted professionally, and public health personnel at all levels should be trained in emergency risk communication approaches.

The plan also emphasizes PHE PRP for subnational and community levels. An outline of an action plan for implementing the PHE PRP is presented briefly here. Monitoring and Evaluation (M&E) indicators have also been presented.

The detailed findings of STAR-IH workshop are presented in annexes 1, 2 and 3. The existing facilities of PHE are described in annex 4.

Bangladesh National Public Health Emergency Preparedness and Response Plan for Infectious Hazards

1. Background, Country Status and Rationale

1. Bangladesh is situated in South Asia, at the junction between South and South East Asia, and belongs to the World Health Organization (WHO) South East Asia Regional Office (SEARO). The population of Bangladesh is estimated at 172,860,801 (estimation as on 1 July 2022 based on Bangladesh Bureau of Statistics). Bangladesh is a country with among the highest population density in the world. According to the World Bank, 63.37% of the total population in 2018 lived in rural areas. It is a delta region crisscrossed by three major and many smaller rivers, carrying thousands of tons of water and alluvial soil to Bangladesh.

2. Bangladesh is a hotspot for emerging infectious diseases, especially of zoonotic origin (Allen et al. 2017). The density of human and animal population, especially poultry, makes it vulnerable for spillover of viruses and reassortment into humans and vice versa (Jones et al. 2008). Bangladesh is also highly vulnerable to climate change, and is a hot-spot for climate sensitive illnesses (World Bank 2021). Bangladesh has witnessed numerous disease outbreaks, e.g., Nipah virus, avian influenza, acute watery diarrhea including cholera, dengue, Chikungunya, cutaneous anthrax, etc. Response activities were conducted during the H1N1 influenza pandemic (2009), for Ebola virus preparedness (2014), and for Chikungunya response (2017).

3. Preparing for a public health emergency or epidemic/pandemic on a large scale is not just about responding to an event, but also detecting a disease event, preventing further spread by responding, mitigating damage, and recovery back to normal after an onslaught. This requires a robust public health system with universal health coverage (UHC). The equity of health care for urban and rural poor, and hard-to-reach areas cannot be ensured in every respect (Mollah and Chi 2017). This situation heightens the vulnerability of some Bangladeshi community to public health emergencies.

4. Capacity alone does not ensure readiness. Efforts must be taken to translate those capacities into functional capabilities. A comprehensive plan is one core element of capacity. PHE preparedness is not a steady state; it requires continuous improvement, including frequent testing of plans through trainings, table-top and simulation exercises, as well as the formulation and execution of corrective action plans. The PHE preparedness also includes the practice of improving the health and resiliency of the communities.

5. In 2016, Bangladesh participated in a Joint External Evaluation (JEE) of its implementation of International Health Regulations (IHR) core capacities, and in 2019, drafted a National Action Plan for Health Security (NAPHS) following the recommendations from the JEE report. The IHR National Focal Point submits mandatory IHR State Party Self-Assessment Annual Reporting (SPAR) every year. At the same time, it is necessary to take forward the work of developing generic plans to deal with the future pandemic or its precursor – public health emergency.

6. The gap of a multi-hazard national public health emergency preparedness and response plan were identified by the JEE. We examined the landscape of existing preparedness and

response plans related to public health emergencies in Bangladesh, and found that the plans already existed that covered man-made and natural disasters but not specifically infectious diseases, and so this plan was scoped to focus on infectious diseases (Table 1).

Table 1: The existing plans of Bangladesh for health hazards

Plan	Area of focus	Developed by	Purpose
National Plan for Disaster Management	All hazard including health (excluding infectious hazards)	Ministry of Disaster Management and Relief (MoDM&R)	Disaster risk reduction and building resilience
National Health Emergency Preparedness and Response Plan (HE PRP)	Health emergency due to natural calamities, chemical, radio nuclear hazards	Non-Communicable Disease (NCDC) Program, Directorate General of Health Services (DGHS)	To have an agreed framework of response for all hazards in Bangladesh
National Public Health Emergency Preparedness and Response Plan (PHE PRP)	Public Health Emergency caused by Infectious Hazards	Institute of Epidemiology, Disease Control and Research (IEDCR), Directorate General of Health Services (DGHS)	To reduce morbidity, mortality, disability, and socio-economic-ecological disruptions due to health threats posed by infectious disease

2. Fulfilling legal requirements and legal authorities

7. Managing health emergencies requires the real time intervention of government agencies and rapid deployment of resources. While the public health response should always seek to use the least restrictive and punitive measures that are effective at controlling the epidemic, enforcing public health measures may require social restrictions and control. Normally, these are not permitted by law, but during emergencies these measures may be required to protect people's health. So having appropriate laws and legal instruments in place is an important prerequisite for public health emergency management. The legislative framework provides agencies with the authority to act and the means to work together. It may be emphasized that these are not the only ways to combat diseases.

8. In Bangladesh several laws and acts exist, such as

- Penal Code 1860
- The Bengal Prevention of Inoculation Act, 1865;
- The Bengal Vaccination Act, 1880;
- The Public Health (Emergency Provisions) Ordinance Act 1944;
- The Prevention of Malaria (Special Provision) Ordinance, 1978 (Ordinance No IV of 1978),
- The Bangladesh Pure Food Ordinance, 1959 (amended in 2007);
- The Bangladesh Pure Food Rules, 1967; and
- The Communicable Diseases (Prevention, Control and Eradication) Law, 2018.

9. The Health Policy of Bangladesh (2011) focuses on managing emerging and re-emerging diseases, surveillance, managing points of entry for prevention and control of infectious diseases.

Besides these, Bangladesh is also signatory to International Health Regulations (IHR) 2005, which is a legally binding instrument. There are also many non-binding legal instruments from international agreements on public health protection and health security.

10. In many cases, the current legal framework is still based on laws inherited from the colonial period, and these may not fully align with the new nature of the disease, epidemic, or pandemic including the emergency of infectious origin. It is now imperative to review these laws within the present context. The experience of the COVID-19 pandemic should be taken into account. Many legal requirements were fulfilled by government order on an emergency basis, but few were endorsed in the Parliament. Taking all these measures into account, a comprehensive law should be enacted for implementing PHE response.

11. A new law for public health emergency management may be enacted like, Disaster Management Act 2012 (Law 34/ 2012). Alternatively, The Communicable Diseases (Prevention, Control and Eradication) Law, 2018 may be updated to serve the purpose. The Communicable Diseases Law 2018 has provision of quarantine, isolation, notification of government listed infectious disease by individual and entities - as a legally binding responsibility of citizens and authorities. But the Law was framed to prevent and control outbreaks in a locality. So it was found inadequate to prevent-detect-respond to worldwide pandemic. Pandemic required whole-of-government and whole-of-society engagement. This Law is only limited to the authority of Directorate General of Health Services.

12. The Penal Code 1860 still forms the backbone of maintaining law and order of the society in a usual time. It was also found inadequate to manage a pandemic situation.

3. List of Stakeholders Implicated in this Plan

1. Cabinet Division
2. Prime Minister's Office
3. Health Services Division, Ministry of Health & Family Welfare (MoHFW) (Lead Ministry)
4. Medical Education and Family Planning Division, MoHFW
5. Ministry of Fisheries and Livestock
6. Ministry of Environment, Forestry & Climate Change
7. Ministry of Agriculture
8. Ministry of Defence
9. Public Safety Division, Ministry of Home Affairs (MoHA)
10. Security Services Division, MoHA
11. Local Government Division, Ministry of Local Government, Rural Development and Co-operatives (MoLGRD&C)
12. Rural Development and Co-operatives Division, MoLGRD&C
13. Ministry of Food
14. Ministry of Disaster Management and Relief
15. Planning Division, Ministry of Planning (MoP)
16. Finance Division, MoP
17. Ministry of Industries
18. Ministry of Science & Technology

19. Ministry of Civil Aviation and Tourism
20. Ministry of Shipping
21. Ministry of Women and Children Affairs
22. Ministry of Information
23. Information and Communication Technology (ICT) Division, Ministry of Post, Telecommunication and Information Technology (MoPT&IT)
24. Post and Telecommunication Division, MoPT&IT
25. NGO Affairs Bureau, PM Office
26. Armed Forces Division, PM Office
27. Ministry of Water Resources
28. Ministry of Religious Affairs
29. Ministry of Housing and Public Works
30. Ministry of Public Administration
31. Economic Relations Division, MoFinance
32. Internal Resources Division, MoFinance
33. Bangladesh Planning Commission
34. Statistics and Informatics Division, MoPlanning
35. Law and Justice Division, Ministry of Law Justice and Parliamentary Affairs
36. Legislative and Parliamentary Division, MoLaw
37. Ministry of Social Welfare
38. Road Transport and Highways Division, MoRT and Bridges
39. Bangladesh Bridges Division, MoRTB
40. Ministry of Railways
41. Secondary and Higher Education Division, MoEducation
42. Technical and Madrasa Education Division, MoE
43. Ministry of Primary and Mass Education
44. Ministry of Chittagong Hill Tracts Affairs
45. Ministry of Youth and Sports
46. Ministry of Cultural Affairs
47. Ministry of Land
48. Ministry of Foreign Affairs
49. Ministry of Textiles and Jute
50. Ministry of Commerce
51. Department of Energy and Mineral Resources, Ministry of Power, Energy and Mineral Resources (MoPE&MR)
52. Power Division, MoPE&MR
53. Ministry of Labour and Employment
54. Ministry of Liberation War Affairs
55. Ministry of Expatriates' Welfare and Overseas Employment
56. Other relevant ministries and departments

Directorate General of Health Services

1. Director, Disease Control
2. Director, Administration

3. Director, Planning and Research
4. Director, Hospital
5. Director, Management Information Service (MIS)
6. Director, Finance
7. Director, PHC & ITHC
8. Director, IEDCR
9. Director, IPH
10. Director, IPHN
11. Director, Central Medical Stores Depot (CMSD)
12. Chief, Health Education Bureau
13. Line Director, CDC
14. Line Director, NCDC
15. Line Director, NNS
16. Line Director, Lifestyle change
17. Line Director, MNCAH
18. Line Director, CBHC
19. Line Director, Upazila Health Care
20. Line Director, AMC
21. Line Director, PMR
22. Law Advisor, Administration, DGHS

Directorate General of Medical Education

1. Director, Medical Education
2. Director, Administration
3. Director, Human Resource Management
4. Director, Planning and Development
5. Director, Research, Publication and Curriculum Development
6. Director, Financial Management
7. Director, Alternative Medicine
8. Line Director, Medical Education & Health Manpower Development

Directorate General of Family Planning

1. Director, Administration (Additional Secy)
2. Director, MCH Services
3. Director, Logistics and Supply
4. Director, MIS
5. Director, Planning
6. Line Director, Field Service Delivery
7. Line Director, Clinical Contraception Service Delivery Program (CCSDP)

Directorate General of Nursing and Midwifery (DGNM)

1. Director (Education)
2. Director (Administration)

Directorate General of Drug Administration (DGDA)

1. Director (Administration)
2. Director (Drug Testing Laboratory)
3. Director (Dept of marketing authorization for vaccine and biologicals)

Essential Drug Company Limited (EDCL)

1. General Manager, Administration and Human Resource Management
2. General Manager, Production
3. General Manager, Procurement

City Corporation Health Offices

1. Chief Health Officer
2. Chief Waste Management Officer
3. Chief Social Welfare and Slum Development Officer

Municipality Health Offices

1. Municipality Health Officer

Points of Entry Health Offices

1. Airport Health Officers (DGHS)
2. Bangladesh Biman Chief Health Officer
3. Consultant, Public Health, HSIA
4. Sea Port Chief Health Officer
5. Land Port Health Officers (DGHS)

Others

1. icddrb
2. Bangladesh Red Crescent Society (BDRCS)

4. Method

13. This Plan was prepared in consultation with a core group of experts in public health, animal health, ecology, laboratory science, public administration, law enforcement, defense and other stakeholders. The first draft was discussed in a stakeholder workshop, and participants provided input after extensive discussion in groups. WHO adapted its existing Strategic Tools for Assessing Risks (STAR) process to focus on infectious hazards only (STAR-IH), in a workshop that was supported by WBG, and held with experts from public health, clinicians, epidemiologists, animal health and fisheries experts, wildlife experts, disaster management professionals, military services and other stakeholders. Another workshop with Directors of Health Services of DGHS and stakeholders of One Health was held at DGHS for consultation about PHE PRP, and other related documents (PHEOC and PHW). Several further discussions with a core group of experts were held to develop the draft.

5. Goal

To reduce morbidity, mortality, disability, and socio-economic-ecological disruptions due to health threats posed by infectious disease

6. Objectives

a) To prepare for and prevent public health emergencies caused by infectious hazards as well as adverse events
b) To promptly detect and confirm adverse public health events caused by infectious hazards
c) To respond promptly and effectively to and to recover from the adverse effects of public health emergencies caused by infectious hazards

7. Principles

i. Community ownership
ii. National institutional ownership (designated focal institute)
iii. Active and sustained multisectoral and multilateral partnerships
iv. Gender and human rights
v. Equity
vi. Evidence and risk based
vii. Transparency
viii. Sustainability
ix. Resilience
x. Public health partnership
xi. Continuous improvement

8. Country Risk & Hazard Assessment Approach Using STAR-IH Tool

14. A very important aspect of developing the PHE PRP is to conduct a risk assessment to identify and assess priority hazards in advance to set the content and directions of such plan. In Bangladesh, a modified version of WHO's Strategic Toolkit for Assessment of Risks (STAR), with an emphasis only on infectious hazards, was used to analyze the country's risks and vulnerabilities with respect to these threats (STAR-IH process). The overall risk was calculated as a measure of likelihood and severity, and severity was calculated automatically in the spreadsheet based on the hazard score, vulnerability and coping capacity.

8.1 STAR IH Risk Summary and Risk Preparedness for PHEPRP

15. The STAR-IH assessment was done by selecting hazards from infectious disease focused hazard classification following WHO hazard scoring template and a risk scoring guide. Here, the total hazard scoring process followed certain infectious hazard specific criteria set for each disease by its characteristics, e.g., lab-based identification, surveillance findings, pathogen type, reservoir, transmission mode, asymptomatic transmission, reproduction number (R_0), case fatality ratio & drug availability *(Ref Annex table: 1*).

16. Below is the most recent STAR assessment, with findings based on the available data and information for the targeted disease, for which in a few cases there was a paucity of data or

recent information. The matrix analysis will need a periodic revision to reflect new knowledge and data regarding these diseases as well as information on their distribution and impact specific to Bangladesh. To this end, in future, these risk categories should be revisited regularly and especially when new evidence is produced.

1) Highest risk: Impact is most severe, and likelihood is almost certain

a. COVID-19: Ongoing pandemic, occurring the whole year (since March, 2020 after its first detection) with waves unlinked to season and anywhere in the country, vaccine available and as of 5 December 2022, two doses has been administered in 73.9% of population
b. Japanese encephalitis: Perennial in summer and rainy season, prevalent in north-western part of the country, vaccine available but not administered by Government

2a) Second highest risk: Impact severe & very likely to occur:

a. Nipah encephalitis virus disease: Impact is severe, recurrent in winter season, prevalent in north-western and mid-western part of the country
b. Rabies: Impact is severe, likely to occur, recurrent in usually summer and rainy season, may occur anywhere in the country, vaccine is available in national as well as district hospitals
c. Dengue: Impact severe, likely to occur, vulnerability high, coping capacity low, epidemic-prone, data reliant on sentinel surveillance, vaccine available overseas
d. Disease X (future pandemic): Unknown impact, assume severe, with high vulnerability and low coping capacity. Likelihood of occurrence uncertain but assume it could happen.

2.b) Impact moderate & almost certain to occur

a. Hepatitis E: Impact is moderate and very likely to occur, frequent in summer, may occur in densely populated urban area
b. Cholera: Impact is moderate and very likely to occur, recurrent in summer, pre and post monsoon season usually occur in peri urban and densely populated urban area. More endemic in southern part of Bangladesh
c. Malaria: Impact is moderate and very likely to occur, perennial in summer, may occur in hilly areas of Bangladesh
d. Foodborne illness: Impact is moderate and very likely to occur, perennial in summer, may occur in any area of Bangladesh

2.c) Impact moderate & very likely to occur

a. Diarrhea: Impact is moderate, may occur very likely anywhere in the country, it is perennial usually in the summer and rainy season
b. Tuberculosis: Impact is moderate, may occur very likely anywhere in the country, occur mostly in slum and densely populated area and low socioeconomic group it is perennial. MDR and XDR TB is a major concern

3a) Third highest risk: impact critical to severe & unlikely to occur

a. Ebola: Still not found in Bangladesh, impact will be extremely critical, occurrence very unlikely, if it spreads in Bangladesh outbreak may occur at any time of year
b. MERS-CoV: Still not found in Bangladesh, impact is severe, occurrence very unlikely, migrant workers and pilgrims are at risk of exposure, if it spreads in Bangladesh it may be prevalent in any region and any time
c. Yellow fever: Still not found in Bangladesh, impact is severe, occurrence very unlikely, if it spreads in Bangladesh it may be prevalent randomly
d. Plague: Unlikely to be found in Bangladesh, impact is severe, if it emerges it will be prevalent in winter season and rural area
e. West Nile virus: Unlikely to be found in Bangladesh, impact is severe, if it emerges it will be prevalent in urban area

3.b) Third highest risk: impact moderate & likely to occur

a. Chikungunya: Impact is moderate, frequently occur in urban areas of Bangladesh

b. Measles: Impact is moderate, recurrent occurrence in urban slums and hard-to-reach areas
c. Hepatitis C: impact is moderate, recurrent occurrence among injectable drug abusers, found in high prevalence in Forcefully Displaced Myanmar Nationals (FDMN) humanitarian settings
d. Typhoid: Impact is moderate, recurrent occurrence among people with poor hygiene, likely in summer
e. Hepatitis A: Impact is moderate, frequent among low-income people with poor hygiene, in early summer
f. HIV: Impact moderate, high vulnerability & coping capacity, frequent among injectable drug users
g. Mumps: Impact moderate, high severity with partial vulnerability, coping capacity high
h. Leptospirosis: Impact moderate, with high severity & high vulnerability, low coping capacity
i. Hepatitis B: Impact is moderate, frequent among health care workers, drug abusers, in mid-summer
j. Pandemic influenza: May emerge from infected poultry, impact may be moderate, may occur randomly

4. Fourth highest risks: impact moderate unlikely to occur

a. Zika: Found in Bangladesh, impact may be moderate, may occur randomly among urban area
b. Diphtheria: Recently found in Bangladesh in a humanitarian setting, impact may be moderate, may occur randomly

5. Fifth highest risks: impact minor, likely /unlikely to occur

a. Cutaneous anthrax: Impact is low, recurrent seasonal occurrence in rainy season
b. Meningitis: Impact is low, may occur among people of any age
c. Poliomyelitis: No longer exists in Bangladesh (elimination certified in 2014), impact minor, very unlikely

Table 2: Risk Summary and Risk Preparedness

Risk Assessment Bangladesh

Risk matrix

Impact	Very unlikely	Unlikely	Likely	Very likely	Almost certain
Critical		Ebola	Disease X		
Severe		MERS, Yellow fever, Plague, West Nile virus	Nipah, Dengue, Rabies,		COVID-19, JE
Moderate		Zika, Diphtheria	Chikungunya, Measles, HIV, Mumps, Hep C, Leptospirosis, Typhoid, Hep A, Hep B, Pandemic influenza	Diarrhoea, TB	Hepatitis E, Cholera, Malaria, Foodborne illness
Minor	Poliomyelitis		Cutaneous Anthrax, Meningitis		
Negligible					

Likelihood

9. Strategy

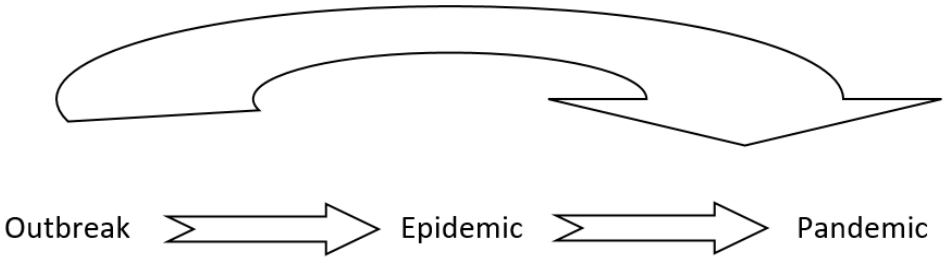
9.1 Identifying Risks

17. Bangladesh has identified risks of infectious hazards by risk and vulnerability analysis following STAR-IH tools, as described above. The analysis should be updated regularly to reflect the developing circumstances.

9.2 Scenarios

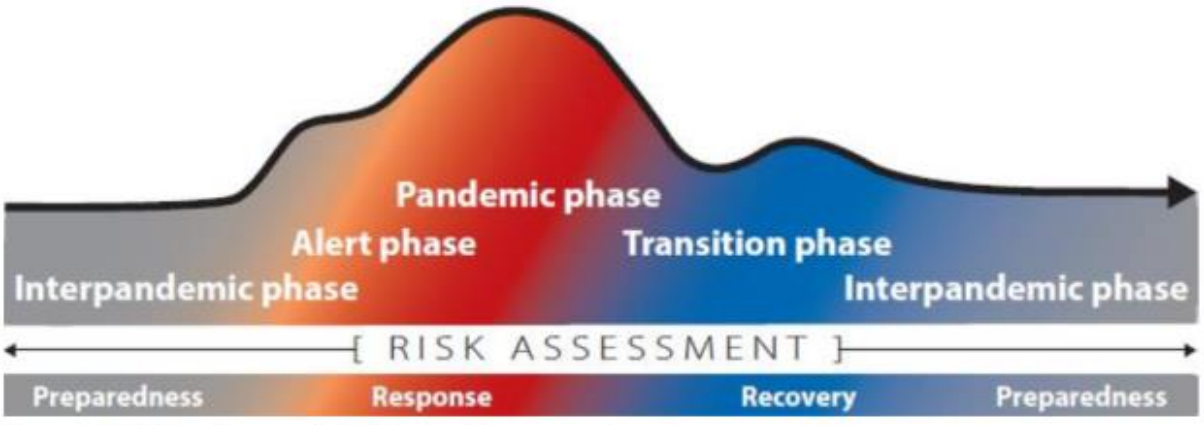
18. The preparedness and response to any PHE depend on the possible scenario. This may develop from low risk to high risk, or may be high risk from the very beginning after outbreak is detected.

Figure 1: Evolving Scenarios in a Pandemic



The staging of pandemic for influenza by WHO, may be applicable for other pandemic prone infectious disease of respiratory origin. But different scenario may emerge. The COVID-19 declared as pandemic within ten weeks after the outbreak was first declared in Wuhan, China in December 31, 2019. The alert phase was very brief.

Figure 2: The continuum of pandemic phases (WHO 2017)



Source: 2017 WHO guide on pandemic influenza risk management

19. During the interpandemic phase the preparedness, surveillance and early warning, planning for response, exercises, monitoring and evaluation are the core functions. But it is a continuous process, and it should not stop even in the community transmission situation of a

pandemic, and can be particularly important for prolonged responses. The experience of two-year long COVID-19 pandemic shows this continuum.

20. The phases of PHE can be categorized into preparatory phase, alert phase, response phase, and recovery phase. It is also a continuum.

Figure 3: Phases of Public Health Emergency

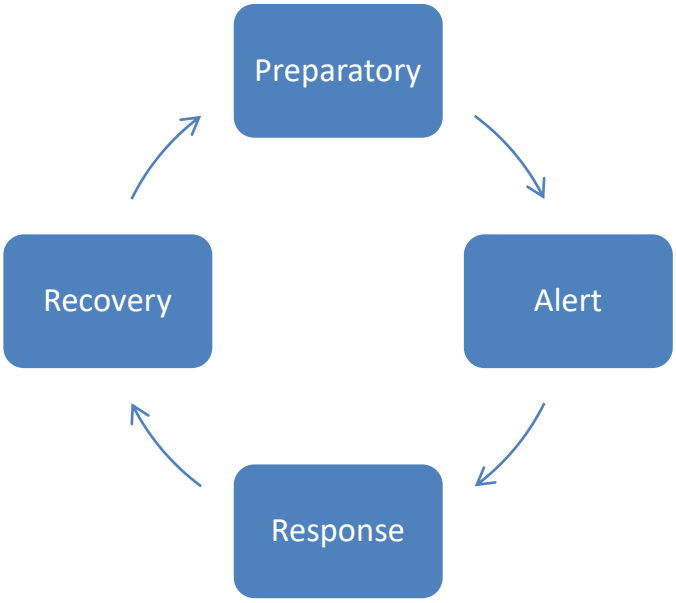


Table 3: Emergency Situation Scenario: Epidemic Crises – Nipah-cholera-avian influenza

Likelihood	Triggering factors (causality)	Areas/zones potentially affected Planning assumptions, operational objectives, and thresholds of activation
Most likely cases	Nipah - Drinking raw date palm sap - Deforestation disturbing bat habitat - Most frequent in winter Cholera/ Acute watery diarrhoea - Poor hygiene - Insufficient sanitation - Lack of availability/provision of potable water Avian influenza - Mass population movements or gatherings (trade, markets) - Environmental factors (migratory birds) - Climatic and geographic factors - Frequent and continued contact between humans and birds/poultry - Lack of hygiene (manipulation of birds) - Immune deficiencies	**Potentially affected zones** Nipah: North-west, central-west region of Bangladesh Cholera/ Acute watery diarrhoea: Usually southern region of Bangladesh Avian influenza: All the territory, especially the areas of trade and those frequented by migratory birds, natural habitats of migratory birds, poultry farming areas, live bird markets **Planning Assumptions, operational objectives, and activation thresholds** - Operational contingency plans for epidemic crises (Nipah infection, cholera) and epizootic (avian influenza) updated Nipah - Highest number in a cluster remains below 50 patients belong to any age - No vaccine available - Reinforced strategies for prevention and risk reduction are implemented in the highest risk districts - Threshold: any new case detected Cholera/ Acute watery diarrhoea - Strengthen the knowledge of the population on control measures against cholera - Ensure timely epidemiological and lab data are available for decision-making - Reduce the lethality due to cholera - Ensure coordination, monitoring, and evaluation of activities for cholera control - Threshold: any case of Cholera detected Avian influenza - Availability of test kits for detecting the virus - The contingency plan includes the strengthening of laboratory capacities for confirming rapid test results - Effective surveillance across the whole country - Availability of pharmaceutical products for prevention and response - Threshold: any novel influenza detected

9.3 Hazard Specific Action Plans

21. The action plan for the PHE (Table 7) includes activities to effectively prevent, prepare for, detect and respond to public health threats and emergencies. A generic plan may be utilized, but a hazard specific plan can be useful in real time during emergencies, especially where a hazard may require specific response actions. At the same time a sector specific plan (or plans) is also necessary for preparing and responding through a One Health, whole-of-government and whole-of-society approach.

22. Bangladesh previously developed a National Pandemic and Avian Influenza Plan, and is currently revising and updating a 3rd version. Hazard specific plans exist to some extent for several infectious hazards, e.g., Nipah encephalitis, Chikungunya, COVID-19, Ebola, MERS-CoV, poliomyelitis, HIV, hepatitis, dengue, tuberculosis. The Livestock services have control plans for avian influenza and anthrax, and the Ministry of Local Government has plans to control rabies and dengue. Most of these plans include detection and response procedures, but the plans are not evenly developed for every disease identified as a hazard by risk mapping (see the list in previous section).

23. Most of the emerging diseases are zoonotic in origin. The health sector alone is not sufficient for detection, prevention and response to such emerging diseases. Scientists and experts from animal health, livestock, wildlife, agriculture, and fisheries are an integral part of such a plan. Moreover, responding to a PHE involves public administration, law enforcement, disaster management officials, finance, people's representatives, civil societies, professional associations, mass media, and other stakeholders.

9.4 Command and Control Structure

9.4.1 Public Health Emergency Committees

24. The proposed emergency committees are the implementing structures at national and sub-national levels. The proposed committees will work in coordination with those of the National Plan for Disaster Management (2021-25) and Standing Order of Disaster (SOD) (2019). The structure of proposed Committees is also mostly similar to those for disaster response.

Table 4: Public Health Emergency Committees (proposed)

Committee	Composition	Role	Focal body/ person
National Council for Pandemic Management (chaired by Honourable Prime Minister)	The ministries listed under List of Stakeholders (p 15). Honourable Minister of each of the ministries will be the members. Honourable Prime Minister will chair the Committee	Provides strategic guidance on policies and PHE PRP, take Incident Command during pandemic.	Cabinet Division (Secretary will be Member Secretary). Focal institute: IEDCR

Committee	Composition	Role	Focal body/ person
Inter-Ministerial Pandemic Management Coordination Committee	The ministries listed under List of stakeholders (p 15) will be represented in the Committee. Secretary of each of the ministries will be the members. Honourable Minister of Health and Family Welfare will chair the Committee, Secretary of Cabinet Division as Vice Chairperson	Undertake activities as advised by Council during pandemic, recommend the Council for approval of laws, rules, policies, orders and national level plans;	MoHFW (Secretary will be Member Secretary). Focal institute: IEDCR
National Pandemic Management Advisory Committee	Members of Parliamentary Standing Committee on MoHFW, Government representatives, development partners, independent experts, civil society representatives will be the members. The Committee will be chaired by Chairperson of Parliamentary Standing Committee	Will provide expert advice for pandemic prevention and control, ensure community engagement, facilitate GO-NGO collaboration, public-private partnership	MoHFW (Additional Secretary – Public Health) will be Member Secretary. Focal institute: IEDCR
National Epidemic Management Committee	The relevant directors listed under List of Stakeholders (p 15) will be represented in the Committee. Secretary of Health Services Division, MoHFW will chair the Committee. DG, Health Services, DGHS will take Incident Command during nationwide epidemic	Coordinate epidemic control nationwide, involve One Health partners and other stakeholders beyond one Health	Director, Disease Control, DGHS will be Member Secretary. Focal institute: IEDCR
National Coordination and Technical Committee for PHE (Directorate level)	Director General of Health Services will chair the Committee, while concerned Directors will be members. Incident	Coordinate public health emergency response when it is localized in any location in Bangladesh	Member Secretary: Director IEDCR. Focal institute: IEDCR

Committee	Composition	Role	Focal body/ person
	Command will be taken by Director IEDCR		
District inter-sectoral Coordination and Technical Committee	Civil Surgeon (during epidemic)/ Deputy Commissioner (during pandemic) will chair the District Committee, while representatives of concerned line ministries will be members. Incident Command will be taken by Civil Surgeon	Coordinate public health emergency response in the district which will be conducted by district rapid response team (DRRT)	Civil Surgeon Office (UHFPO Sadar will be Member Secretary)
Upazila inter-sectoral Coordination and Technical Committee	Upazila Health and Family Planning Officer (during epidemic)/ Upazila Nirbahi Officer (during pandemic) will chair the Upazila Committee, while representatives of concerned line ministries will be members. Incident Commander: UHFPO	Coordinate public health emergency response in the Upazila which will be conducted by Upazila rapid response team (URRT)	Upazila Health and Family Planning Office (UHFPO) [Resident Medical Officer will be Member Secretary]
City Corporation inter-sectoral Coordination Committee	City Mayor will chair the City Corporation Committee, while representatives of concerned line ministries will be members	Provide support to public health emergency response	Chief Health Officer of City Corporation
City Corporation Technical Committee	City Chief Health Officer will chair the City Corporation Technical Committee, while representatives of concerned line ministries will be members. Incident Commander: Civil Surgeon	Coordinate public health emergency response in the city corporation area which will be conducted by relevant district rapid response team (DRRT)	Civil Surgeon

a) Cabinet Division will approve the policies for response mechanism
b) Lead Ministry will be MoHFW. If any other circumstances arise beyond human health, inter-ministerial pandemic management coordination committee will decide about lead ministry.

c) In every scenario of PHE (outbreak/ epidemic/ pandemic) focal institute will be IEDCR.
d) Other concerned Ministries will provide policy input, implement their respective parts of the program, and ensure representation through inter-ministerial committees at national and sub-national levels. The Lead Ministry will activate the process, and convene meetings. When a disease outbreak is localised or an epidemic is nationwide, the Ministry of Health and Family Welfare will take the lead if human health is affected, while the Ministry of Livestock and Fisheries will take lead when animal health is affected. During the pandemic, the Prime Minister's Office and Cabinet Division will take the lead and the Lead Ministry (Human or Animal Health) will be the focal Ministry and the designated specialised institute at directorate level will be the focal institute.

The role of the different sectors and intra-sectoral responsibilities will depend on the phase of the PHE, i.e., preparedness, prevention/mitigation, response, and recovery.

9.5. Action plans in One Health Approach

25. Bangladesh is one of the few countries which has institutionalized the One Health approach through the establishment of the One Health Secretariat to develop and implement the One Health approach to improve health, prevent illness and ensure health security. The action plans (Table 7) should follow the same approach.

26. Currently the Ministry of Livestock, and the Ministry of Environment Forest & Climate Change are components of the One Health Secretariat along with the Ministry of Health and Family Welfare. Sector specific plans of these three ministries (or a single plan) should be developed through the One Health Approach for risks identified by risk analysis following STAR-IH tools. The interdependence of living beings in the global biodiversity, which shall be duly taken into account to prevent and fight pandemics, in "One Health" approach (ICCEL 2021).

27. The One Health Secretariat (OHS) has responsibilities which include sharing surveillance data within sectors of human health-animal health-wildlife, identifying wildlife and ecological variables of disease outbreaks, identifying interface areas among wildlife-human-livestock, risk communication and community engagement (Strategic Framework for One Health 2012). The OHS should coordinate the operation centres and response teams of the three (or two) components during any outbreak of zoonotic origin.

9.6. Standing Order on Public Health Emergency (SOPHE) [proposed]

28. In public health emergency preparedness, readiness and response, the effective participation of all is very important. The objective of the proposed Standing Orders on Public Health Emergency (SOPHE) is to inform all concerned about their roles and responsibilities at every stage of public health emergency. As per the SOPHE, each ministry, division, department and agency will: (i) prepare its own detailed work plan to perform its responsibilities and functions efficiently as mentioned in the Standing Orders; and (ii) take necessary measures to implement it as per their own duty and capacity. To respond to a pandemic, the National Pandemic Management Council (NPMC) and the Inter-Ministerial Pandemic Management Coordination Committee (IMPMCC) will coordinate pandemic-related activities at the national level. Coordination at division, district, city corporation, Upazila, pourashava, union and ward

levels will be done by the respective Public Health Emergency Management Committees (PHEMC).

29. A very brief sketch of SOPHE is presented in the Table 9 (Annex 5). It may be further detailed in a separate document.

9.6.1. General Responsibilities and Duties of Ministries, Divisions, Departments and Government-Owned Corporations

- The responsibilities and functions for respective ministries, divisions, departments and agencies have been set separately for pandemic risk management.
- Accordingly, each ministry will include pandemic risk reduction and effective pandemic response issues in their policies and rules and will formulate relevant guidelines thereof.
- Each ministry, divisions, departments and other agencies should perform the following general responsibilities:

9.6.1.1. Pandemic Risk Reduction Functions

- Include pandemic risk reduction issues properly during preparation and implementation of development plans;
- Formulate pandemic risk reduction and development plans following the STAR (WHO);
- Include pandemic risk management related policies and programmes in the process of the National Development Plan;
- Incorporate pandemic risk reduction, response, rehabilitation and recovery issues in the acts, policies and rules of each ministry and prepare related guidelines as necessary;
- Prepare and implement programmes of each ministry for conducting research on different hazards and their impact on respective sectors and their mitigation measure;
- Participate actively in different national and local level committees formed for pandemic risk reduction and emergency response planning and implementation;
- Allocate necessary resources for preparing and implementing programmes for pandemic risk reduction on the basis of identified risk and vulnerability by conducting different hazard and risk analyses processes (following STAR);
- Prepare contingency plans for ministries and respective departments;
- Establish and maintain control rooms/ operation centres to coordinate prevention, control and rehabilitation programmes, if necessary;
- Analyze capacity gaps for operating emergency response, rescue and humanitarian assistance programmes and take necessary measures for its improvement including training to fill gaps;
- Strengthen the inter-ministerial coordination mechanism for response, humanitarian assistance and rescue programmes and improve systems for sharing information with ministries and other related partners;
- Review and update contingency plans based on experience and learnings from response, humanitarian assistance, rehabilitation and rebuilding activities;
- Designate one officer as the Focal Point for pandemic risk management in each ministry, division and department;

- Ensure the incorporation of pandemic risk reduction, response, rehabilitation and recovery issues in the policies, programmes and plans of the ministries and its agencies;
- Formulate medium and long-term plans for pandemic risk management and risk informed development with consideration to the STAR-IH findings;
- Adopt pandemic risk reduction strategies for strengthening resilience of existing infrastructure and undertake necessary initiatives for reducing the risk of services and other systems;
- Formulate risk reduction and contingency plans based on assessment of sector-based risks;
- Formulate plans and arrange regular drills on different types of pandemics (e.g., respiratory illness, encephalitis, water-borne illness);
- Develop and implement pandemic risk reduction and emergency response plans following social inclusion principles by ensuring participation of the women, children, the elderly, persons with disabilities, small ethnic groups, marginalized populations and others.

9.6.1.2. Emergency Response

- Ensure participation in inter-Ministerial coordination activities on conducting humanitarian assistance, public health and social measures and recovery programmes;
- Actively participate in the meetings of committees at all levels and ensure implementation of the meetings' decisions;
- Establish linkages between the National Emergency Operation Centre (NEOC), Public Health Emergency Operation Centre (PHEOC) and all ministries, divisions, departments and agencies;
- Ensure dissemination of early warning message through the ministries and departments;
- Ensure the allocation of necessary resources from the respective ministries for implementation of response, humanitarian assistance, and recovery programmes;
- Ensure participation of local level staff for helping response, and humanitarian assistance activities;
- Send information and reports regularly to the Integrated Control Room at the Ministry of Health and Family Welfare;
- Prepare Situation Reports and make sure to disseminate them properly;
- Assess overall morbidity and mortality, and estimate the recovery costs for restoration of essential health services and send a report to the respective authority;
- Re-establish all health services after a pandemic and continue them where necessary;
- Follow the 'build back better' approach for recovery activities; and
- Where necessary, reallocate ministry resources including staff from non-affected areas to affected areas to support humanitarian assistance, rescue, recovery and rehabilitation activities.

9.6.2. Roles and Responsibilities of Stakeholders During Outbreak Response (localized and clusters)

30. The National Rapid Response Team (NRRT) is led by the Director, IEDCR. The NRRT

conducts the outbreak response in any area of the country. The extent of spread of the outbreak is usually localized within a village/ moholla. Sometimes several clusters of outbreaks are detected in different parts of a district or division. Even several clusters may be found across whole of the country (e.g., outbreak of mass sociogenic illness in schools across several districts). Often DRRT lead by Civil Surgeon and/or URRT led by UHFPO conduct the outbreak response with guidance from NRRT. The roles and responsibilities of Upazila, District, Divisional and National RRTs will be possible to implement if there would be activation of Upazila, district, divisional and/or national level PHEOC facilities respectively.

Table 5: Roles and Responsibilities of Stakeholders During Outbreak (localized and clusters) Response by NRRT

Sl. no	Components of outbreak response	Principal Actor	Collaborator
1	Scientific and investigative issues	IEDCR (NRRT)	CS (DRRT)/ UHFPO (URRT), icddr,b, DLS, DoForest, WHO, US CDC, One Health Secretariat, DGHS, local sites (URRT, DRRT), IPH, EcoHealth Alliance
2	Management and operational issues	IEDCR	DGHS especially CDC, WHO, Development partners (DP), local sites (URRT, DRRT)
2A	Team formation (NRRT)	IEDCR	According to necessity (e.g., DGHS, DLS, DoForest, URRT, DRRT, icddrb, EcoHealth Alliance). For OH approach, OHS may be involved. Experts from non-government and private sector
2B	Contact with outbreak area	IEDCR	DGHS, OHS, CS, UHFPO, local administration
2C	Moving to outbreak site by transport	IEDCR	CS office, UHFPO
2D	Accommodation of NRRT at locality	CS/ UHFPO	Deputy Commissioner, local community leader, NGOs
3	Implement control and preventive measures	IEDCR will initiate the control measures which will be continued by the Disease Control Unit and other department of DGHS such as Bureau of Health Education (BHE), Director (Hospital) etc.	Director (Hospital), Director Administration, DP, CS, UHFPO, local administration, local community
4	Emergency Risk Communication and Community Engagement	IEDCR	BHE, local office of Ministry of Information, local govt, local public administration, local community leaders
5	Outbreak report and feedback	IEDCR	DGHS/MoHFW, DLS/MOFL or BFD/MFE&CC

Sl. no	Components of outbreak response	Principal Actor	Collaborator
	(Recommendation for future outbreak prevention)		

9.7 Resource deployment for immediate use

31. Resources needed for public health emergencies include human resources, financial resources, medical and non-medical logistics and equipment. The experience of the COVID-19 pandemic shows the need of resources for public administration, law and order, defence, local government, social welfare, points of entry, transport, and other relevant sectors. Resource deployment will depend on the scale and extent of emergency.

32. The Ministry of Health and Family Welfare is responsible for funding emergencies related to human health; the Ministry of Fisheries and Livestock is responsible for emergencies in livestock and fish; and the Ministry of Environment Forest Climate Change is responsible for wildlife and ecology. If the requirement exceeds the financial capacity of the ministries, the Prime Minister's Office provides funds reserved for emergency. The Ministry of Planning and the Ministry of Finance reallocate and revise the usual budgetary allocation, diverting from non-emergency functioning ministries and sectors to emergency functioning ministries and sectors.

33. Deployment of human resources in an emergency situation is largely dependent on intra- and inter-sectoral collaboration and coordination. Mobilizing non-emergency human resources for emergency purpose may be an option. Rapid recruitment of skilled human resources, and utilizing volunteers may supplement the mobilization operation. In Bangladesh, a large pool of Red Crescent volunteers remains prepared to be deployed before any natural calamity and disaster. They may be trained to be deployed in a PHE of infectious hazard. Similar steps may be taken for same category of volunteers.

34. Ensuring emergency procurement and maintaining the supply chain is also another important component of response planning. An efficient, smart system should be in place with appropriate legal instruments. Resource mapping for response to PHE should be conducted and updated regularly.

9.7.1 Human resources

35. Developing surge capacity is a prerequisite for emergency preparedness, as rapid transmission of infectious agents may result in large numbers of sick people seeking medical help as well as increasing demand for service providers. Many people may rush to health facilities out of panic. There should be provision for mobilizing human resources working for non-emergency and non-essential services for deployment in emergency services. Medical, Nursing, Para-medical student may be deployed as volunteer or temporary recruit to non-essential and non-emergency after a short training or on-duty training. In addition, these activities should be conducted:

1. Organizing local rapid response team(s), including if necessary, mobilizing RRTs from other districts and deploying them for national RRT;

2. Mobilizing surge capacity such as health workers, health workers from private sector, retired health workers, medical students
3. Mobilizing NGOs, community workers, volunteers and other sectors outside Health
4. If necessary, mobilizing specialized foreign response teams/experienced health workers
5. Developing mechanisms for receiving and deployment
6. Training and exercise need to be organized regularly for the potential surge capacity

9.7.2 Continuing essential health services

36. Continuity of essential health services should be maintained through the short- to medium- and long-term interventions. The experience of COVID-19 pandemic highlighted the importance of continuing essential health care services to: (i) control increased mortality from non-epidemic causes; (ii) maintain immunization services to reduce child morbidity and mortality for non-PHE illness; and (iii) ensure the safety of the health care provider and health care seeker from PHE-IH. A health care system with universal health coverage, including maternal and child health care, emergency services may minimize the disruption of essential health care during PHEs. During a PHE, the following two components should be emphasized:

1. A triage system in a health facility
2. A designated/ dedicated unit in the hospital to receive suspected infectious disease

9.7.3 Supporting operation of healthcare facilities

37. Healthcare providers are front-liners to fight PHEs. They should be protected fully during their service hours as well as resting hours. If the health care workers do not feel confident, the operation of health care facilities will face a challenge. Ensuring adequate supply of medical equipment and logistics will help to operate the healthcare facilities smoothly.

9.7.4 Organization of surveillance and laboratory

38. The country has the capacity of sentinel-based and community-based surveillance. Most disease surveillance is run by IEDCR, which is designated by the government for this purpose. Outbreaks of respiratory diseases are mostly identified by the event-based surveillance (hotline and media surveillance), national and hospital-based influenza surveillances. The IEDCR is recognized as the National Influenza Centre (NIC) of Bangladesh by World Health Organization (WHO) since 2008. The capacity of nationwide lab network developed for COVID-19 detection should be retained for respiratory disease surveillance.

39. IEDCR also trains veterinary doctors in surveillances and outbreak investigations for improving the capacity of responses to outbreaks of zoonotic diseases through One Health approach. For advanced response, IEDCR is developing a workforce through the Field Epidemiology Training Program, Bangladesh (FETP,B), which exists in three different iterations of different lengths - Advanced (2 years), Intermediate (9 months) and Frontline (3 months), targeting all levels of the health system.

40. Indicator-based surveillance and event-based surveillance must be in operation to detect the emergency as early as possible. Relevant workforce and logistics must be provided and sustained to run the surveillance successfully. An annual review should be conducted to

strengthen the system.

41. The surveillance system should also continue during a PHE. The data will be utilized in real-time for rapid response, public health and social measures (PHSM). For example, the school closure or reopening may depend on surveillance findings of PHE. The PHEOC at the outbreak site and at national level will respond according to the extent of the PHE, utilizing the real-time surveillance findings.

42. Primary laboratories at Upazilla Health Complex with limited laboratory capacity support sample collection, preparation and rapid testing. Secondary laboratories at District Hospitals or at the specialized hospitals test TB or other infectious diseases. Tertiary laboratories are working under the departments of Microbiology, Virology, Biochemistry, Hematology, Histopathology, Immunology, Molecular Biology and Laboratory Medicine/ Clinical Pathology at different Medical Colleges and Hospitals. These laboratories are equipped with standard instruments for testing of body fluids, tissues and other biological specimens. Laboratories at different specialized facilities, e.g., IEDCR, IPH, IPHN, NILMRC, among them some of these laboratories are equipped with advanced instruments and capable of conducting high level biochemical, immunological, microbiological and molecular analysis of the clinical/ biological specimens (IEDCR 2022).

43. A formal Public Health Laboratory Network with IEDCR as the reference laboratory has been planned to designate (ibid). Currently, laboratory detection for most of the surveillance and event based surveillance is conducted by IEDCR. For any public health emergency, usually samples are collected by designated medical technologists from the field. Samples for routine surveillance are sent to IEDCR by medical technologists working at Upazila, District Hospitals. Samples are sent to IEDCR from tertiary and specialized hospitals also, mostly for detecting any outbreak.

9.7.5 Continued training and exercise

44. The dedicated human resources for responding to PHE should be trained and retrained regularly. Because persons in charge at different tiers of the government sector are regularly transferred, the newly placed persons must be trained immediately after their placement. In addition, this plan and the Standard Operating Procedure (SOP) for preparedness and response must be tested regularly with simulation and table-top exercises, both to keep the training living and to mend the gap when such exercise finds any. The exercise should not be limited to the health sector only, joint exercises with all stakeholders will contribute to the preparedness at different levels of government and society.

9.7.6 Operational support and logistics, stockpiling and supplies

45. The experience of COVID-19 showed the barriers and challenges for rapid deployment of logistics and operation supplies. The key activities which need to be addressed with priority: (i) Compilation of procurements of all participating agencies to address the priority requirements of the government; (ii) Coordination between development partners with DGHS and DGDA on the approved standard specifications for medical equipment; (iii) Establishment of a systematic inventory management system for medical equipment and logistics within DGHS to ensure that the entire supply chain is on track; and (iv) Liaison with the National Board of Revenue (NBR)/

Customs/ Ministries to simplify the importation process of required medical items in case of need.

46. Effective response requires a resilient public health supply chain, anchored in manufacturing capabilities or rapid import from neighboring countries, so that health care and preventive measures can reach patients. Sustaining the resilience of this supply chain is critical for national security (US National Strategy for a Resilient Supply Chain, 2021) and requires: (i) Identifying and listing critical medical supplies and products; and (ii) prioritizing mapping and analysis of supply chain of those products. The Central Medical Store Depot (CMSD) should be stockpiled with PPEs, equipment, and medicine according to assumed scenarios of PHE.

9.8 Data collection, analysis, and information sharing

47. Recording and compiling data are pre-requisites for evidence generation. The main challenge of a PHE is it's evolving nature. Systematic data collection, analysis, and dissemination in real-time ensures prompt intervention. The IEDCR of DGHS is the designated institute of surveillance for data collection, transmission, storage and management for emergency response in Bangladesh. This is done in collaboration with PHEOC, which is a key resource for information sharing and coordination. The MIS of DGHS collects the routine data of disease profiles and other information including human resources and health management.

48. Data becomes information after analysis. Exchange of information in a timely manner with stakeholders is a key to successful community engagement for mitigating risks from PHE. The IEDCR disseminate information of PHE. The Health Education Bureau is the designated office of DGHS to disseminate routine information of public health importance to people. But other offices also disseminate information on their own initiative, with the concurrence of higher authorities.

49. A One Health dashboard for real time surveillance information should be developed jointly by human health, animal health, and ecosystem. Experts will interpret these data into information for mass communication. The One Health Secretariat has taken initiative to install such a dashboard.

9.9 Incident management system

50. In the event of a public health emergency, response efforts will be organized through an incident management system (IMS). Within the IMS, an Incident Manager (IM) will be designated. The position and level of the IM will depend on the scale of the event. For small, localized outbreaks, the PHEOC at the IEDCR will be activated, as is described in more detail in the following section. But when the extent of the outbreak becomes large, the system expands to embrace the network of DGHS as well as Ministry of Health and Family Welfare (MoHFW). Often the nature of the health emergency warrants coordination between human health, animal health and wildlife sectors, following the One Health Approach. In a pandemic situation, like COVID-19, coordination within whole of the government machineries become the key to success. In a PHE situation of local nature or an international pandemic, coordination with community and civil society is another key link for success. The table below highlights the IM selection at different emergency scales.

Table 6: Incident management lead of different scenarios of Public Health Emergency

Scenario of PHE	Incident Manager	Example
Localised outbreak	a) CS/ UHFPO supervised by IEDCR b) Director IEDCR, supervised by DGHS	a) Diarrhoea outbreak b) Nipah outbreak
Epidemic nationwide	Directorate General of Health Services, supervised by MoFHW	Cholera outbreak in post-flood situation in more than one Division of Bangladesh
Pandemic	Cabinet Division supervised by Honourable PM	COVID-19 pandemic

9.10 Public Health Emergency Operation Centre (PHEOC)

51. The term 'emergency operations centre' or 'EOC' usually refers to permanent emergency coordination centers at national, sub-national, regional and international levels. A PHEOC is a central location for coordinating operational information and resources for strategic management of public health emergencies and emergency exercises. The PHEOC provides communication and information tools and services, and a management system during a response to an emergency or emergency exercise.

52. In Bangladesh, other hazards are mostly responded to by the Disaster Management Operation Centre and designated health facilities. The Line Director of Non-Communicable Disease Control coordinates the responses to non-infectious hazards. DGHS operates the Management Information System (MIS) through the Integrated Control Room (ICR), which receives information of emergency health events and serves as an information hub. The PHEOC stationed at IEDCR directly responds to infectious hazards and ensures a coordinated response to all other hazards, which are responded by other agencies. Moreover, as per One Health Approach, reports of response to adverse health events in livestock, wildlife, environment should also be shared with PHEOC, for overall coordination and response.

53. The PHEOC is organized via an incident management system (IMS) (Handbook of PHEOC. IEDCR. 2018). The Director IEDCR activates the response mode in consultation with Core Committee and informing higher authority. This is practiced for PHE of local concern.

Figure 4: Organogram of PHEOC at Response Mode

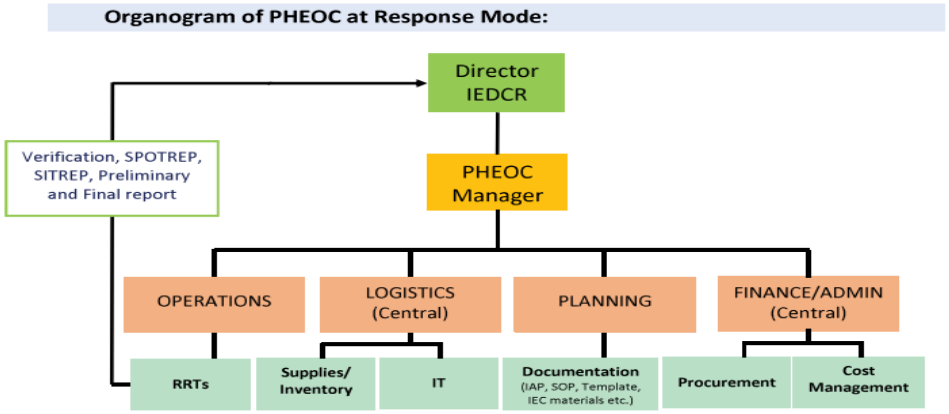


Figure 2: Organogram of PHEOC at Response Mode

54. The PHEOC is supported by Integrated Control Room for information, supported by IEDCR for surveillance (routine/ event-based) and laboratory investigation, and for emergency risk communication and community engagement.

Figure 5: CONOPs Level

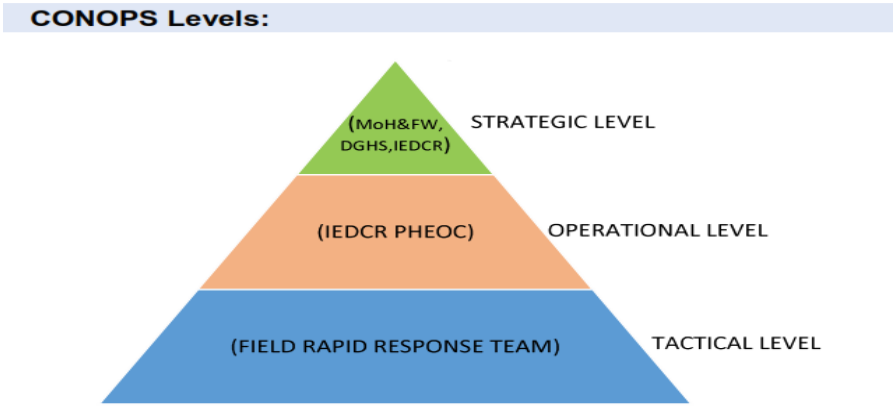


Figure 3: Level of IMS Response, PHEOC

The structural placement, strategic directions and functionality, coordination and multi-institutions and multi-sectoral collaboration in emergency responses management are very vital considerations in the MOHFW PHEOC system development.

9.10.1 Plan for activation mechanism of PHEOC

55. The Handbook of PHEOC (IEDCR 2019) describes the activation mechanism of the Centre: (i) during the inter-emergency period, the PHEOC will be in Watch mode; (ii) when any unusual morbidity or mortality incident is reported it will pass into Alert mode; and (iii) when the outbreak is confirmed, the Director of IEDCR will declare the Response mode and activate IMS. According to severity of the PHE, s/he will consult with higher authority prior to declaration of Response mode and activation of IMS.

9.10.2 Roles and Responsibilities within PHEOC (as per the PHEOC Handbook)

- ***PHEOC Manager:*** The Manager will be responsible for day-to-day operations in the Watch mode, as well as overall supervision and monitoring of planning and operations sections.

- ***Incident Manager (IM):*** The Director IEDCR or her/his designate will act as an Incident Manager, who will provide overall direction to the PHE response operations. The Manager will be responsible for overall incident/ outbreak action plan.
- ***Public Information Officer (PIO)*** and ***Liaison Officer (LnO)*** will also be selected by Director, IEDCR. The PIO will develop and release information about the incident/ PHE to news media, to the response personnel, and to other relevant agencies in consultation with IM and Director, IEDCR. The LnO will communicate and coordinate with the designated point of contact (Liaison officers) from other relevant agencies.
- ***Planning Section Chief*** will receive, compile, evaluate, and analyze all outbreak information, and provide updated status reports to PHEOC management and field operators.
- ***Operations Section Chief*** will submit the approved contingency/ incident action plan, and request for funds.
- ***Logistics Section Chief*** will provide logistic support to PHEOC, estimate the needs, manage the procurement.
- The ***IT Officer*** will provide all type of IT support to PHEOC.
- The ***Administrative and Finance Officer*** will monitor, supervise and evaluate all administrative and financial documents; will do all routine correspondence related to operation, contribute in budget preparation, audit and accounts.

9.11 Risk Communication and Community Engagement (RCCE)

56. Protecting communities from infection and breaking the chain of transmission during PHE-IH require a holistic approach involving every member of the community. Extensive RCCE work requires strong leadership of government at upstream level to coordinate with multiple partners on a common platform. The DGHS will take the lead role in coordinating the multi-stakeholder RCCE platform and provide guidance in identifying needs, designing interventions, and implementing RCCE plans at national and sub-national level.

57. Funding for RCCE planned interventions should be ensured. Concerted resource mobilization and allocation to enable design and implementation of evidence-based RCCE interventions is needed for sustained prevention practices.

9.11.1 Working with mass media

58. In the current pandemic, DGHS has designated spokespersons for the media. These spokespersons update the pandemic situation at a regular interval. Periodic training and refresher training is conducted by DGHS on media management for health managers at different

level. Media personnel are also oriented regularly by health authorities. An institutional arrangement is needed to sustain the process of risk communication with a functional involvement of PHEOC.

9.11.2 Information Hub

59. In the early days of the COVID-19 pandemic the role of information hub was played by PHEOC stationed at IEDCR. Currently, the MIS at DGHS is working as the information hub for COVID-19 pandemic. The Integrated Control Room (ICR) is operated by MIS and issues press releases daily on important public health issues, including the COVID-19 pandemic situation and mass vaccination of COVID-19. For a PHE of localized spread, the role of dissemination and information hub may be played by PHEOC, but in cases of larger epidemics and pandemics a dedicated agency is needed to run as a hub.

9.12 Community preparedness and response plan

60. Community engagement is a crucial part of PHE response. At the community level, there should be a preparedness and response plan. This is perhaps a key lesson learnt in Bangladesh during its current COVID-19 response. To achieve it, emphasis should be put on community self-reliance and resilience before the Government support comes in.

61. Outbreak of any public health emergency may be evident in a community. In that situation, the responsibility of first responder will lie within the community. If preventive and control measures are taken at an early stage, much of the casualties may be averted. So readiness of the community to prevent-detect-response at the primary level may help to limit the spread of adverse event beyond the community.

10. Plan of Actions

Table 7: Plan of Actions

Sl. no	Action to be taken	Responsible agency	Priority
1	Develop Sector specific plans of Ministry of Livestock and Fisheries, and Ministry of Environment Forest and Climate Change (or a single plan)	DLS/ CCF (DGHS will be included for developing a single plan)	Long term
2	Form and activate PHE committees at national and sub-national level	DGHS/ Disease Control/ IEDCR	Short term
3	Develop a framework for mobilizing funds for PHE	Planning wing, MoHFW	Short term
4	Create a calendar for annual simulation exercise for PHE PRP at multi-sectoral level	Disease Control/ Director (Hospital), DGHS	Short term
5	Develop Standard Operating Procedures (SOP) for operational support and logistics	CMSD/ DGHS	Short term
6	Conduct a thorough review and assessment of existing legislation, regulations and other legal instruments related to public health emergency preparedness and response, to identify gaps and	Disease Control/ IEDCR/Director (Hospital)/ Legal focal point, DGHS/ Legal section, MoHFW	Long term

Sl. no	Action to be taken	Responsible agency	Priority
	opportunities for future revisions/new laws to strengthen PHE PRP functions		
7	Enact a comprehensive law for effective implementation of public health emergency response	Disease Control/Director (Hospital)/ Legal focal point, DGHS/ Legal section, MoHFW	Long term
8	Strengthen PHEOC to function as an operation centre for rapid response to PHEs and coordinating centre for response to other hazards which affect human health	IEDCR/ Disease Control/ NCDC/ DGHS	Medium term
9	Sign a Letter of Agreement (LoA) or issue a Government Order to enable Infectious Disease Hospitals as a referral centre for Rapid Response Teams at national and sub-national level	Disease Control/ IEDCR/ IDH	Short term
10	Develop institutional arrangements for occupational health and safety for health care workers	Dept of occupational health, NIPSOM/ BMA/ BSMMU	Long term
11	Strengthen IEDCR for implementing Emergency Risk Communication and Community Engagement (RCCE) plan for preparedness and response to public health emergencies	IEDCR/HEB/ Disease Control/ DGHS	Medium term
12	Develop a community preparedness and response plan	IEDCR/ MoLGRD	Short term
13	Develop terms of reference for PHEOC and the Integrated Control Room at DGHS to avoid both duplication and gray areas	IEDCR/ Disease Control/ NCDC/ MIS/ DGHS	Short term
14	Develop a One Health Dashboard for dissemination of disease surveillance findings of public health importance	One Health Secretariat	Short term

11. Monitoring and Evaluation (M&E)

62. Regular monitoring and evaluation should be conducted by public health emergency committees at relevant tiers. The indicators and outcomes should be identified from this PRP, as well as the timeline agreed for measuring the progress. The M&E should be coordinated with State Party Self-Assessment Annual Report (SPAR) of IHR, Joint External Evaluation (JEE) and similar other M&E conducted at MoFL and MoEF.

Table 8: Monitoring and Evaluation

Sl. no	Indicators	Frequency	Responsibility
1	Updating of risk and vulnerability analysis for infectious hazards	Annual	IEDCR
2	Review of PHE PRP	Bi-annual	IEDCR
2	Review of hazard specific action plans	Annual	DGHS

Sl. no	Indicators	Frequency	Responsibility
3	Updating of sector specific action plans	Annual	DGHS/DLS/ CCF/ OHS
4	Meeting of Public Health Emergency Committees at national and sub-national levels with reports	National: Annual District/ city corporation: six-monthly Upazila: four-monthly	Concerned Coordination Committee
5	Updated report of national and sub-national stockpile of medical and non-medical logistics	Annual	Disease Control, DGHS
6	Annual simulation exercise for IMS and PHEOC	Annual	IEDCR
7	Annual table top exercise for continuation of essential services during public health emergency at all health facilities.	Annual	Hospital and Primary Health Care, DGHS
8	Simulation exercise may be conducted at five years interval	Five yearly	National Technical Committee

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Annexes

Annex 1: Infectious Hazard likelihood, severity, vulnerability, impact and risk level matrix

Type of infectious hazard	Infectious disease	Likelihood	Severity	Vulnerability	Coping capacity	Impact	Confidence	Risk level
Respiratory viruses, Encephalitis	Nipah	Almost certain	High severity	High	Low	Severe	Good	Very high
Respiratory	COVID-19	Almost certain	high severity	High	Partial	Severe	Satisfactory	Very high
Vector borne viruses, Encephalitis	Japanese Encephalitis	Almost certain	High severity	High	Partial	Severe	Satisfactory	Very high
Enteroviruses	Hepatitis E	Almost certain	Moderate severity	Partial	Partial	Moderate	Good	High
Entero bacteria	Cholera	Almost certain	Moderate severity	Very high	Very high	Moderate	Good	High
Vector borne	Malaria	Almost certain	Moderate severity	Partial	High	Moderate	Good	High
Neurotrophic, zoonotic	Rabies	Likely	Very high severity	Very high	High	Severe	Good	High
Entero bacteria, Protozoa, Enteroviruses	Diarrhea	Very likely	Moderate severity	Partial	High	Moderate	Satisfactory	High
Entero bacteria	Leptospirosis	Likely	High severity	High	Low	Severe	Satisfactory	High
Multi-drug resistance respiratory organism	Tuberculosis	Very likely	Moderate severity	Partial	High	Moderate	Good	High
Entero bacteria, Enteroviruses	Foodborne Illness	Almost certain	Low severity	Partial	Partial	Moderate	Satisfactory	High
Respiratory viruses	MERS-CoV	Unlikely	Very high severity	Very high	Partial	Severe	Good	Moderate

Type of infectious hazard	Infectious disease	Likelihood	Severity	Vulnerability	Coping capacity	Impact	Confidence	Risk level
Vector borne	Yellow Fever	Unlikely	Moderate severity	High	Very low	Severe	Unsatisfactory	Moderate
Vector borne	Plague	Unlikely	High severity	High	Low	Severe	Satisfactory	Moderate
Vector borne	West Nile Virus	Unlikely	High severity	Moderate	Very low	Moderate	Unsatisfactory	Moderate
Vector-borne diseases	Chikungunya	Likely	Moderate severity	High	Partial	Moderate	Satisfactory	Moderate
Respiratory viruses	Measles	Likely	Moderate severity	High	High	Moderate	Good	Moderate
Other viruses causing serious diseases in humans	HIV	Likely	Low severity	High	High	Moderate	Good	Moderate
Droplet infection	Mumps	Likely	High severity	Partial	High	Moderate	Good	Moderate
Blood borne viral infection	Hepatitis C	Likely	Moderate severity	Partial	Partial	Moderate	Satisfactory	Moderate
Food and water borne bacterial infection	Typhoid	Likely	Moderate severity	Partial	Partial	Moderate	Satisfactory	Moderate
Other viruses causing serious diseases in humans	Hepatitis A	Likely	Low severity	Low	Low	Moderate	Good	Moderate
Other viruses causing serious diseases in humans	Hepatitis B	Likely	Moderate severity	Partial	Partial	Moderate	Satisfactory	Moderate
Respiratory virus	Pandemic influenza	Likely	Moderate severity	High	High	Moderate	Good	Moderate

Type of infectious hazard	Infectious disease	Likelihood	Severity	Vulnerability	Coping capacity	Impact	Confidence	Risk level
Other viruses, causes of serious diseases (Filovirus)	Ebola	Unlikely	Very high severity	Very high	Very low	Critical	Satisfactory	Moderate
Arboviruses	Dengue	Very likely	Moderate severity	High	Low	Severe	satisfactory	Low
Enteroviruses	Poliomyelitis	Very unlikely	Low severity	Low	Very high	Minor	Satisfactory	Very low
Arbovirus	Zika	Unlikely	Moderate severity	High	Partial	Moderate	Unsatisfactory	Low
Other infectious hazards (Bacteria)	Diphtheria	Unlikely	High severity	Low	High	Moderate	Good	Low
Other infectious hazards	Cutaneous Anthrax	Likely	Low severity	Low	Partial	Minor	Satisfactory	Low
Other infectious hazard (Uncertain)	Disease X	Very unlikely	Very high severity	Very high	Very low	Critical	Good	Low
Other viruses causing serious diseases in humans	Meningitis	Likely	Very low severity	Low	Low	Minor	Satisfactory	Low

Annex 2: Infectious disease hazard consequences & exposure frequency

Hazard	Hazard profile	Hazard score (Range 9-27)	Health Consequences	Scale	Exposure	Frequency
Nipah	Nipah: Nipah virus infection, Reservoir: Fruit Bats, (endemic) annual outbreak in every year in winter season, highly fatal, predominantly seen in north west region. Diagnosis by lab confirmation (pandemic potential)	24	Immediate: fever may be low grade, cough, encephalitis, Secondary: neurologic manifestation/ sequela, psychological sequel	Western region of Bangladesh, mostly male, adult population, low socioeconomic society,gachi, raw date palm sap consumer	Mainly Northwest region of the country, but can occur in any part depending on the presence of reservoir and all age group	Perennial
COVID-19	COVID-19: Infectious viral disease, reservoir unknown:), COVID-19 (pandemic) SARS – CoV-2, Diagnosis by lab confirmation, Human to human transmission	24	Immediate: Fever, cough, breathlessness, weakness, body ache; cytokine storm Secondary: Multi organ involvement & long COVID, post COVID complications	Global	Exposure: All age group	Random
Japanese Encephalitis	Lab based diagnosis, vector borne, viral infection; encephalitis in severe form	18	Immediate: fever, headache (prodromal syndrome), 1/3 of cases develop encephalitis, among them 50% may cause death; Secondary: may cause neurological sequel of encephalitis cases	sporadic cases all over the country,	(All age group (Mostly young and adult)	Perennial

Hazard	Hazard profile	Hazard score (Range 9-27)	Health Consequences	Scale	Exposure	Frequency
Hepatitis E	Causes epidemic of jaundice, prevalent in south east Asian region, pregnant are vulnerable, Outbreaks are reported	20	immediate: sickness, death	Geographical area: Dhaka, Chattogram, Raj Shahi, Khulna, Sylhet, Population: Urban	All age group (children and pregnant women vulnerable)	Frequent
Cholera	Poor sanitary conditions unsafe water supply	17	immediate: Dehydration, electrolyte imbalance Secondary: Severe nutrition & growth failure	Geographical area: southern part of Bangladesh Population: Urban & rural	All age group	Recurrent
Malaria	Parasitic disease, easy to diagnose, Complicated in cerebral malaria	15	immediate: anemia, hepatitis Secondary: liver failure and jaundice, shock, pulmonary edema acute respiratory distress syndrome (ARDS)	Geographical area: Hill tracts Population: rural	All age group (living/travel in hill tract area)	Perennial
Rabies	Rabies: High endemic viral disease, children are at risk fatality 100%. Transmission by rabid-animal bite/scratch, diagnosis mostly clinical based, lab diagnosis essential	16	Immediate: Fever, Headache, vomiting, confusion, Secondary: Neurological manifestation (mainly hydrophobia), Death	Nation wide	All over the country with prevalence rate is high in cities.	Perennial
Diarrhoea	Diarrhoea : (Bacterial, viral and parasitic, Rota virus: mostly among children) endemic origin,	15	Immediate: loose motion, dehydration, anorexia, vomiting,	Nation wide	All age group	Perennial

Hazard	Hazard profile	Hazard score (Range 9-27)	Health Consequences	Scale	Exposure	Frequency
	outbreak is reported, confirmation by lab diagnosis		confusion, weakness, typhoid, hepatitis Secondary: nutrition & growth failure, multi organ failure, cancer			
Leptospirosis	Leptospirosis: zoonotic disease, reservoir: Animal (mostly rodents), confirmation by lab diagnosis, outbreaks are reported	17	Immediate: Fever, jaundice, body ache, chill, abdominal pain, red eye Secondary: hepatorenal failure	Nation wide	Farmers, fishermen	Frequent
Tuberculosis	Long duration of treatment, causing noncompliance with development of MDR/XDR tuberculosis	17	Immediate: fever with generalized weakness, cough, Secondary: if untreated / poorly treated may developed MDR/XDR Tuberculosis with suppression of immunity.	Nation wide	Slum people, People with overcrowded place, people with low socio-economic condition, all age group exposed to risk factors; Immunocompromised person	Perennial
Foodborne Illness	Outbreak potential may be caused by bacterial, viral or protozoal organism, toxins, chemicals	14	Immediate: Hospitalization varies with severity Secondary: malnutrition with suppression of immunity & growth failure	Nation wide	Children and young adult people	Perennial

Hazard	Hazard profile	Hazard score (Range 9-27)	Health Consequences	Scale	Exposure	Frequency
MERS-CoV	No known cases; risk of importation from travelers; can cause severe disease. High risk of nosocomial transmission	21	Immediate: High CFR. Severe respiratory disease. Small proportion of asymptomatic cases (9.8%). Secondary: Multi organ failure	Chittagong division (high proportion of overseas workers)	Migrant workers, pilgrims (>150,000)	Random
Yellow Fever	lab based; viral; case fatality low	23	immediate: sickness, death secondary: chronic hepatitis	Not found in Bangladesh, Urban	Travelers from endemic countries	Random
Plague	transmit through Rat flea	18	Immediate: respiratory distress, Pneumonia, septicemia secondary: respiratory failure	Geographical area: Population: rural	Rural population, Farmers, Waste – management workers	Random
West Nile Virus	potentially life-threatening viral infection, pass to animals and humans if they are bitten by an infected mosquito.	22	Immediate: develop a fever, headache, vomiting, or a rash, encephalitis or meningitis or West Nile poliomyelitis secondary: neurological disease and death in people	Geographical area: Dhaka Population: Urban	Population of Urban area and northern part of country, travelers from endemic region	Random
Chikuingunya	Chikungunya infection: Vector borne (Aedes mosquito) Chikungunya viral infection.	20	Immediate: high fever, joint pain, body ache, joint swelling,	Mainly urban area	High incidence in urban area	Frequent

Hazard	Hazard profile	Hazard score (Range 9-27)	Health Consequences	Scale	Exposure	Frequency
	Seasonal outbreak, Diagnosis by lab confirmation		arthritis, arthralgia, additional- nausea, vomiting, anorexia, Secondary: Arthritis , Outbreak & epidemic prone			
Measles	Epidemic-prone syndrome caused by viral pathogens, spread by droplets and close contact. Only human reservoirs.	22	Immediate consequence: high fever, later suppression of immunity with malnourishment and making vulnerable to other severe diseases Secondary; Vit A deficiency, & Malnutrition	Lower vaccination coverage: urban slums (Dhaka predominantly). Sylhet CC, Mymenshing. Hard to reach area and hilly area	Children, FDMN, Area with low vaccine coverage	Recurrent
HIV	Caused by viral pathogen, transmitted by direct contact, asymptomatic transmission with high CFR	22	immediate consequence: Flu like symptoms fever, later develop AIDS due to impaired immunity level, with high CFR Secondary; AIDS and complication with multi organ failure	sex workers, MSM, injectable drug users who lives in twenty priority districts (urban setting)	Injectable drug user, Sex workers, migrant worker, clients of sex workers, MSM	Frequent
Mumps	Mumps: Mumps viral disease, Probable diagnosis clinically	21	Immediate: sore throat, fever, body ache, difficulty in deglutition,	Nation wide	School going children, HCW, travelers from outbreak area	Recurrent

Hazard	Hazard profile	Hazard score (Range 9-27)	Health Consequences	Scale	Exposure	Frequency
			Secondary: Carditis, otitis, orchitis, male infertility			
Hepatitis C	Hepatitis C: Hepatitis C viral infection, main mode of transmission through contaminated blood. Diagnosis by lab confirmation, vaccine not available, treatment available	23	Immediate: fever, jaundice, anorexia, weakness. Secondary: Hepatic carcinoma, Hepatic encephalopathy	Nation wide	Injectable Drug Users	Recurrent
Typhoid	Typhoid: Typhoid a bacterial infection, Food-borne transmission, vaccine & medication available, diagnosis by lab confirmation	21	Immediate:: abdominal pain, loose motion, fever, anorexia, vomiting, Secondary: Intestinal perforation, Neuropsychiatric complications	Nation wide	Poor communities and vulnerable groups including children, people lacking safe-water supply, street-food takers, people with poor hygiene	Recurrent
Hepatitis A	Food / water borne disease with outbreak potential caused by viral pathogen	19	Immediate: Most cases mild to moderate, hepatitis with Jaundice, prone to acute hepatic failure Secondary: Epidemic potential	Urban area	Children, slum people and people with lower middle class, people who lives in crowded place, people with poor hygiene	Frequent
Hepatitis B	Caused by viral pathogen, transmitted by direct contact, asymptomatic transmission	18	Immediate consequence: Hepatitis, later Chronic liver disease, occurrence of	Nationwide	Drug abuser, sex workers, Health care professionals, vertical transmission. unsafe injection.	Frequent

Hazard	Hazard profile	Hazard score (Range 9-27)	Health Consequences	Scale	Exposure	Frequency
			asymptomatic transmission Secondary: Hepatic Cirrhosis with Ca- liver			
Pandemic influenza	Lab based, viral, airborne droplet infection	23	immediate: Flu like syndromes, respiratory distress secondary: Respiratory failure	Geographical area: whole country Population: poultry industry	poultry worker, live bird market worker, wild bird hunter, illegal wild bird trader	Random
Ebola	Ebola virus infection, causes workers but highly fatal, Diagnosis by lab confirmation (No case reported yet in Bangladesh). Vaccine have been developed.	21	Immediate: High CFR, Secondary: multi organ involvement	(African region) not found in Bangladesh	Bush meat, Health care provider, infected body fluid	Random
Dengue	Epidemic-prone, reliant on sentinel surveillance.	18	Immediate: most cases mild/moderate, Small proportion: Secondary: DSS/DHF with multi organ failure	Nation-wide (64 districts); predominantly urban	Entire urban population	Perennial
Poliomyelitis	Eliminated in Bangladesh. Surveillance continues for vaccine-derived cases. High vaccination coverage (>90%).	19	Immediate: consequences: acute flaccid paralysis. Secondary: socio-economic and psychological burden	Eliminated. Lower vaccine coverage: urban slums (Dhaka predominantly). Sylhet CC, Mymensingh.	Children with low vaccination coverage	Rare
Zika	Lab based, high risk for pregnant women	23	Immediate: microcephaly and other congenital	Geographical area: Dhaka Population: Urban	Immunity low, pregnant, neonates and older child	Random

Hazard	Hazard profile	Hazard score (Range 9-27)	Health Consequences	Scale	Exposure	Frequency
			malformations. Miscarriage in pregnant. secondary: linked to Guillain-Barre syndrome			
Diphtheria	Serious bacterial infection (Diagnosis by lab confirmation). Vaccine available under routine Immunization of EPI	22	immediate: Respiratory failure due to pseudo membrane formation secondary: Damage to the heart muscle (myocarditis) Nerve damage (polyneuropathy) Loss of the ability to move (paralysis) Kidney failure	Geographical area: Cox's Bazar Population: FDMN, children, young adults	Immunity low in Refugee camp, Cox's Bazar	Random
Cutaneous Anthrax	Zoonotic disease with outbreak potential caused by bacterial pathogen	12	Immediate consequence: skin ulcer with good response to treatment, Secondary: Necrotizing skin ulcer, if untreated can causes serious systemic consequence	Meherpur, Sirajganj, Pabna	Exposure to affected animal, Butcher, Slaughter person and meat handler Meherpur, Sirajgong, Pabna	Recurrent
Disease X	Unknown disease, of serious nature, pandemic potential	24	Immediate: high mortality and	Global	Unpredictable	Random

Hazard	Hazard profile	Hazard score (Range 9-27)	Health Consequences	Scale	Exposure	Frequency
	required wide attention, need lab confirmation		morbidity, effect on health system, dropdown of national economy,			
Meningitis	Epidemic-prone syndrome caused by viral and bacterial pathogens, spread by droplets and close contact. No animal/environmental reservoirs. Low awareness of disease	20	Immediate consequences: Hospitalization, encephalitis, impaired consciousness. Secondary: Neuro Sequelae after recovery	Countrywide, can affect all age group old age and young adults are more vulnerable group	Infected persons, young and old age. group.	**Random**

Annex 3: Annual Risk calendar

	Bangladesh											*Date of assessment*		<date>
Subgroup of hazard	**Hazard**	**Risk level**	January	February	March	April	May	June	July	August	September	October	November	December
BIOLOGICAL	**Nipah**	Very high												
BIOLOGICAL	**COVID-19**	Very high												
BIOLOGICAL	**Japanese Encephalitis**	Very high												
BIOLOGICAL	**Hepatitis E**	High												
BIOLOGICAL	**Cholera**	High												
BIOLOGICAL	**Malaria**	High												
BIOLOGICAL	**Rabies**	High												
BIOLOGICAL	**Diarrhoea**	High												
BIOLOGICAL	**Leptospirosis**	High												
BIOLOGICAL	**Tuberculosis**	High												
BIOLOGICAL	**Foodborne Illness**	High												
BIOLOGICAL	**MERS-CoV**	Moderate												
BIOLOGICAL	**Yellow Fever**	Moderate												
BIOLOGICAL	**Plague**	Moderate												
BIOLOGICAL	**West Nile Virus**	Moderate												
BIOLOGICAL	**Chikingunya**	Moderate												
BIOLOGICAL	**Measles**	Moderate												
BIOLOGICAL	**HIV**	Moderate												
BIOLOGICAL	**Mumps**	Moderate												
BIOLOGICAL	**Hepatitis C**	Moderate												
BIOLOGICAL	**Typhoid**	Moderate												
BIOLOGICAL	**Hepatitis A**	Moderate												
BIOLOGICAL	**Hepatitis B**	Moderate												
BIOLOGICAL	**Pandemic influenza**	Moderate												
BIOLOGICAL	**Ebola**	Moderate												
BIOLOGICAL	**Dengue**	Low												
BIOLOGICAL	**Poliomyelitis**	Very low												
BIOLOGICAL	**Zika**	Low												
BIOLOGICAL	**Diphtheria**	Low												
BIOLOGICAL	**Cutaneous Anthrax**	Low												
BIOLOGICAL	**Disease X**	Low												
BIOLOGICAL	**Meningitis**	Low												

Annex 4: Working relation between IDH, the Disease Control Unit of DGHS and IEDCR

Why a document is necessary for defining the roles of and relation between IEDCR, Disease Control Unit and IDH?

The IEDCR, Disease Control unit of DGHS, IDH – all work under the Directorate General of Health Services. Usually, all these institutions and units work for a common purpose of providing health services to the people. A document defining the roles and relations among them will further strengthen the working relation between them. It will also complement and supplement each other's resources for the management of public health emergencies.

Infectious Disease Hospital (IDH)

The Infectious Disease Hospitals form a national network across the country of Bangladesh. There are seven (7) Infectious Disease Hospitals in the divisional cities, including IDH Dhaka. The 100-bed Infectious Diseases Hospital is located at Mohakhali, Dhaka. It was established in 1956. It is a specialized hospital for infectious diseases. It became famous due to its contribution to smallpox hospitalization and control. All types of highly contagious and less contagious infectious diseases including encephalitis, tetanus (neonatal and non-neonatal), AIDS with different complications (only one service hospital for HIV/AIDS in Bangladesh), animal bites with suspected rabies, rabies, enteric fever, kala-azar, filariasis, unexplained fever, chicken pox, viral hepatitis, mumps, measles, rubella, Nipah virus infection, COVID-19, influenza and other infectious diseases are clinically managed here. The hospital has a planning of 10-bed isolation unit, 5-bed ICU with negative pressure facilities as well as 10-bed HVAC (Heat Ventilated Airway Conditioning). The Plan for restructuring has been submitted to the MoHFW. The IDH houses the office of the National Rabies Prevention & Control Program, and all the IDHs at divisional level house the associated District Program (District Rabies Prevention & Control Program). It also acts as a referral center for patient management under Disease Control unit, DGHS.

In every district hospital, there are dedicated wards/beds for infectious disease and isolation. In several districts it is known as the diarrhoea ward and it is located in a separate building for isolation purpose. In 2008, as part of pandemic influenza preparedness efforts, all district and Upazila hospitals earmarked isolated space for clinically managing influenza patients. Those isolated beds were known as the 'Influenza ward'. The facilities were also provided with personal protective equipment (PPE). During 'Nipah season' (winter season) the hospitals in the 'Nipah belt' (Rangpur, Rajshahi divisions; Faridpur, Kushtia districts) are provided with PPE including respirators.

The IDHs at all locations in Bangladesh are administratively under the Director (Hospital) of DGHS.

Bangladesh Institute of Tropical and Infectious Diseases (BITID)

It is a government medical postgraduate institute and hospital situated in Sitakunda, Chattogram. It was established in 2013. It is associated with the Chittagong IDH, which is adjacent, and consists of a 20 bed facility. The BITID has an aesthetic modern building and is situated in a place where it has all the potentials to develop itself as a center of excellence in the field of infectious diseases research and treatment. One of the main aspects of the activity of this institute is research in the field of tropical-infectious diseases. The hospital section of BITID is under Director (Hospital), DGHS. The academic section operates under Directorate General of Medical Education (DGME).

Public Health Emergency – Infectious Hazards and role of IDH and BITID

From their inception, the IDHs have managed patients affected by infectious diseases. Most of the patients are referred from general hospitals or practicing physicians. The IEDCR conducts outbreak investigations and response, and refers infectious patients which are detected during epidemiological investigations. In districts where IDH do not exist, patients are referred to the medicine unit of the District Hospital or Medical College Hospitals, from where they are clinically managed in isolated infectious wards.

Disease Control Unit, DGHS

The Disease Control Unit of DGHS routinely controls infectious disease after the outbreak investigation and response by the respective RRT. Its primary role is through program activities, such as implementation for prevention and control of infectious and tropical diseases. If required, the Disease Control Unit deploys Medical Teams in the affected area, providing logistics. The Disease Control Unit keeps close contact with IEDCR and the RRTs for following protocols developed during outbreak investigation, for managing the cases.

IEDCR

The PHEOC is stationed at IEDCR and the Director is the Member-Secretary of PHEOC. The Director General of Health Services is the Chairperson of the Steering Committee of PHEOC. One of the components of outbreak investigation and response is detection by epidemiological and laboratory method. It is particularly important for emerging infectious diseases. The scientists of IEDCR (including FETP graduates and fellows), clinicians and other relevant experts contribute to this management and detection protocol. The Disease Control Unit, DGHS take over the charge of patient management of the outbreak area, once the protocol is established. The NRRT is deployed by PHEOC and local RRTs conduct rapid response taking advice and instruction from PHEOC. The RRT also support the clinicians to decide the referral of the patients to an appropriate health facility. The IDH at Dhaka and divisional level works as the first referral centre for infectious disease.

Areas of collaboration & cooperation

a) Clinical management: The experience of the clinicians may contribute to provide clinical management of the patients referred from the surveillance and outbreak investigation sites

b) Isolation facilities: The IDH provides the isolation facilities for the infectious patients. IDH should be supported with logistics and resources for functioning an appropriate Infection Prevention Control (IPC) system. Logistics can be provided from Disease Control unit of DGHS and IPC training can be provided by IEDCR.

c) Detection facilities: The detection of health condition may be done clinically and by laboratory investigation. The IDH have limitation for laboratory facilities, which should be strengthened by IEDCR and Disease Control unit of DGHS. IEDCR will also provide Laboratory support by training of the IDH-Lab personnel and diagnosis of the EIDs.

d) Documentation and research: The RRT and IDH may collaborate among each other and with other relevant institutes for documentation, data management and research. The IEDCR and IDH can work together for documentation and research activities through data & information sharing and data visualization in the One Health Event based Surveillance (OH EBS) Data Dashboard at One Health Secretariat (OHS)/IEDCR.

Annex 5: Role of different sectors in public health emergency preparedness and response

		Preparedness phase	Prevention/mitigation phase	Response phase	Recovery phase
Health sector	IEDCR (outbreak/ epidemic/ pandemic – all scenarios)	Provide technical support to the govt and non-govt sector through expertise and institutional experience	Technically support the govt and non-govt sector through expertise and institutional experience Provide training for Human resource development (Surveillance, Outbreak response and Lab capacity)	Initiate rapid response and build a model response mechanism to be followed by implementing actors	Recommend for recovery 'Plan of action'
	Disease Control (outbreak/ epidemic/ pandemic – all scenarios)	Implement and coordinate preparedness activities and focal point for building core capacities required by IHR 2005	Implement and coordinate prevention/ mitigation programs for infectious hazards	Implement response programs for infectious hazards	Develop recovery programs for infectious hazards
	MIS, DGHS (outbreak/ epidemic/ pandemic – all scenarios)	Public Health Data Hub Develop surge capacity for data management during public health emergency	Provide real time information in prevention phase. Manage data surge during the mitigation	Provide real time information Prepare Reports and share with relevant/concerned departments	Provide real time information Update Reports and share with relevant/concerned departments
	NCDC, DGHS (outbreak/ epidemic/	Develop capacity for non-communicable disease prevention and control, management of natural	Coordinate & Implement prevention/ mitigation programs for natural hazards	Implement response programs for natural hazards	Develop 'Plan of action' and implement the programs

		Preparedness phase	Prevention/mitigation phase	Response phase	Recovery phase
	pandemic – all scenarios)	hazards, as per IHR 2005 requirements			
	Director (Hospital), DGHS (outbreak/ epidemic/ pandemic – all scenarios)	Develop capacity for health facilities, laboratories and diagnostics (including private sector) as per IHR 2005 requirements Develop surge capacity (including private sector) to enable continuation of essential non-pandemic health care during pandemic	Implement infection prevention and control programs in health facilities, laboratories and diagnostics Arrange &Provide training for Human resource development {Clinical management, Infection Prevention and Control (IPC)}	Implement infection prevention and control programs in health facilities, laboratories and diagnostics	Follow-up the IPC practice and implement infection prevention and control programs in health facilities, laboratories and diagnostics
	Director (Admin), DGHS (outbreak/ epidemic/ pandemic – all scenarios)	Develop surge capacity for mobilizing human resources (including private sector)	Implement human resource management plan Prepare database of trained human resources for placement as per need	Implement human resource management plan Ensure trained human resource placement as per need	Implement human resource management plan
	Other concerned Directors, DGHS (outbreak/ epidemic/ pandemic – all scenarios)	Develop capacity in relevant field as per IHR 2005 requirement in coordination with IHR NFP and IHR focal institute	Develop" Action Plan" and implement programs in respective field	Implement programs in respective field	Implement programs in respective field

		Preparedness phase	Prevention/mitigation phase	Response phase	Recovery phase
	Tertiary hospitals (including private sector) (outbreak/ epidemic/ pandemic – all scenarios)	Develop surge capacity for hospitals, conduct simulation exercise annually Form and make functional Hospital IPC Committee Annual training program on IPC for the health care providers	Implement hospital management program	Implement triage-based hospital management services/program Ensure IPC	Implement hospital management program
	Infectious Disease Hospital (IDH) (outbreak/ epidemic/ pandemic – all scenarios)	Develop surge capacity for hospitals, conduct simulation exercise annually Form and make functional Hospital IPC Committee Annual training program on IPC for the health care providers	Implement hospital management program	Implement triage-based hospital management services/program Ensure IPC	Implement hospital management program
	District hospitals (including private sector) (outbreak/ epidemic/ pandemic – all scenarios)	Develop surge capacity for hospitals, conduct simulation exercise annually Form and make functional Dist. Hospital IPC Committee Annual training progam on IPC for the Health care providers	Implement hospital management program	Implement triage-based hospital management program Ensure IPC	Implement hospital management program
	Upazila hospitals (including private sector)	Develop surge capacity for hospitals, conduct simulation exercise annually	Implement hospital management program	Implement hospital	Implement hospital management program

		Preparedness phase	Prevention/mitigation phase	Response phase	Recovery phase
	(outbreak/ epidemic/ pandemic – all scenarios)	Form and make functional Upazila Hospital IPC Committee Annual training program on IPC for the Health care providers		management program Ensure IPC	
	Community clinics (outbreak/ epidemic/ pandemic – all scenarios)	Develop surge capacity for clinic, conduct simulation exercise annually	Implement clinic management program	Implement clinic management program	Implement clinic management program
	Directorate General of Medical Education (DGME) (epidemic/ pandemic scenario)	Manpower development (including private sector) for public health with a focus on requirement for managing public health emergency	Deploy medical trainees as required, provide scientific support	Act in collaboration with other stakeholders	Act in collaboration with other stakeholders
	Directorate General of Family Planning (DGFP) (epidemic/ pandemic scenario)	Provide orientation to personnel for managing public health emergency	Deploy personnel as required	Act in collaboration with other stakeholders	Act in collaboration with other stakeholders

		Preparedness phase	Prevention/mitigation phase	Response phase	Recovery phase
	Director General of Nursing and Midwifery (DGNM) (outbreak/ epidemic/ pandemic – all scenarios)	Develop surge capacity for hospitals, conduct simulation exercise annually Play respective role in Hospital IPC Committee Annual training program on IPC for the health care providers	Implement hospital management program	Implement triage-based hospital management services/program Ensure IPC	Implement hospital management program
	Directorate General of Drug Administration (DGDA) (epidemic/ pandemic)	Develop surge capacity (including private sector) as required for IHR 2005 Dedicated/ Ensure resource allocation	Collaboration in prevention/ mitigation as required	Collaboration in response as required	Collaboration in recovery as required
	Essential Drug Company Limited (EDCL) (epidemic/ pandemic)	Develop surge capacity as required for IHR 2005 Dedicated/ Ensure resource allocation	Collaboration in prevention/ mitigation as required	Collaboration in response as required	Collaboration in recovery as required
Livestock	Department of Livestock Services (DLS) (outbreak/ epidemic/ pandemic – all scenarios)	Develop capacity for zoonotic hazards as per IHR 2005, joint surveillance and data sharing	Collaboration in prevention/ mitigation as required Reporting of EIDs or Zoonotic disease events	Collaboration in response as decided by One Health Secretariat	Collaboration in recovery as decided by One Health Secretariat
	Concerned Offices at national/sub-	Develop capacity for zoonotic hazards as per IHR 2005	Collaboration in prevention/ mitigation as required	Collaboration in response as decided by One	Collaboration in recovery as decided by One Health

		Preparedness phase	Prevention/mitigation phase	Response phase	Recovery phase
	national level (including private sector) (outbreak/ epidemic/ pandemic – all scenarios)			Health Secretariat through DLS	Secretariat through DLS
Forest and environment	Wildlife centre (outbreak/ epidemic/ pandemic – all scenarios)	Develop capacity for ecological hazards as per IHR 2005	Collaboration in prevention/ mitigation as required Reporting of EIDs or Zoonotic disease events	Collaboration in response as decided by One Health Secretariat	Collaboration in recovery as decided by One Health Secretariat
	Concerned Offices at national/sub-national level (including private sector) (outbreak/ epidemic/ pandemic – all scenarios)	Develop capacity for ecological hazards as per IHR 2005	Collaboration in prevention/ mitigation as required	Collaboration in response as decided by One Health Secretariat through CCF	Collaboration in recovery as decided by One Health Secretariat through CCF
Public administration	Establishment division (epidemic/ pandemic scenario)	Develop surge capacity as required for IHR 2005 Dedicated/ Ensure resource allocation	Collaboration in prevention/ mitigation as required	Collaboration in response as required	Collaboration in recovery as required

		Preparedness phase	Prevention/mitigation phase	Response phase	Recovery phase
	District and Upazila public administration (epidemic/ pandemic scenario)	Develop surge capacity as required for IHR 2005	Collaboration in prevention/ mitigation as required Part of District Surveillance and response team	Collaboration in response as required	Collaboration in recovery as required
Ministry of Home	Public Safety Division: Police (epidemic/ pandemic scenario)	Develop surge capacity as required for IHR 2005	Collaboration in prevention/ mitigation as required	Collaboration in response as required	Collaboration in recovery as required
	Public Safety Division: Border Guard Bangladesh (BGB) (epidemic/ pandemic scenario)	Develop surge capacity as required for IHR 2005	Collaboration and coordination in prevention/ mitigation as required	Collaboration and coordination in response as required	Collaboration in recovery as required
	Public Safety Division: Bangladesh Ansar and Village Defence Party (Ansar and VDP) (epidemic/ pandemic)	Develop surge capacity as required for IHR 2005	Collaboration and coordination in prevention/ mitigation as required	Collaboration and coordination in response as required	Collaboration in recovery as required
Ministry of Disaster	Disaster Management Bureau (DMB)	Update contacts and links with DGHS, NCDC, IEDCR	Collaboration and coordination in prevention/ mitigation as required	Collaboration and coordination in	Collaboration in recovery as required

		Preparedness phase	Prevention/mitigation phase	Response phase	Recovery phase
Management and Relief	(epidemic/ pandemic scenario)			response as required	
Honorable Prime Minister's Office	Prime Minister's Office (PMO) (pandemic)	Monitor and evaluate implementation of pandemic preparedness programs on behalf of HPM	Overall direction	Overall direction	Gradually scaling down to inter-pandemic phase
	NGO Affairs Bureau (pandemic)	Prepare and maintain a database of NGOs running humanitarian assistance programme and submit all the information to the Ministry of Health and Family Welfare; Instruct relevant NGOs to be prepared for pandemic response.	Assist NGOs in releasing humanitarian assistance goods sent by international agencies/organizations within the shortest possible time from the points of entry Instruct all NGOs to assist District and Upazila Pandemic Management Committees when necessary;	Assist NGOs in releasing humanitarian assistance goods sent by international agencies/organizations within the shortest possible time from the points of entry Instruct all NGOs to assist District and Upazila Pandemic Management Committees when necessary;	Collaboration in recovery as required

		Preparedness phase	Prevention/mitigation phase	Response phase	Recovery phase
Cabinet Division	Cabinet Division (pandemic)	Coordinate implementation of pandemic preparedness across whole-of-government and whole-of-society	Provide instructions to concerned ministries and local administrations regarding implementation of pandemic response,	Provide instructions to concerned ministries and local administrations regarding implementation of pandemic response	Gradually scaling down to inter-pandemic phase
Armed Forces Division	Armed Forces Division (pandemic)	Develop pandemic preparedness strategies; Arrange training and simulation exercises periodically	Operate a control room along with the Monitoring and Coordination Cell in the Prime Minister's Office and keep active 24/7; Deploy armed forces (army, navy, air force) as required by Incident Command of pandemic	Operate a control room along with the Monitoring and Coordination Cell in the Prime Minister's Office and keep active 24/7; Deploy armed forces (army, navy, air force) as required by Incident Command of pandemic	Collaboration in recovery as required
Ministry of Defence	Bangladesh Meteorological Department (epidemic/ pandemic)	Maintain database for use of epidemiological prediction of climate sensitive epidemic/ pandemic	Ensure full-time functioning of communication systems to quickly disseminate weather alert messages	Ensure full-time functioning of communication systems to quickly	Provide data as required

		Preparedness phase	Prevention/mitigation phase	Response phase	Recovery phase
				disseminate weather alert messages	
	Bangladesh Space Research and Remote Sensing Organization (SPARRSO) (epidemic/ pandemic)	Maintain database for use of epidemiological prediction of climate sensitive epidemic/ pandemic	Ensure full-time functioning of communication systems to quickly disseminate weather alert messages	Ensure full-time functioning of communication systems to quickly disseminate weather alert messages	Provide data as required
Ministry of Agriculture	Department of Agricultural Extension (DAE) (outbreak/ epidemic/ pandemic – all scenarios)	Surveillance for entomological vectors of public health importance, unintentional pesticide poisoning	Collaboration in prevention/ mitigation as required	Collaboration in response as required	Collaboration in recovery as required
Ministry of Information	Mass media (outbreak/ epidemic/ pandemic – all scenarios)	Direct radio, television, news media, Department of Information (Press Information Department), Department of Mass Communication and Department of Films & Publications to conduct risk communication related to PHE on the mass media	Operate the control room on a 24/7 basis; Conduct emergency risk communication as requested by designated institute/ committee for RCCE	Operate the control room on a 24/7 basis; Conduct emergency risk communication as requested by designated institute/ committee for RCCE	Continue disseminating health promotion and disease prevention messages

		Preparedness phase	Prevention/mitigation phase	Response phase	Recovery phase
		(electronic and print media, social media and online)			
Ministry of Post, Telecommunication and Information Technology (MoPT&IT) (epidemic/ pandemic)	Division of Post and Telecommunication (epidemic/ pandemic)	Establish a network with all mobile phone companies and use it to send early warning messages speedily to local people; Include a toll-free message system in the policy to send alert signals to mobile phones during a disaster.	Keeping system ready for urgent delivery of PHE related goods; Keeping communication channel ready for rapid response	Keeping system ready for urgent delivery of PHE related goods; Keeping communication channel ready for rapid response	Collaboration with other stakeholders as required
	Information and Communication Technology (ICT) Division (epidemic/ pandemic)	Develop software for epidemic/ pandemic management in collaboration with relevant experts in public health	Provide scientific support for digital data management	Provide scientific support for digital data management	Provide scientific support for digital data management
Ministry of Local Government, Rural Development,, and Cooperatives	Local government division (outbreak/ epidemic/ pandemic – all scenarios)	Orient community leaders about role of community in disease surveillance, public health and social measures, infection prevention and control, epidemiological investigation and rapid response	Community involvement in RCCE	Community involvement in RCCE	Community involvement in RCCE

		Preparedness phase	Prevention/mitigation phase	Response phase	Recovery phase
	Department of Public Health Engineering (DPHE) (outbreak/ epidemic/ pandemic – all scenarios)	Maintain water and sanitation hygiene (WASH) in urban and rural settings	Ensure WASH facilities in the affected area as per request of rapid response team	Ensure WASH facilities in the affected area as per request of rapid response team	Evaluate the WASH facilities to improve
Ministry of Housing and Public Works	Ministry of Housing and Public Works (pandemic)	Make plan to construct permanent and temporary emergency health facilities to meet the surge during pandemic	Construct community isolation/ quarantine facilities as per requirement	Construct community isolation/ quarantine facilities as per requirement	Make plan to convert temporary facilities for other community purpose
	Urban Development Directorate (UDD) (pandemic)	Make plan to make temporary shelter for urban poor and floating population to enforce public health and social measures for pandemics	Construct community shelters as per requirement	Construct community shelters as per requirement	Make plan to convert temporary shelters for other community purpose
Ministry of Finance	Finance Division (pandemic)	Develop policies on budget allocation by following the instructions of the NPMC and assist in preparing a pandemic preparedness ans response fund; Integrate PHE management policies and practices in the National Economic	Undertake arrangements and ensure quick allocation of funds for pandemic management; Establish close coordination with the Ministry of Health and Family Welfare, and NPMC	Undertake arrangements and ensure quick allocation of funds for pandemic management; Establish close coordination with the	Revise financial policies in light of the pandemic experience

		Preparedness phase	Prevention/mitigation phase	Response phase	Recovery phase
		Development Process and Policy		Ministry of Health and Family Welfare, and NPMC	
	Economics Relations Division (ERD) (pandemic)	Establish networks with multilateral and bilateral partners to receive quick international assistance during pandemic and undertake steps to receive funds from development partners	Prepare documents with the assistance of the MOHFW, if international assistance is required for pandemic management	Undertake initiatives to receive humani-tarian aid from development partners or international agencies, as per the demand and request of the MOHFW.	Collaborative activities with other stakeholders
	Internal Resources Division (IRD) (epidemic/ pandemic)	Prepare necessary policies/guidelines in the light of existing acts to entirely rebate or reduce VAT/tax from the materials needed for epidemic/ pandemic and humani-tarian assistance activities	Simplify the import process of humanitarian aid materials/goods and undertake arrangements for quick customs clearance; Undertake arrangements to provide tax clearance certificates for quick release of humanitarian aid materials; Assist the port authority to apply a tax waiver for materials arrived for	Simplify the import process of humanitarian aid materials/goods and undertake arrangements for quick customs clearance; Undertake arrangements to provide tax clearance	Collaborative activities with other stakeholders

		Preparedness phase	Prevention/mitigation phase	Response phase	Recovery phase
			humanitarian aid via sea, land and air according to government instructions;	certificates for quick release of humanitarian aid materials; Assist the port authority to apply a tax waiver for materials arrived for humanitarian aid via sea, land and air according to government instructions;	
	National Board of Revenue (NBR) (epidemic/ pandemic)	Take necessary actions to waive/reduce VAT/tax of the materials required for risk reduction and emergency response activities in the light of existing policies, and if needed issue circulars;	Assist the import of humanitarian aid materials and take measures to expedite clearance; Arrange for issuing customs clearance for speedy release of humanitarian aid materials; Assist the port authorities to ensure prompt unloading of humanitarian aid materials and tax exemptions of humanitarian assistance at	Assist the import of humanitarian aid materials and take measures to expedite clearance; Arrange for issuing customs clearance for speedy release of humanitarian aid materials;	Collaborative activities with other stakeholders

		Preparedness phase	Prevention/mitigation phase	Response phase	Recovery phase
			sea, land and airports as per government regulations;	Assist the port authorities to ensure prompt unloading of humanitarian aid materials and tax exemptions of humanitarian assistance at sea, land and airports as per government regulations;	
Ministry of Planning	Bangladesh Planning Commission (pandemic)	Integrate PHE PRP in the preparation of Development Project Proposals (DPP) with a view to pandemic preparedness; Approve projects based on PHE PRP on whether the new schemes and proposed projects will strengthen pandemic preparedness;	Recommend resource allocations for pandemic management	Recommend resource allocations for pandemic management	Collaborative activities with other stakeholders
	Planning Division (pandemic)	Recommend to include lessons learnt from previous projects in COVID-19 pandemic	Initiate for quick approval of contingency plans for preparedness and to combat emergency the	Initiate for quick approval of contingency plans for preparedness and to combat	Collaborative activities with other stakeholders

		Preparedness phase	Prevention/mitigation phase	Response phase	Recovery phase
		and development project planning process;	situation brought about by pandemic	emergency the situation brought about by pandemic	
	Bangladesh Bureau of Statistics (BBS) (epidemic/ pandemic)	Take initiatives to update epidemic/ pandemic statistics (considering gender, age and disabilities); Provide technical assistance to include Geographical Information Systems (GIS) in Epidemic/ pandemic management; Determine and preserve a GO code for the health facilities.	Take initiatives to update epidemic/ pandemic statistics (considering gender, age and disabilities); Provide technical assistance to include Geographical Information Systems (GIS) in Epidemic/ pandemic management; Determine and preserve a GO code for the health facilities.	Take initiatives to update epidemic/ pandemic statistics (considering gender, age and disabilities); Provide technical assistance to include Geographical Information Systems (GIS) in Epidemic/ pandemic management; Determine and preserve a GO code for the health facilities.	Collaborative activities with other stakeholders
Ministry of Education					
Ministry of Women and	Ministry of Women and	Include protection of women, children, the elderly			

		Preparedness phase	Prevention/mitigation phase	Response phase	Recovery phase
Children Affairs	Children Affairs (MoWCA) (pandemic)	and persons with disabilities into pandemic response plans and include psycho-social services;			
Ministry of Science and Technology	Bangladesh Council of Scientific and Industrial Research (BCSIR) (pandemic)	Conduct research on pandemic management and disseminate research findings and recommendations to concerned departments;	Provide laboratory support in detecting pandemic	Provide laboratory support in detecting pandemic	Act in collaboration with other stakeholders
	Bangladesh Atomic Energy Commission (BAEC) (outbreak/ epidemic/ pandemic – all scenarios)	Ensure safety of all nuclear and radioactive materials and equipment used in different healthcare facilities, research laboratories and other institutes, as per laws and regulations; Ensure risk assessment of all radioactive and nuclear installations to avoid possible accidents; Use the most sophisticated technologies to reduce the risk of radioactive accidents at nuclear power plants.	Provide laboratory support for detection of radio nuclear hazard	Provide laboratory support for detection of radio nuclear hazard	Act in collaboration with other stakeholders

		Preparedness phase	Prevention/mitigation phase	Response phase	Recovery phase
Ministry of Religious Affairs (MoRA)	Islamic Foundation (outbreak/ epidemic/ pandemic – all scenarios)	Ensure participation of religious leaders when developing the pandemic preparedness plan and enhance their capacity through training on disaster risk reduction and climate change issues so they can disseminate disaster risk reduction messages among communities through religious institutions;	Ensure participation of religious leaders in public awareness activities on outbreak/ epidemic/ pandemic at the community level.	Ensure participation of religious leaders in public awareness activities on outbreak/ epidemic/ pandemic at the community level.	Act in collaboration with other stakeholders
Ministry of Youth and Sports	Ministry of Youth and Sports (epidemic/ pandemic)	Select volunteers for PHE prevention and management and provide training through Youth Training Centres	Take necessary steps to activate available resources of the ministry including trained volunteers to assist in response activities; involve players of all levels in PHE prevention and control	Take necessary steps to activate available resources of the ministry including trained volunteers to assist in response activities; involve players of all levels in PHE prevention and control	Act in collaboration with other stakeholders
Ministry of Cultural Affairs	Ministry of Cultural Affairs (outbreak/	Undertake cultural programmes to create	Instruct cultural organizations for extensive publicity for awareness-	Instruct cultural organizations for extensive	Act in collaboration with other stakeholders

		Preparedness phase	Prevention/mitigation phase	Response phase	Recovery phase
	epidemic/ pandemic – all scenarios)	awareness on PHE prevention. Involve prominent cultural personalities in these activities if required;	raising on PHE management. Undertake special activities and allocate a budget for nationwide comprehensive implementation;	publicity for awareness-raising on PHE management. Undertake special activities and allocate a budget for nationwide comprehensive implementation	
Ministry of Foreign Affairs (MoFA)	Ministry of Foreign Affairs (MoFA) (pandemic)	Keep contact with UN agencies, international bodies, foreign governments in relation to pandemic preparedness and information sharing	Initiate public health and social measures according to International Health Regulation at points of entry in collaboration with MoHFW; Disseminate information at MoFA website for international travelers arriving and departing from Bangladesh	Initiate public health and social measures (PHSM) according to International Health Regulation at points of entry in collaboration with MoHFW; Disseminate information at MoFA website for international travelers arriving and departing from Bangladesh	Scale down PHSM as advised by MoHFW

		Preparedness phase	Prevention/mitigation phase	Response phase	Recovery phase
Ministry of Civil Aviation and Tourism	Civil Aviation Authority Bangladesh (pandemic)	Annual exercise in collaboration with IHR NFP for pandemic management at international airports	Ensure safe journey of passengers by implementing PHSM in collaboration with MoHFW	Ensure safe journey of passengers by implementing PHSM in collaboration with MoHFW	Scale down PHSM as advised by MoHFW
Ministry of Shipping	Ministry of Shipping (pandemic)	Annual exercise in collaboration with IHR NFP for pandemic management at international sea ports	Ensure safe journey of passengers/ safe handling of cargoes by implementing PHSM in collaboration with MoHFW	Ensure safe journey of passengers/ safe handling of cargoes by implementing PHSM in collaboration with MoHFW	Scale down PHSM as advised by MoHFW
Ministry of Road, Transport and Bridges	Road Transport and Highways Division (pandemic)	Prepare a contingency plan for road transport sector in case of pandemic, where transporting passengers will not be allowed as a part of PHSM	Implement PHSM in transport sector	Implement PHSM in transport sector	Scale down PHSM as advised by MoHFW
Ministry of Railways	Ministry of Railways (pandemic)	Prepare a contingency plan for rail transport sector in case of pandemic, where transporting passengers will not be allowed as a part of PHSM	Implement PHSM in railway sector	Implement PHSM in railway sector	Scale down PHSM as advised by MoHFW

		Preparedness phase	Prevention/mitigation phase	Response phase	Recovery phase
Ministry of Education	Secondary and Higher Education Division (outbreak/ epidemic/ pandemic – all scenarios)	Prepare a contingency plan for educational institutes in case of PHE, where classes will not be allowed as a part of PHSM	Implement PHSM in educational institutes	Implement PHSM in educational institutes	Scale down PHSM as advised by MoHFW
Ministry of Primary and Mass Education	Ministry of Primary and Mass Education (outbreak/ epidemic/ pandemic – all scenarios)	Prepare a contingency plan for educational institutes in case of PHE, where classes will not be allowed as a part of PHSM	Implement PHSM in educational institutes	Implement PHSM in educational institutes	Scale down PHSM as advised by MoHFW
Ministry of Chittagong Hill Tracts Affairs	Chittagong Hill Tracts Development Board (outbreak/ epidemic/ pandemic – all scenarios)	Prepare a contingency plan for Chittagong Hill Tracts area for PHE	Act in collaboration with other stakeholders	Act in collaboration with other stakeholders	Act in collaboration with other stakeholders
	Rangamati/Bandarban/Khagrachari Hill District Council (outbreak/ epidemic/	Include a local people's representative and communities to ensure environmental and ecological balance through conservation of natural	Act in collaboration with other stakeholders	Act in collaboration with other stakeholders	Act in collaboration with other stakeholders

		Preparedness phase	Prevention/mitigation phase	Response phase	Recovery phase
	pandemic – all scenarios)	resources, water reservoirs, mountains and hills; Assess risks and hazards of zoonotic diseases in the Chittagong Hill Tracts;			
Ministry of Labour and Employment	Ministry of Labour and Employment (pandemic)	Prepare guidelines and improve the work environment to ensure worker safety; Formulate a compensation policy for the workers working in risky environments and ensure safety against any infectious hazards.	Ensure PHSM and social security of workers and employees	Ensure PHSM and social security of workers and employees	Act in collaboration with other stakeholders
Ministry of Expatriates' Welfare and Overseas Employment	Ministry of Expatriates' Welfare and Overseas Employment (pandemic)	Assess the health hazard and disaster risks in the overseas job market and in related countries. Prepare a strategic plan for preparedness and pandemic control for the ministry and its departments;	Ensure health security for expatriate workers in collaboration with partners and stakeholders	Ensure health security for expatriate workers in collaboration with partners and stakeholders	Act in collaboration with other stakeholders
Other Ministries/Divisions/Departments	Other Ministries/Divisions/Departments (outbreak/ epidemic/	In the case of a public health emergency (outbreak/ epidemic/ pandemic), all ministries/ divisions/ departments/ directorates will contribute from their respective positions to reduce health hazards and restore the normal situation. Ministries for which there is no clear standing order will prepare their respective work plans for PHE.			

		Preparedness phase	Prevention/mitigation phase	Response phase	Recovery phase
	pandemic – all scenarios)				
Partners	World Health Organization (WHO) (outbreak/ epidemic/ pandemic – all scenarios)	Technical support to GoB	Technical support to GoB	Technical support to GoB	Technical support to GoB
	Other UN Bodies and WB (outbreak/ epidemic/ pandemic – all scenarios)	Update contacts and links with MoHFW, Cabinet Division, PMO	Technical assistance in prevention/ mitigation as required	Technical assistance in response as decided by Public-private partnership, GO-NGO collaboration Committee at national level	Technical assistance in recovery as decided by Public-private partnership, GO-NGO collaboration Committee at national level
	NGOs and INGOs (outbreak/ epidemic/ pandemic – all scenarios)	Update contacts and links with MoHFW, Cabinet Division, PMO	Technical assistance in prevention/ mitigation as required	Technical assistance in response as decided by Public-private partnership, GO-NGO collaboration Committee at relevant tier	Technical assistance in recovery as decided by Public-private partnership, GO-NGO collaboration Committee at relevant tier

		Preparedness phase	Prevention/mitigation phase	Response phase	Recovery phase
	Public Health departments of Universities (pandemic)	Capacity building for public health emergency	Act in collaboration with other stakeholders	Act in collaboration with other stakeholders	Act in collaboration with other stakeholders

Annex 6: List of persons consulted

(Alphabetically)

Abu Sufian
Abu Syed Md Imtiaz Hossain
Abul Bashar Mohammad Khurshid Alam
Abul Kalam Azad
AFM Rakibul Hasan Bhuiyan
Afreena Mahmood
Ahmad Raihan Sharif
Ahmed Nawsher Alam
Ahmedul Kabir
Aninda Rahman
Ariful Basher
Ariful Islam, BRAC
Ariful Islam, EcoHealth
Asheq Ahammed Shahid Reza
ASM Alamgir
Farsim Tarannum Haque
Farzana Islam
Golam Azam Tulu
Hasan Mohiuddin Ahmed
Khondoker Mahbuba Jamil
M Salim Uzzaman
Mahbubur Rahman
Mahmudur Rahman
Malay Kanti Mridha
Mallick Masum Billah
Manjur Hossain Khan
Mashiul Munir
Md Abdur Rab Miah
Md Abu Zaher
Md Abul Kalam Azad
Md Farid Hossain Mian
Md Ferdous Rahman Sarker
Md Giasuddin
Md Jahidul Kabir
Md Lutfur Rahman Shahin

Md Mostafizur Rahman
Md Mukhlesur Rahman
Md Nasir Ahmed Khan
Md Nizam Uddin Choudhury
Md Omar Qaiyum
Md Rakibul Islam
Md Shahadat Hossain
Md Shahriar Sazzad
Md Shahta Zarab Salehin
Md Shamsul Haque
Md Zillur Rahman
Meerjady Sabrina Flora
Meherun Nahar
Minati Rani Saha
Mohammad Rashedul Hassan
Mohammad Sazzad Hossain
Mohammed Abdus Samad
Monalisa
Morsheda Choudhury
Mostafa Moinuddin
Muhammad Abul Faiz
Muhammad Zahidul Islam
Mustafizur Rahman
Mustufa Mahmud
Nadia Rimi
Nawroz Afreen
Nazmul Islam Munna
Nitish C Debnath
Nusrat Sharmin Poppy
Parvez Ahmed
Qamrul Hasan
Qazi Ahmed Zaki
Rabeya Sultana
Rafiqul Islam
Rahat Chowdhury
Rahat Iqbal
Ripon Barua
Samsad Rabbani Khan

Shafiun Shimul
Shah Ali Akbar Ashrafi
Shah Mahfuzur Rahman
Shah Md. MohibullahShowrav
Shah Monir Hossain
Sharmin Sultana
Shusmita Dutta
Sohel Rahman
Sohelur Rahman
Sreejon Saha Anik
Syed Ashraful Islam
TABM MozaffarGani Osmani (Jewel)
Tahmina Akhter
Tahmina Shirin
Tahmina Sultana
Tajul Islam Abdul Bari
Zakir Hossain Habib

WHO (STAR-IH virtual workshop)

(Alphabetically)
Abbas Omar
Bardan Jung Rana
Harsh Lata
Kingsley Bieh
Masaya Kato
Muhammad ZahidurRahim
Qudsia Huda
Sandip Shinde
Taylor Warren

WBG Team

(Not alphabetically)
Mohammad Mushtuq Husain
Nazneen Akhter
Claire Standley
Asib Nasim
Rianna L Roberts-Mohammed
Aissatou Diack
Shiyong Wang
-END-