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A BRIEF REPORT ON DISEASE SURVEILLANCE IN BANGLADESH

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Editor-in-Chief's Note

Prof Mamunar Rashid, *Editor-in-Chief, NBPH, IEDCR*

Disease surveillance plays an important role in raising public health awareness and take appropriate measures to forecast and mitigate the problems. Although several institutions and departments, both government and non-government, are involved in surveillance activities, the Institute of Epidemiology, Disease Control and Research (IEDCR), under Directorate General of Health Services (DGHS) and Ministry of Health and Family Welfare (MoH&FW), Bangladesh, is the mandated institute for conducting disease surveillance, especially for communicable diseases. In addition, it is also responsible for carrying out outbreak investigations whenever the situation demands.

The findings of these surveillance are available in their respective publications and postings. A collated and consolidated information from the various departments with periodic updates at regular intervals about the prevailing disease situation in Bangladesh and their changes over time is missing. It was felt that the NBPH could play an important role in this aspect.

The matter was discussed with the US-CDC Foundation who were very positive on the matter. A special workshop on preparing a framework for "Integrated Disease Surveillance and Response" was held on 27th September, 2023 with the focal persons of the surveillance systems conducted by IEDCR. They came up with their current reporting system and all efforts were made to come to a consensus about a common platform to report their respective surveillance data. It was also agreed that their surveillance reports carried out so far and future updates will be submitted to NBPH and an automated process be implemented as far as practical. This special issue of NBPH is an effort in that direction and some of the surveillances carried out in IEDCR (mentioned in Table 1) are presented here. Much still remains to be done and this special issue will be followed by sharing periodic updates on a regular basis in future NBPH issues. NBPH could also take initiatives to include pertinent information of all surveillance carried out in and outside IEDCR in the near future.

We owe special thanks to Kimberly Koporc, Public Health Bulletin Project Manager, CDC Foundation who along with John Moran, Consultant, CDC Foundation provided a lot of input in giving the issue its current shape. We are also thankful to the focal persons of all the disease surveillance systems and their active fellows who took the initiative to provide the data for this special issue.

A Brief Report on Disease Surveillance in Bangladesh

Prof. Dr. Tahmina Shirin, *PhD, Director, IEDCR*

Disease surveillance is an essential public health function and an integral part of public health systems. Disease surveillance is defined as the "systematic ongoing collection, collation and analysis of data for public health purposes and the timely dissemination of public health information for assessment and public health response, as necessary"[1]. International Health Regulations (IHR) 2005 obligates all WHO member states to develop an effective surveillance system to enhance early detection, reporting, notification, and verification of outbreaks and epidemics of emerging and re-emerging communicable diseases to support timely response by the national governments[1,2]. This important IHR core capacity is measured by the country's ability to conduct surveillance for priority epidemic-prone diseases according to international standards and is evaluated by the regular reporting and analysis of surveillance data[3].

Bangladesh has several surveillance platforms; some are active and most of them are sentinel based or passive surveillance. Surveillance of emerging and re-emerging communicable and non-communicable diseases are being conducted by the responsible departments, and institutions. Most of these surveillances are indicator based, while there are some event-based surveillances including use of media monitoring and Early Warning, Alert and Response System (EWARS). The Bangladesh Communicable Disease (Prevention, Control and Eradication) Act 2018 identified several endemic communicable diseases, necessary measures were advised for prevention and control of those diseases including any emerging or re-emerging diseases declared by the Government following the WHO IHR 2005 guidelines[4]. To comply with the act, disease surveillance is regarded as an important public health function in Bangladesh. The first Joint External Evaluation for IHR 2005 core capacities in Bangladesh, conducted in 2016, acknowledged that the country had attained reasonable capacities for detection of events of significance for both human and animal health as well as for other health security threats of concern. It has been possible through establishing and enhancing an indicator-based national disease surveillance system with an automated and real-time data entry and data analysis capability[5].

I congratulate the NBPH team to bring together many of the surveillance activities carried out by various departments of IEDCR (Table 1). This will help those interested to look at a glance on how they were initiated as well as their present status. It also promises quarterly updates so that current position of the diseases is known. We will strive to make it more exhaustive so that surveillance carried out by institutions and departments outside IEDCR are also included in future issues.

Table 1: List of some of the Surveillances carried out in IEDCR

Acute Encephalitis Syndrome (AES) Surveillance	Leptospirosis Surveillance
Anthrax Surveillance	National Influenza Surveillance
Acute Watery Diarrhea Surveillance	National Respiratory Pathogen Genomic Surveillance in Bangladesh
Antimicrobial Resistance (AMR) Surveillance	National SARS-CoV-2 Genomic variants surveillance in Bangladesh
Cell Phone Based Surveillance	Nipah Virus (NiV) surveillance
Child Health & Mortality Prevention Surveillance (CHAMPS)	One Health Event Based Surveillance
Climate Sensitive Disease Surveillance	Respiratory Event Based Surveillance (Respiratory EBS)
Environmental (Wastewater) Surveillance	Surveillance for emerging zoonotic disease threats and behavioral risk characterization in high-risk communities in Bangladesh
Hospital Based Rotavirus & Intussusception Surveillance (HBRIS)	Web Based Disease Surveillance System (WBDSS)

National Influenza Surveillance

Influenza is a contagious respiratory illness caused by influenza viruses. It infects the nose, throat, and lungs commonly known as flu. The influenza has various types and sub-types infecting both humans and animals. Humans are infected throughout the year by some sub-types of Influenza virus, known as seasonal Influenza and has the potentiality to cause deadly pandemics.

WHO initiated National Influenza Centers (NICs) in many of its member countries as measures for early detection of pandemic threats by intense monitoring of the changes of types and sub-types as well as vaccine development. In 2007, IEDCR was recognized by WHO as the NIC of Bangladesh. IEDCR is also the national reference laboratory for influenza. Influenza surveillance is conducted through two systems:

1. NISB (National Influenza Surveillance Bangladesh), coordinated by IEDCR was initiated in 2010, and. It is conducted in 10 sentinel sites across Bangladesh, of which, 8 are district hospitals and 2 are medical college hospitals (Table 2).
2. HBIS (Hospital Based Influenza Surveillance) started in 2007, and is coordinated by IEDCR and icddr,b. It is conducted in 9 sentinel sites located in tertiary-hospitals of which 8 are government medical college hospitals and 1 is a private medical college hospital (Table 2).

Participants are recruited from the pediatric and medicine departments of the sentinel sites. Two types of cases are recruited: a) Severe Acute Respiratory Infections (SARI); b) Influenza like illness (ILI). ILI cases from out-patient departments and SARI cases from in-patient departments are selected using the case definition presented in Text Box 1. Nasal and throat swabs are collected from each of the enrolled cases and transported to IEDCR and icddr,b laboratories on weekly basis and tested for influenza A & B with reverse transcription polymerase chain reaction (RT-PCR). Weekly laboratory and epidemiological data are submitted to WHO Global Influenza Surveillance and Response System.

By utilizing this system two more surveillances are running:

1. SARS Cov-2 surveillance started from January, 2020 and
2. Respiratory Syncytial Virus surveillance running through integrated surveillance system where children under five years of age are recruited (started from October 2022)

Text box 1: Case definition of SARI and ILI[6]

| Severe acute respiratory infections (SARI): An acute respiratory infection with: • history of fever or measured fever of ≥ 38 °C • and cough; • with onset within the last 10 days • and requires hospitalization	Influenza like Illness (ILI) An acute respiratory infection with: • measured fever of ≥ 38 °C • and cough; • with onset within the last 10 days

Table 2: List of sentinel sites for Influenza surveillance (NISB and HBIS)

Name of hospitals (NISB)	District
Thakurgaon District Hospital	Thakurgaon
Naogaon District Hospital	Naogaon
Satkhira District Hospital	Satkhira
Narshingdi District Hospital	Narshingdi
Habiganj District Hospital	Habiganj
Cox's Bazar District Hospital	Cox's Bazar
Joypurhat District Hospital	Joypurhat
Dhaka Medical College Hospital	Dhaka
Patuakhali District Hospital	Patuakhali
Shaheed Tajuddin Ahmed Medical College hospital	Gazipur

Name of hospitals (HBIS)	District
Jahurul Islam Medical College Hospital	Kishoreganj
Rajshahi Medical College Hospital	Rajshahi
Cumilla Medical College hospital	Cumilla
Khulna Medical College hospital	Khulna
Jashore General Hospital	Jashore
Jalalabad Ragib Rabeya Medical College & Hospital	Sylhet
Sher-e- Bangla Medical College Hospital	Barisal
Chittagong Medical College Hospital	Chattogram
M Abdur Rahim Medical College Hospital	Dinajpur
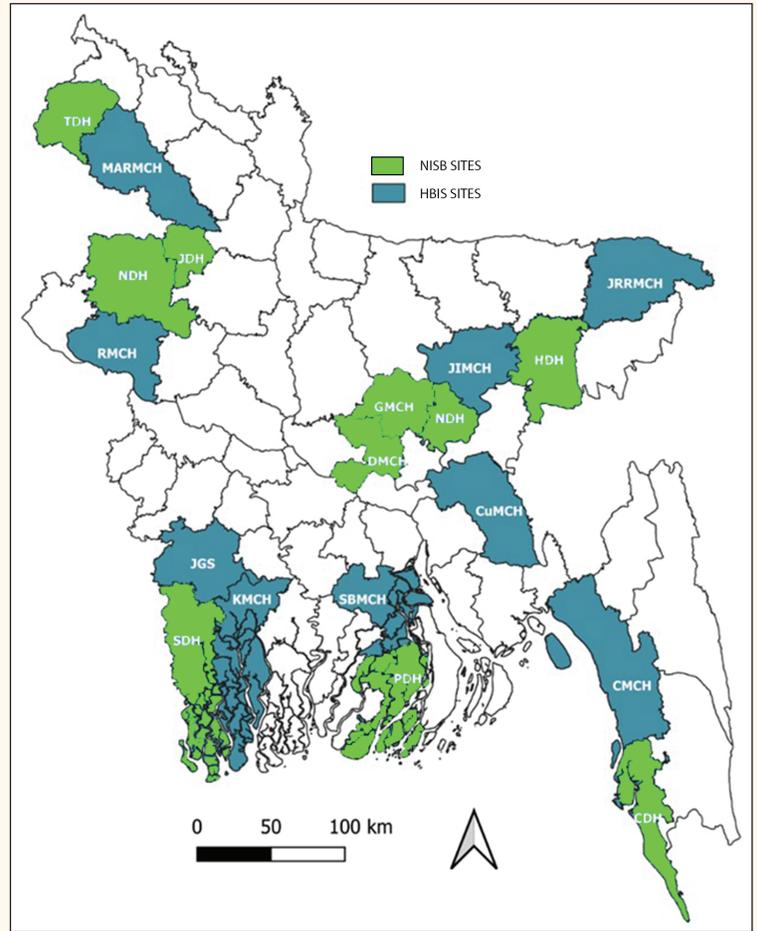
Fig 2: Distribution of the National Influenza Surveillance sites (N=19) in Bangladesh (Source: Bangladesh influenza surveillance system, NISB and HBIS platform)
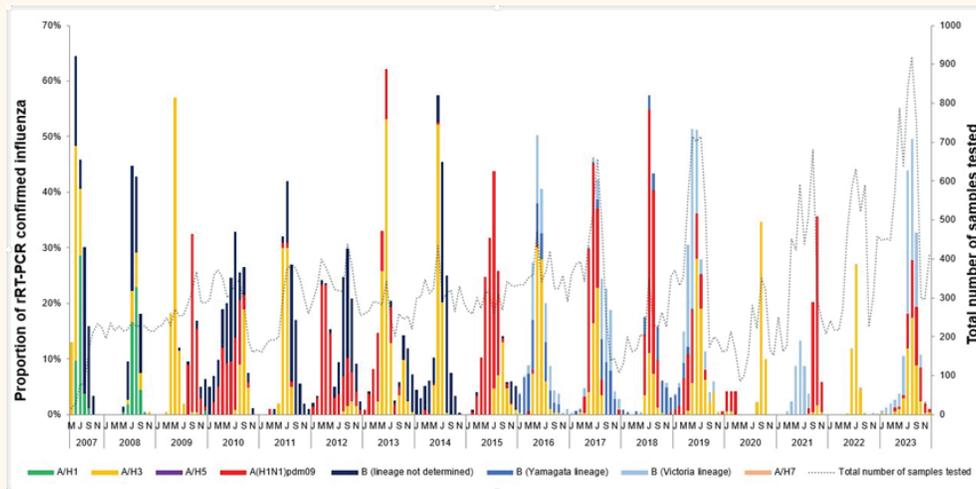
Fig 1: Epi-curve of influenza seasonality and subtypes (May 2007 — December 2023) (Source: Bangladesh influenza surveillance system cumulative data (NISB and HBIS platform)

In Bangladesh, the influenza season is from April to September which coincides with the monsoon season. The seasonal peak is in June and July. The number of sample collection increased as the number of sentinel sites increased over time. The frequency of flu strains changed from year to year (Fig 1).

Highlights:

• Age group: Positivity rate amongst persons aged 15 to 25 years is the highest among all the age groups (From 2007 to 2023).

For further details, please click the link below:
-- *https://www.iedcr.gov.bd/site/page/077670e7-ea37-439e-a59e-085d4c49e923/-*
-- *https://www.iedcr.gov.bd/site/page/55f17e29-d56d-4d6e-aa35-129000fdb9da/-*

## Hospital Based Rotavirus and Intussusception Surveillance (HBRIS)

The estimated incidence of rotavirus is 10,000 cases per 100,000 children under five years in Bangladesh. According to WHO, severe health conditions are reported from 25-30% of rotavirus infected children. IEDCR and icddr, b jointly started Hospital-Based Rotavirus and Intussusception Surveillance (HBRIS) in 2012 with the technical support from United States Centers for Disease Control and Prevention (US-CDC). With the support of WHO, IEDCR took over HBRIS in 2019. Currently, it is running in 7 tertiary hospitals (table 3). The objectives of the surveillance system are to:

1. Describe the frequency of rotavirus-associated hospitalizations
2. Identify the circulating strains among children less than 5 years of age
3. Estimate the frequency of intussusception-related hospitalizations among children less than 2 years of age across the country (currently the intussusception surveillance is running for collecting baseline data)
4. Estimate changes in rates and ratios in rotavirus-associated hospitalizations after introduction of rotavirus vaccine in Bangladesh
5. Identify changes in strain diversity and detect any increase in patients seeking care for intussusception after the introduction of vaccine (intussusception was found as an adverse event of rotavirus vaccine administration in Malaysia in 2006. Thus in 2009, WHO suggested intussusception baseline surveillance in countries who are planning for rotavirus vaccine implementation).

N.B. The vaccine for the rotavirus is yet to be implemented in Bangladesh.

Table 3: List of Hospital-Based Rotavirus and Intussusception Surveillance (HBRIS) sentinel sites

Name of Hospitals	District
Rajshahi Medical College Hospital	Rajshahi
Jahurul Islam Medical College Hospital	Kishoreganj
Jalalabad Ragib Rabeya Medical College & Hospital	Sylhet
Jashore General Hospital	Jashore
Sher-e-Bangla Medical College Hospital	Barisal
Rangpur Medical College Hospital	Rangpur
Chittagong Medical College Hospital	Chattogram
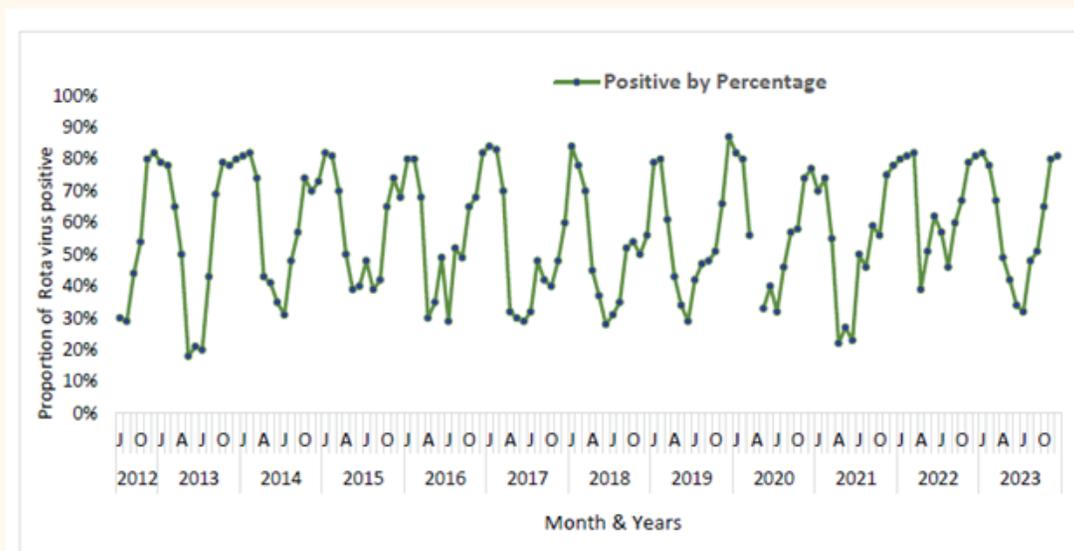
* HBRIS activities were postponed between 1st April 2020 to 15th May 2020 due to pandemic COVID-19

Fig 3: Proportion of rotavirus positivity among the hospitalized acute gastroenteritis cases by months and years (Source: HBRIS Monthly Report, iedcr.gov.bd, accessed on 13th Aug, 24[7])

From 2012 to 2023 the proportion of rotavirus positivity showed a seasonal variation with upsurge in November to February with a peak in January (Fig 3).

Highlights:

• In 2023, 1,490 samples were tested of which 944 (63%) cases were positive for Rotavirus

For more details, click the link below:
-- *https://iedcr.portal.gov.bd/site/page/176d8dc1-0abb-4950-b0b6-a57390d9829d/-*

Nipah virus (NiV) surveillance

Nipah encephalitis is a zoonotic viral infection caused by the Nipah virus (NiV). Fruit bats of *Pteropid* species are the primary reservoir for NiV. The first human Nipah outbreaks were reported from Malaysia and Singapore in 1998-1999 with 283 cases and 109 deaths. In Malaysia people developed severe encephalitis who came in close contact with NiV infected pigs. In Bangladesh, the first case of NiV encephalitis was identified retrospectively in 2001 in Meherpur district. Consumption of raw date palm juice contaminated by fruit bats was identified as the possible risk factor for NiV infection. A hospital-based surveillance system was established in Bangladesh since 2006 using the case definition mentioned in text box 2. The objective of the surveillance is to detect outbreaks of NiV infection and to identify possible risk factors and modes of transmission.

Text box 2: Case definition of Nipah encephalitis (Source: National Guideline for Management, Prevention and Control of Nipah Virus Infection including Encephalitis. 2011[8]):

Suspected case
A person fulfilling both of the following criteria is defined as a suspected case:
1. Features of acute encephalitis as demonstrated by
    a. Acute onset of fever AND
    b. Evidence of acute brain dysfunction as manifested by
        i. Altered mental status OR
        ii. New onset of seizure OR
        iii. Any other neurological deficit
2. Epidemiological linkage
    a. Drinking raw date palm sap OR
    b. Occurring during Nipah season OR
    c. Patient from Nipah endemic area

Probable case
A person with features of acute encephalitis
    • during a Nipah outbreak in the area OR
    • with history of contact with confirmed Nipah patient In both suspected and probable cases, the patient might present with respiratory features with or without encephalitis. The respiratory features are
      - Illness < 7 days duration AND
      - Acute onset of fever AND
      - Severe shortness of breath, cough AND
      - Chest radiograph showing diffuse infiltrates

Confirmed case
A suspected or probable case with laboratory confirmation of Nipah virus infection either by:
    • IgM antibody against Nipah virus by ELISA in serum or cerebrospinal fluid
    • Nipah virus RNA identified by PCR from respiratory secretions, urine, or cerebrospinal fluid

In collaboration with icddr,b and technical support from US-CDC and Coalition for Epidemic Preparedness Innovations (CEPI), IEDCR is currently conducting the NiV surveillance in 14 sentinel sites, which includes 12 government medical college hospitals and 2 district hospitals covering all the 8 divisions of the country (Table 4).

Table 4: List of Nipah surveillance sites

Name of the hospitals	District
Bangabandhu Sheikh Mujib Medical College & Hospital	Faridpur
Rajshahi Medical College & Hospital	Rajshahi
Rangpur Medical College & Hospital	Rangpur
Chittagong Medical College & Hospital	Chattogram
Khulna Medical College & Hospital	Khulna
Sher-E-Bangla Medical College & Hospital	Barishal
Mymensingh Medical College Hospital	Mymensingh
Sylhet M.A.G Osmani Medical College Hospital	Sylhet
Cox's Bazar Medical College Hospital	Cox's Bazar
M Abdur Rahim Medical College Hospital	Dinajpur
Shaheed Ziaur Rahman Medical College Hospital	Bogura
Jashore Medical College Hospital	Jashore
Rajbari General Hospital	Rajbari
Tangail Sador Hospital	Tangail
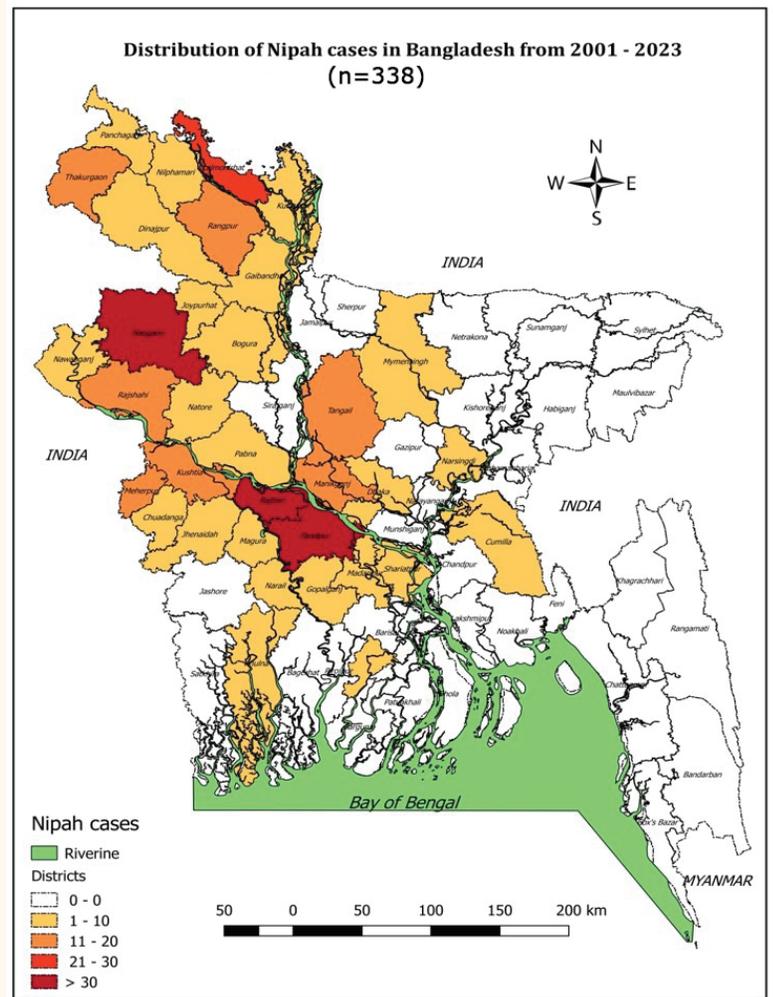
Fig 4: Distribution of Nipah cases in Bangladesh from 2001-2023 (N=338) (Source: NIPAH Situation Dashboard, iedcr.gov.bd website[9])

Highlights:

- From 2006 to 2023 a total of 338 NiV cases were detected in 32 districts of Bangladesh. Faridpur district has the highest number of reported cases (n= 71) followed by Rajbari (n=35), Naogaon (n=32) and Lalmonirhat district (n=24).
- In 2023 there were 13 confirmed cases of NiV infection. The case fatality is 77% (10/13).

For further details, please click the link below:

-- *https://iedcr.portal.gov.bd/site/page/03d6e960-2539-4966-8788-4a12753e410d/-*

Acute Encephalitis Syndrome (AES) Surveillance (Focused on Japanese Encephalitis)

Japanese encephalitis (JE) is a vector-borne, vaccine-preventable disease transmitted by the culex mosquito. An infected person acquires lifelong immunity if they recover from the infection. Infected children are at a greater risk of developing encephalitis, which may cause death or lifetime morbidity. The objective of JE case-based surveillance is to understand the epidemiology, predisposing factors and associated clinical features. A nation-wide surveillance system started in 2017. This surveillance has 103 sentinel sites, among these, 82 are Government facilities (tertiary level medical college hospitals, district hospitals and specialized institutions) and 21 private hospitals.

Text box 3: Case definition of AES[10]

> A person of any age at any time of the year with an acute onset of fever and having at least one of the following:
> - A change in mental status (including symptoms such as confusion, disorientation, coma, or inability to talk (excluding simple febrile seizures).
> - A simple febrile seizure defined as a seizure that occurs in a child aged 6 months to less than 6 years, whose only symptoms are a fever, a single generalized convulsion lasting less than 15 minutes with consciousness regained within 60 minutes of the seizure.

Highlight:
- From 2017 to 2022 a total of 420 JE positive cases have been detected.

N.B. *The JE vaccine is currently available in different countries. However, in Bangladesh, the JE vaccination strategy will be formed based on JE surveillance data.*

Anthrax Surveillance

Anthrax is a zoonotic disease and endemic in the northern districts of Bangladesh. In 2019, IEDCR initiated an active anthrax surveillance in 9 upazilas of 5 districts (Sirajgonj, Pabna, Meherpur, Tangail, and Rajshahi) based on previous anthrax outbreaks. Since 2020, almost all the anthrax cases were reported from Meherpur district. Therefore, surveillance activities continue in three upazilas in Meherpur district.

The surveillance platform is also supporting disease prevention efforts through community engagement by distributing IEC (Information, Education and Communication) materials, such as posters and trifold leaflets. Anthrax management guidelines for community intervention and campaign programs are also developed. Awareness programs were conducted at the hospital premises to increase knowledge on caring for sick animals, disposal of carcasses, and vaccination of animals. For the diagnosis of cutaneous anthrax, IEDCR initially did staining and culture, and later diagnosis is being made by RT-PCR testing.

- In 2022, out of 464 suspected cases, 85 samples were tested of which 62 were positive (73%). Most of the cases could not be tested due to dry-wound (healed-lesion). One positive case was from Kamarkhond upazila of Sirajgonj district and the remaining were from Gangni upazila of Meherpur district.
- In 2023, out of 655 suspected cases, 142 samples could be tested of which 78 (57%) were positive. All of the cases were from Gangni upazila of Meherpur district.

For further details, please click the link below:
-- *https://iedcr.portal.gov.bd/site/page/23af0a61-c8d7-4fac-97a0-2e298491ebf6/-*

Leptospirosis Surveillance

Bangladesh experiences long monsoon seasons, frequent flooding, stagnant water, high temperatures, humidity, and a high density of animal and human populations, which create an ideal situation for zoonotic transmission of *Leptospira* spp. from animals to humans. Since 2019, IEDCR has been conducting leptospirosis surveillance in 8 sentinel sites (Table 5) throughout the country with the technical support from the Bacterial Special Pathogen Branch (BSPB) of US-CDC. Surveillance teams at sentinel sites are responsible for case identification, sample collection, epidemiologic data collection and transportation of samples from sentinel sites to IEDCR. Rapid Diagnostic test (RDT) for IgM antibodies is done at sentinel sites and confirmatory RT-PCR test is done at IEDCR.

Table 5: List of leptospirosis surveillance sites with positive cases (2019-2023)

Name of Hospital	District	Number of positive cases
District Sadar Hospital	Satkhira	124
Bangladesh Institute of Tropical & Infectious Diseases	Chattogram	72
Uttara Adhunik Medical College Hospital	Dhaka north	39
Dhaka Medical College Hospital	Dhaka south	34
250-Bed District Sadar Hospital	Habiganj	33
250-Bed General Hospital	Naogaon	20
250-Bed General Hospital	Patuakhali	4
250-Bed Sadar Hospital	Cox's bazar	2
	Total	**328**

Most positive cases were identified from Satkhira, Chittagong and Dhaka districts (Table 5). From 2019 to 2023, a total of 5325 samples were tested and 334 cases were found to be positive for *Leptospira* (Table 6).

Table 6: Number of samples tested to detect IgM antibody to *Leptospira* over time

| Year	Number of samples tested	Positive cases	Percentage
2019	1283	107	8.3
2020	483	39	8.1
2021	778	50	6.4
2022	1173	51	4.4
2023	1608	87	5.4

Antimicrobial Resistance (AMR) Surveillance

WHO has declared that AMR is one of the top 10 global public health threats facing humanity. In May 2015, the 68th World Health Assembly adopted the Global Action Plan (GAP) on Antimicrobial Resistance, which advocated for the establishment of Antimicrobial Resistance (AMR) surveillance in member states. IEDCR initiated AMR surveillance in 2017 with the technical support from the US-CDC. At present, the surveillance is mainly supported by WHO along with other development partners and the government of Bangladesh. The surveillance system in Bangladesh is unique as it currently integrates both case-based and lab-based approaches, as recommended by the Global Antimicrobial Resistance and Use Surveillance System (GLASS). In case-based surveillance, clinical cases are identified by physicians and include both epidemiological data and laboratory culture and sensitivity test results conducted across 11 sites nationwide (Table 7 & Fig 5). Meanwhile, the lab-based surveillance, initiated in 2022, focuses solely on laboratory test data in both private (n=20) and public (n=1) laboratories (Table 8 & Fig 5).

Table 7: List of Active case-based surveillance sites

| Name of Hospitals (active case-based surveillance)	District
Mymensingh Medical College and Hospital	Mymensingh
Rajshahi Medical College and Hospital	Rajshahi
Rangpur Medical College and Hospital	Rangpur
Bangladesh Institute of Tropical and Infectious Diseases	Chattogram
Uttara Adhunik Medical College and Hospital	Dhaka
Dhaka Medical College and Hospital	Dhaka
Sylhet MAG Osmani Medical College and Hospital	Sylhet
Khulna Medical College and Hospital, Khulna	Khulna
Cox's Bazar Medical College and Hospital	Cox's Bazar
Sher-e-bangla Medical College and Hospital	Barisal
Chittagong Medical College and Hospital	Chattogram

Table 8: List of passive laboratory-based surveillance sites

| Name of Diagnostic lab and Hospitals (passive laboratory-based surveillance)	District
National Institute of Neurosciences and Hospital	Dhaka
Epic Health Care Ltd.	Chattogram
The Ibn Sina Trust (1 branch)	Dhaka
Square Hospitals Ltd. (5 branches)	Dhaka, Sylhet
Popular Diagnostic Centre Ltd. (13 branches)	Dhaka, Chattogram, Barishal, Gazipur, Khulna, Kushtia, Mymensingh, Narayanganj, Noakhali, Rajshahi
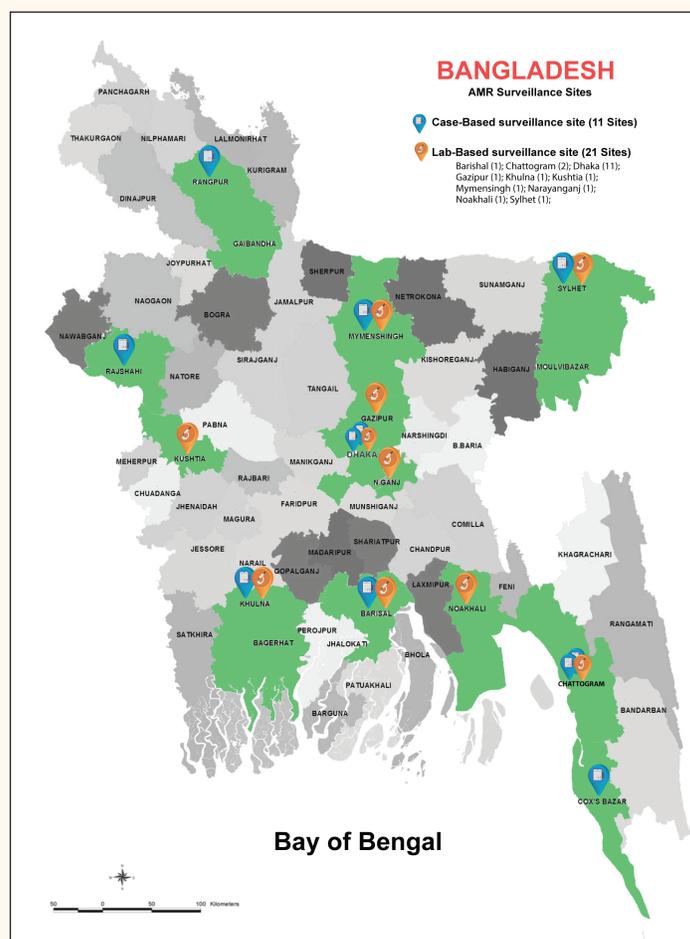
Fig 5: Distribution of AMR sites in Bangladesh (Source: iedcr.gov.bd, AMR surveillance[11])

From 2017 to June 2023, a total of 34,340 samples were collected, which included 49% (n= 16943) from outpatient departments, 39% (n=13349) from in-patient departments and the rest, 12% (n= 4048) from intensive care units. The highest number of samples (15,973) were of urine (47%) (Fig 6), however, wound swabs were found to provide maximum positive cultures (57%) (Fig 7).
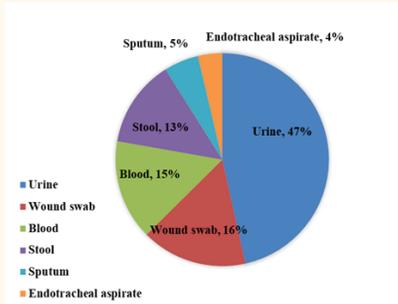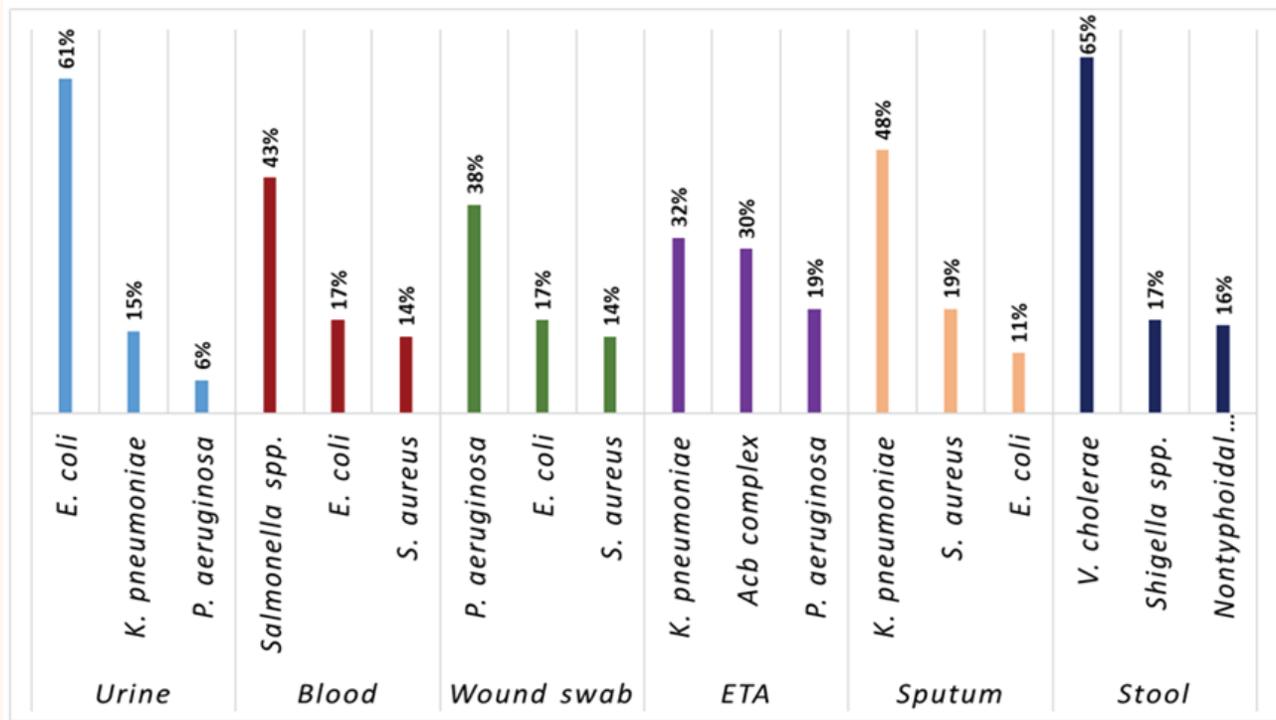
Fig 6: Distribution of different samples in case-based surveillance (n=34,340)
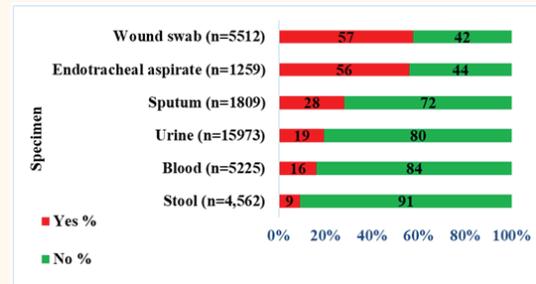
*Total growth (N=8,654)

Fig 7: Distribution of growth in cultured specimens in case-based surveillance

Fig 8: The most frequently isolated organisms (top 3) from different samples in case-based surveillance (2017 - Jun 2023)

The growth in different samples shows *E. coli, Salmonella spp., P. aeruginosa, K. pneumoniae* and *V. cholerae* are the highest frequent organisms (Fig 8).

Highlights:

- *E. coli* was the most isolated organism in the laboratory
- *Acinetobacter spp., P. aeruginosa,* and *K. pneumonia* were found to be more resistant
- SDG (Sustainable Development Goals) AMR indicator ESBLs (extended-spectrum beta-lactamases) *E. coli* in blood was 31% and another indicator, MRSA (methicillin-resistant Staphylococcus aureus) was 70%.
- The gram-positive bacteria were more susceptible to linezolid and nitrofurantoin (in case of urine samples)
- The gram-negative bacteria were found more susceptible to amikacin, imipenem, meropenem and fosfomycin (in case of urine).
- Although being the top listed used antibiotic, susceptibility to ceftriaxone and cefixime was poor, which further decrease over time.
- MDR organisms (resistant to at least one antibiotic from one group, total 3 or more groups) in case-based surveillance had increased over time (2017 to 2023) from 71% to 82%. More MDR pathogens were observed among *Acinetobacter spp.* followed by *Pseudomonas aeruginosa*.
- Susceptibility increased towards clindamycin and in linezolid, although these are commonly used.

To see the antibiogram and detailed information, please click the link below:
-- *https://www.iedcr.gov.bd/site/page/79ff9b37-67f4-4769-a0b6-ba96faa8ee36/-*

Child Health and Mortality Prevention Surveillance (CHAMPS)

Until 2017, the causes of child deaths have been evaluated by verbal autopsy. A new approach was started with MITS (Minimally Invasive Tissue Sampling) under a surveillance named Child Health and Mortality Prevention Surveillance (CHAMPS). The primary objective of CHAMPS is to identify the precise causes of stillbirths and deaths among children under five years of age. IEDCR, in collaboration with the icddr,b has been conducting the CHAMPS activities from 2017. The CHAMPS network is a multi-country initiative, implementing its activities in nine countries, including Bangladesh. The primary objective of CHAMPS is to identify the precise causes of stillbirths and deaths among children under five years of age.

In Bangladesh, CHAMPS is implementing its activities in one upazila of Rajbari named Baliakandi, and six upazilas of Faridpur. Facility-based mortality surveillance was established in September 2017 at BSMMCH (Bangabandhu Sheikh Mujib Medical College Hospital), Faridpur and later on expanded to ZMCH (Dr. Zahed Memorial Child Hospital) and BUHC (Baliakandi Upazila Health Complex) to identify most of the hospitalizations and deaths of children under five years living in the CHAMPS catchment area. To capture community deaths, community mortality surveillance was established in 2019 in Baliakandi, Rajbari.

Procedure: After a death of a child under 5 years or stillbirth delivery, a medical team (consisting of physicians, consent takers and medical technologists) conduct MITS (Minimally Invasive Tissue Sampling) from the deceased child's body both in the facility and community after taking informed written consent from the families. Subsequently the clinical documents, verbal autopsy provided by the mother/ caregiver and laboratory findings of the collected samples are gathered. An expert panel of specialists named as DeCoDe (Determination of Cause of Death) panel consisting of obstetrician, gynecologist, pathologist and epidemiologist is assigned to determine the cause of death.
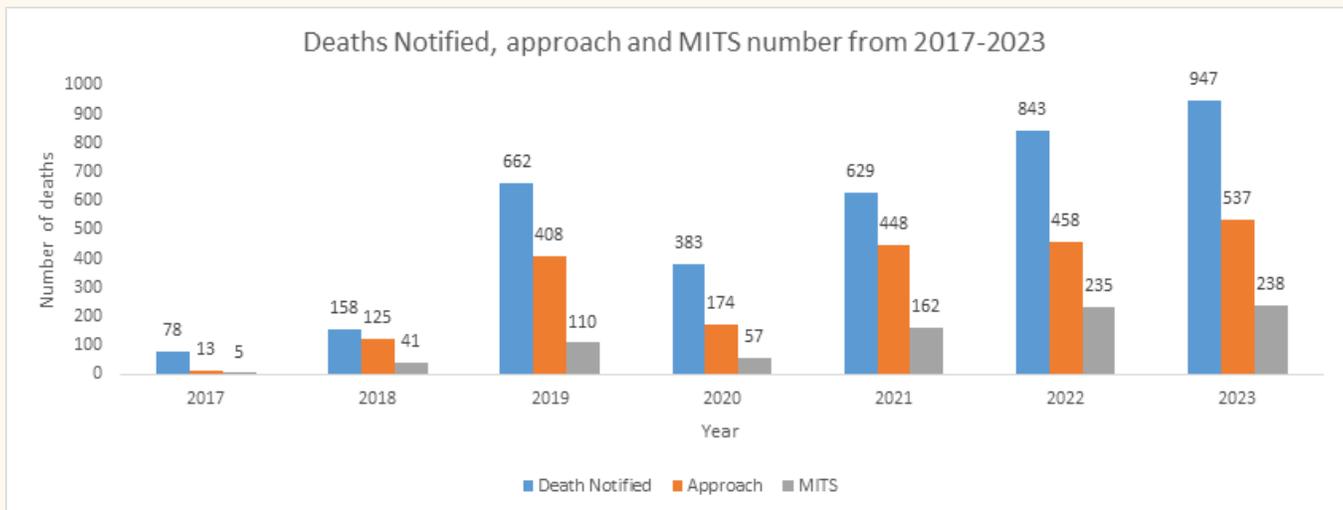

Fig 9: Number of death notifications, approach for MITS and agreed for MITS (2017-2023) (Source: https://champs.iedcr.gov.bd/mits)

The number of death notifications and approaches for MITS by the CHAMPS team increased gradually over the years. This is due to improvement of the infrastructure of 3 surveillance facilities as well as boosted capacity to provide more services which eventually gain people's trust to visit these places more. The MITS numbers also increased as a result of strong community engagement activities and good coordination with Government and private stakeholders (Fig 9).
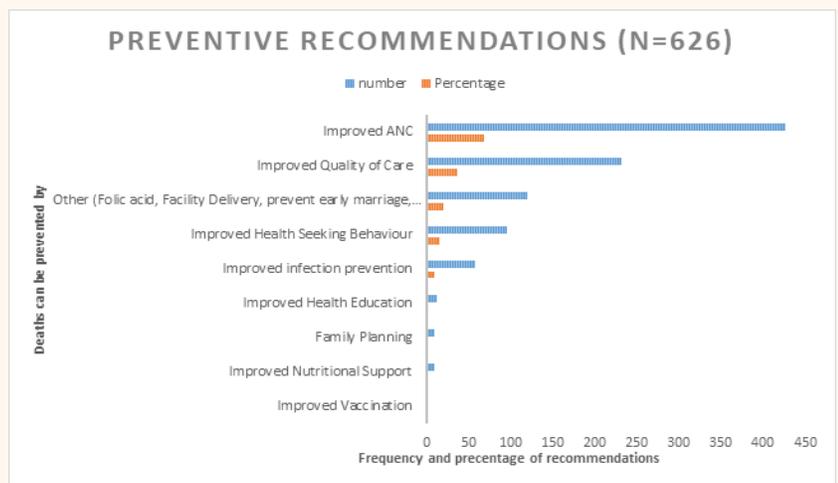

Fig 10: Preventive recommendations by the DeCoDe panel
(Source: https://champs.iedcr.gov.bd/decode)

Out of 720 DeCoDe cases, 626 cases were mentioned with preventive recommendations. The majority of the preventive recommendations were associated with improved quality of antenatal care (ANC) (59%) and improved clinical management (29%) (Fig 10). For the remaining cases, recommendations were not suggested due to insufficient maternal data.

Highlights:
- More than half of the MITS cases were stillbirths (STB). Intrauterine hypoxia causes 86% of stillbirths and 42% of early neonatal deaths. However, 7% of stillbirths were due to intrauterine infection.
- 38% of the early neonates and 59% of the late neonates died due to prematurity.

For further details, please click the link below:
-- Data Source: *https://champs.iedcr.gov.bd/data*

Cell Phone Based Surveillance (CPBS)

To assess the changing health scenario within the country and also act accordingly, public health program implementers and policymakers need timely and accurate information, but there is usually a dearth of relevant data. Traditionally data are collected by household face-to-face surveys which are costly and time consuming; as a result, face-to-face surveys are not conducted on a regular basis. On the other hand, an increase in ownership and access to mobile phones has opened new opportunities to gather information from respondents over their mobile phones within a short period of time at a lower cost. Furthermore, in conflict situations, natural disasters, or, epidemics, where movements become restricted, the applicability of mobile phone survey increases many folds.

Since 2012, IEDCR is collecting health-related data of public health importance through its Cell Phone Based Surveillance (CPBS) platform as an alternative or to supplement face-to-face data collection practices. During its journey, CPBS moved forward with different organizations, that includes names like, International Association of National Public Health Institutes (IANPHI), United Nations Population Fund (UNFPA), United Nations Children's Fund (UNICEF), Food and Agriculture Organization (FAO), Bloomberg Philanthropies, Bill & Melinda Gates Foundation (BMGF), Johns Hopkins University (JHU), The London School of Hygiene & Tropical Medicine (LSHTM), Bangladesh Telecommunication Regulatory Commission (BTRC) and the mobile operators in Bangladesh. So far CPBS activities revolved around issues like communicable and non-communicable diseases, sexual and reproductive health of women, foodborne diseases, follow-up of COVID cases and contact tracing, etc. Since 2015, IEDCR is working with the JHU on the ways to improve the mobile phone surveys to collect data on Non-Communicable Diseases (NCD) risk factors. The CPBS is currently involved with the following activities;

1. Rapid Mortality Mobile Phone Survey (RaMMPS) to collect data on COVID mortality with the objectives, to conduct a national level mortality survey to evaluate the cost effectiveness and feasibility of RaMMPS as a mortality surveillance methodology; and also to estimate excess mortality during the COVID-19 pandemic nationally in Bangladesh using the national level RaMMPS survey.
2. To obtain a nationally representative NCD risk factor data, a call-center based study was undertaken from November 9, 2023 by using random digit dialing through mobile phone (CATI- computer assisted telephone interview) survey following the WHO recommended STEP wise approach to NCD risk factor surveillance (STEPS) tools. In this study, data was generated from each of the eight administrative divisions in Bangladesh to assess the NCD risk factors status in the country. Additionally, the MPS (Mobile Phone Survey) derived data will be analyzed for data validity and reliability by comparing with the data derived through the nationwide face-to-face STEPS survey conducted in 2022
3. Conducted two separate surveys, first a face-to-face survey, followed by a call-center based survey (CATI) on NCD risk factors in a small population (sample size 960) at a month's interval using the same tool. The data is now being analyzed to evaluate the validity and reliability.
4. Developed and tested tools for MPS to assess primary health care status in different countries. It is a mixed method study comprising qualitative and MPS based survey funded by Resolve to Save Lives (RTSL).

References:

1. World Health Organization, International health regulations (2005). 2nd edition ed. 2008: World Health Organization.

2. World Health Organization, International health regulations (2005). 2008: World Health Organization.

3. World Health Organization, Joint External Evaluation Tool: International Health Regulations (2005). 2022: World Health Organization.

4. Bangladesh, Communicable Diseases (Prevention, Control and Eradication) Act, 2018. (accessed on 7 July 2024); Available from: http://bdlaws.minlaw.gov.bd/act-1274.html, in Bangla.

5. World Health Organization, JEE Report Bangladesh 2016.

6. World Health Organization. WHO surveillance case definitions for ILI and SARI. 2014; Available from:https://www.who.int/teams/global-influenza-programme/surveillance-and- monitoring/case-definitions-for-ili-and-sari.

7. Hospital Based Rotavirus and Intussusception Surveillance Monthly Report. 2024 (accessed on 18th Aug 2024); Available from: https://www.iedcr.gov.bd/site/ page/964d9c0e-5efa-4032-af2e-e68d4097af1a/-.

8. National Guideline for Management, Prevention and Control of Nipah Virus Infection including Encephalitis. 2011; Available from: https://www.iedcr.org/ pdf/files/nipah/National_Nipah.pdf.

9. Nipah Virus Transmission in Bangladesh. 2024 (accessed on 18th Aug 2024); Available from: https://www.iedcr.gov.bd/site/page /d5c87d45-b8cf-4a96- 9f94-7170e017c9ce/-.

10. encephalitis, W.J. Japanese encephalitis details. 2024 (accessed on 19th Aug 2024); Available from: https://www.who.int/news-room/fact-sheets/detail/japanese- encephalitis#:~:text=Overview,documented%20in%201871%20in%20Japan.

11. National Antimicrobial Resistance (AMR) Surveillance Report Bangladesh. 2024 (accessed on 19th Aug 2024); Available from: https://www.iedcr.gov.bd /site/page/e1a03902-9a9a-4d86-8c9d-876485e92359/-.

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