

Present Status of AMR Surveillance in Bangladesh



Prof. Dr. Zakir H. Habib
Chief Scientific Officer, IEDCR

August 05, 2023

By end of this presentation, you will be able to learn:



- Surveillance: case and laboratory-based surveillance
- Global surveillance-WHO GLASS initiatives and IEDCR contribution
- Global and National AMR action plan
- Regional lab-based surveillance: CAPTURA(Asia) and MAAP (Africa)
- IEDCR surveillance (initiatives, targeted samples, and pathogens, collected data)
- How it helps to make the national and local decision
- Tools used by IEDCR to analyze and report (web-based surveillance system with open dashboard visualization)
- Skill development initiatives (Regular training at IEDCR and sites)
- Recommendations for fresh graduates, laboratory technologists, and microbiologists)

**“Stop referring to a coming post-antibiotic era — it’s
already here.”**

U.S. Center for Disease Control

- AMR is among the top 10 global health threats
- Antimicrobial resistance poses serious threats to human, animal, and plant health.
- According to WHO report, 2020 overall, the clinical pipeline and recently approved antibiotics are insufficient to tackle the challenge of increasing the emergence and spread of antimicrobial resistance.

Globally, rates of resistance are constantly increasing.....

Global Action Plan (GAP):

❑ In May 2015, World Health Assembly adopted the **Global Action Plan** on AMR.

❑ One of the five strategic objectives of the GAP is to strengthen the evidence base through **surveillance** and research.

Five strategic objectives:

1. Improve awareness and understanding
2. Strengthen the knowledge through surveillance and research
3. Reduce the incidence of infection
4. Optimize the use of antimicrobial medicines
5. Ensure sustainable investment

□ Surveillance of antimicrobial resistance (AMR)

- tracks changes in microbial populations.
- permits the early detection of resistant strains of public health importance.
- supports the prompt notification and investigation of outbreaks.

□ Surveillance findings are needed

- to inform clinical therapy decisions.
- to guide policy recommendations.
- to assess the impact of resistance containment interventions.

GLASS Surveillance: Global AMR Surveillance Initiatives



Enrolment status by end of 2021

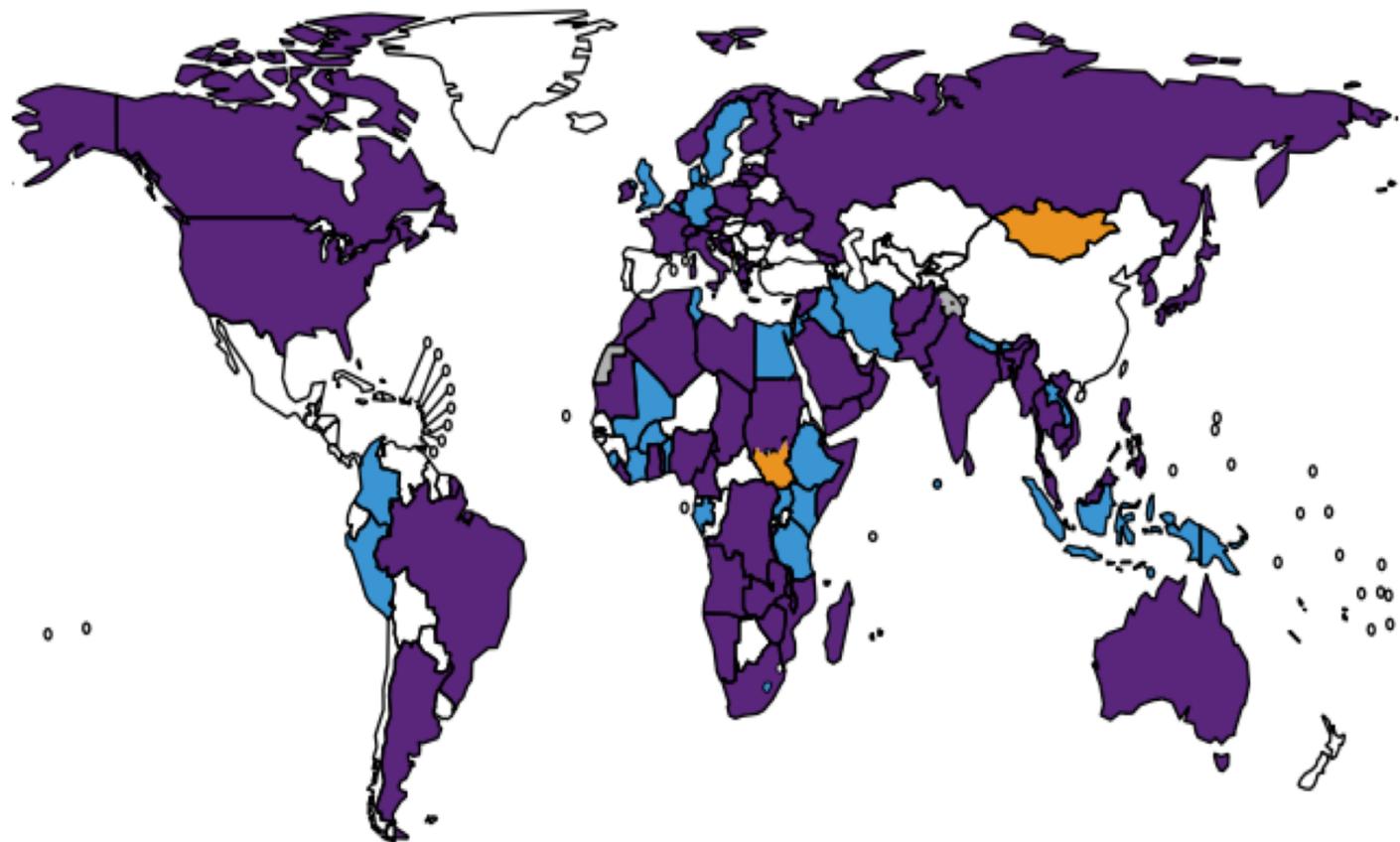


Fig. 2.1. CTAs enrolled in GLASS-AMR and/or GLASS-AMC (2017, 2019, 2021)

■ Enrolled in GLASS-AMR and GLASS-AMC ■ Enrolled in GLASS-AMR ■ Enrolled in GLASS-AMC □ Not enrolled ■ Not applicable

- In 2015, the WHO established the Global Antimicrobial Resistance and Use Surveillance System (GLASS) to monitor AMR in common bacteria and invasive fungi, and antimicrobial consumption (AMC) in humans.
- By the end of the 2021 , 109 countries plus two territories and areas were enrolled in GLASS-AMR
- As of 30 April 2021, 19 in the GLASS-AMC module
- Two countries are enrolled only in GLASS-AMC)

Regional: Routine surveillance in Europe and America



EARS-Net otherwise known as European Antimicrobial Resistance Surveillance Network is a central and comprehensive database for the European Union that focuses on eight different bacterial pathogens established in 1998 .



The **Latin American Network for Antimicrobial Resistance Surveillance** (ReLAVRA by its Spanish acronym) was formally established in 1996 by the WHO/PAHO.

Regional Surveillance initiatives: CAPTURA for Asia



CAPTURA

Capturing data on Antimicrobial resistance
Patterns and Trends in Use in Regions of Asia

CAPTURA partners



International
Vaccine
Institute



BRIGHAM AND
WOMEN'S HOSPITAL



PUBLIC
HEALTH
SURVEILLANCE
GROUP



Supported by



The
Fleming Fund
Regional Grants



UKaid
from the British people

The CAPTURA Project

The UK Government has established the **Fleming Fund** to respond to the global threat of antimicrobial resistance (AMR). The Fleming Fund Regional Grants includes a "call for data", which aims to expand the volume of historical and current data available on AMR and antimicrobial use (AMU) across regions in Africa and Asia.

Regional Surveillance initiatives: MAAP for Africa

What We Do | [MAAP](#)

What Is MAAP?

The Mapping Antimicrobial Resistance and Antimicrobial Use Partnership (MAAP) is a multi-organization and multi-national consortium led by ASLM, and funded by the UK Government's [Fleming Fund](#) that focuses on the response to the global threat of antimicrobial resistance (AMR), with the goal of improving laboratory capacity and diagnosis, as well as data and surveillance of AMR through a 'One Health' approach.

MAAP seeks to establish a system for the collection, storage, and analysis of AMR and antimicrobial use (AMU) data across Africa. MAAP ensures that data are analysed with national and and provide actionable information in support of controlling AMR and developing policies at institutional, national and regional levels. MAAP links up with the [QWArS](#) project, which further consolidate country capacity to analyse AMR data, and the [EQuAFRICA](#) project, which addresses gaps in the quality of AMR laboratory testing.



AMR National Action Plan



Ministry of Health & Family Welfare

National Action Plan

Antimicrobial Resistance Containment in Bangladesh
2017-2022



Disease Control Unit
Communicable Disease Control Program (CDC)
Directorate General of Health Services



National Strategy for Antimicrobial Resistance Containment in Bangladesh 2021-2026

Disease Control Unit
Directorate General of Health Services
Ministry of Health and Family Welfare



The National Antimicrobial Resistance (AMR) Surveillance Strategy of Bangladesh 2020-2025

December 2020

NO TIME TO WAIT:
SECURING THE FUTURE
FROM DRUG-RESISTANT
INFECTIONS



Antibiotics
Antivirals
Antifungals
Antiparasitics



Antimicrobial Resistance Surveillance in Bangladesh

Implementing agency:

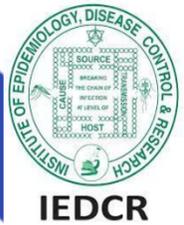
Institute of Epidemiology Disease Control & Research (IEDCR)

Funded: GoB (CDC,DGHS), GHSA (US-CDC), WHO

Duration: From 2016 – 2020

World Health Organization (At present)

IEDCR Surveillance sites



Antimicrobial Resistance Surveillance in Bangladesh (2016-2023)



The Global Antimicrobial Resistance Surveillance System (GLASS)

The WHO manual for GLASS describes three types of surveillance methods:

- Laboratory-based surveillance without linkage to patient data
- Case-finding based on routine clinical specimens
- Case-based surveillance of clinical syndromes



AMR
Surveillance in
Bangladesh

General Objective

To establish a surveillance system to find out the status of Antimicrobial Resistance among common pathogens in Bangladesh



Specific Objectives

1. To strengthen selected Microbiology laboratories for performing standard techniques of bacterial culture & sensitivity testing.
2. To isolate, identify & perform Antimicrobial Sensitivity testing (AST) of the selected pathogens using uniform laboratory protocol.
3. To develop antibiogram periodically according to the observed sensitivity pattern.

10 Priority pathogens

- Escherichia coli*
- Klebsiella pneumoniae*
- Enterococcus species*
- Vibrio cholerae*
- Shigella species*
- Streptococcus pneumoniae*
- Salmonella species*
- Pseudomonas aeruginosa*
- Acinetobacter species*

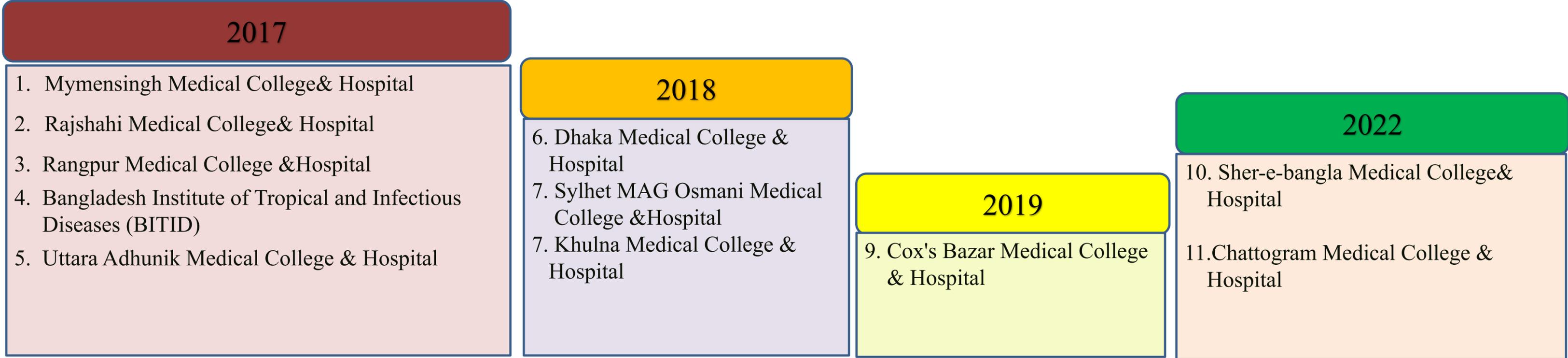
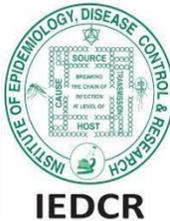
6 Specimens

- Urine
- Blood
- Stool
- Sputum
- Endotracheal aspirate
- Wound Swab

5 cases

- Urinary Tract Infection
- Septicemia
- Diarrhoea
- Pneumonia
- Wound Infection

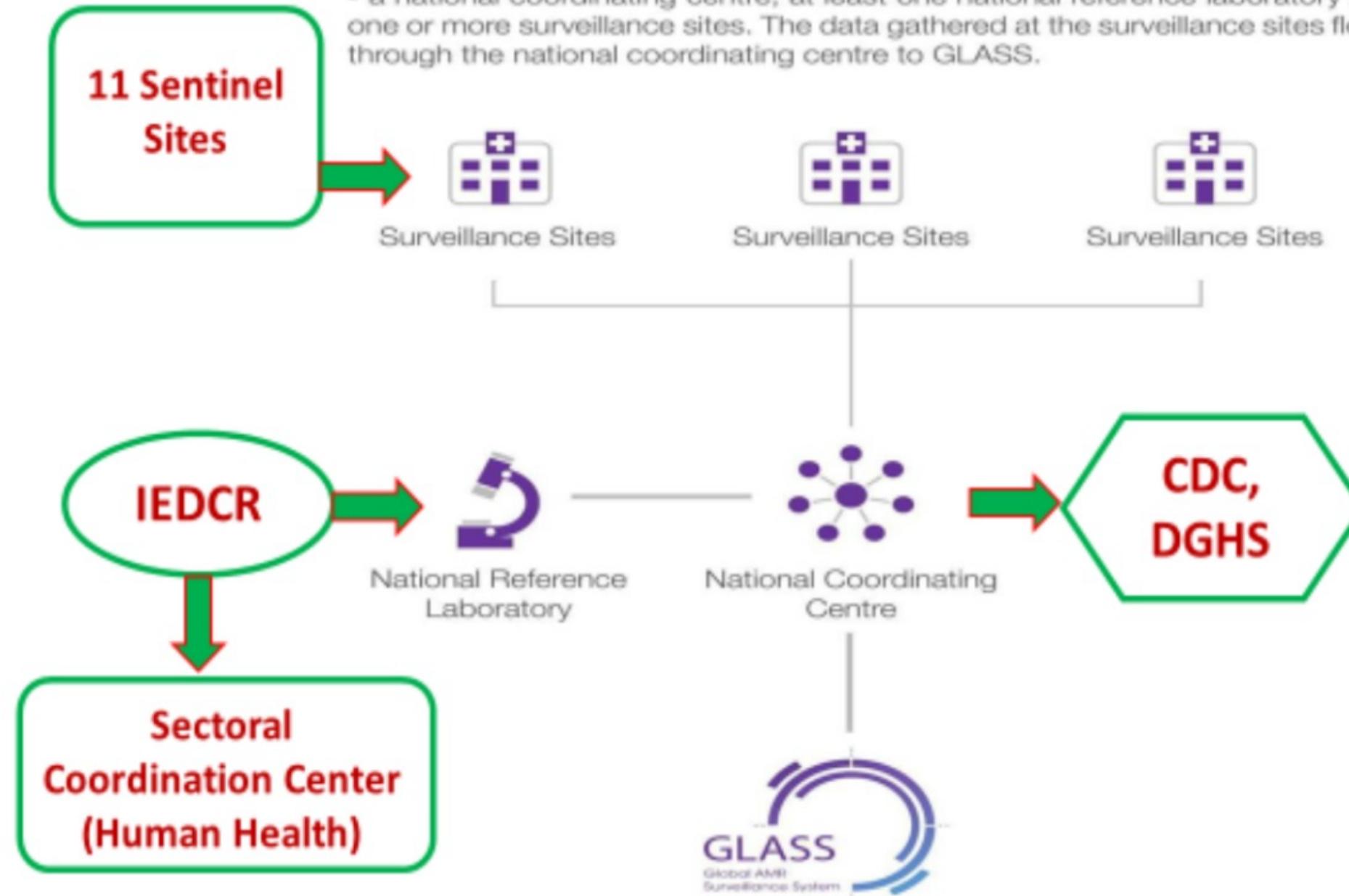
AMR Surveillance in Bangladesh milestones (Human Sector)



AMR Surveillance Sites for the Case-Based surveillance

Antimicrobial Resistance Surveillance in Bangladesh (2016-2023)

There are **3 core components** of a national AMR surveillance system:
- a national coordinating centre, at least one national reference laboratory and one or more surveillance sites. The data gathered at the surveillance sites flows through the national coordinating centre to GLASS.



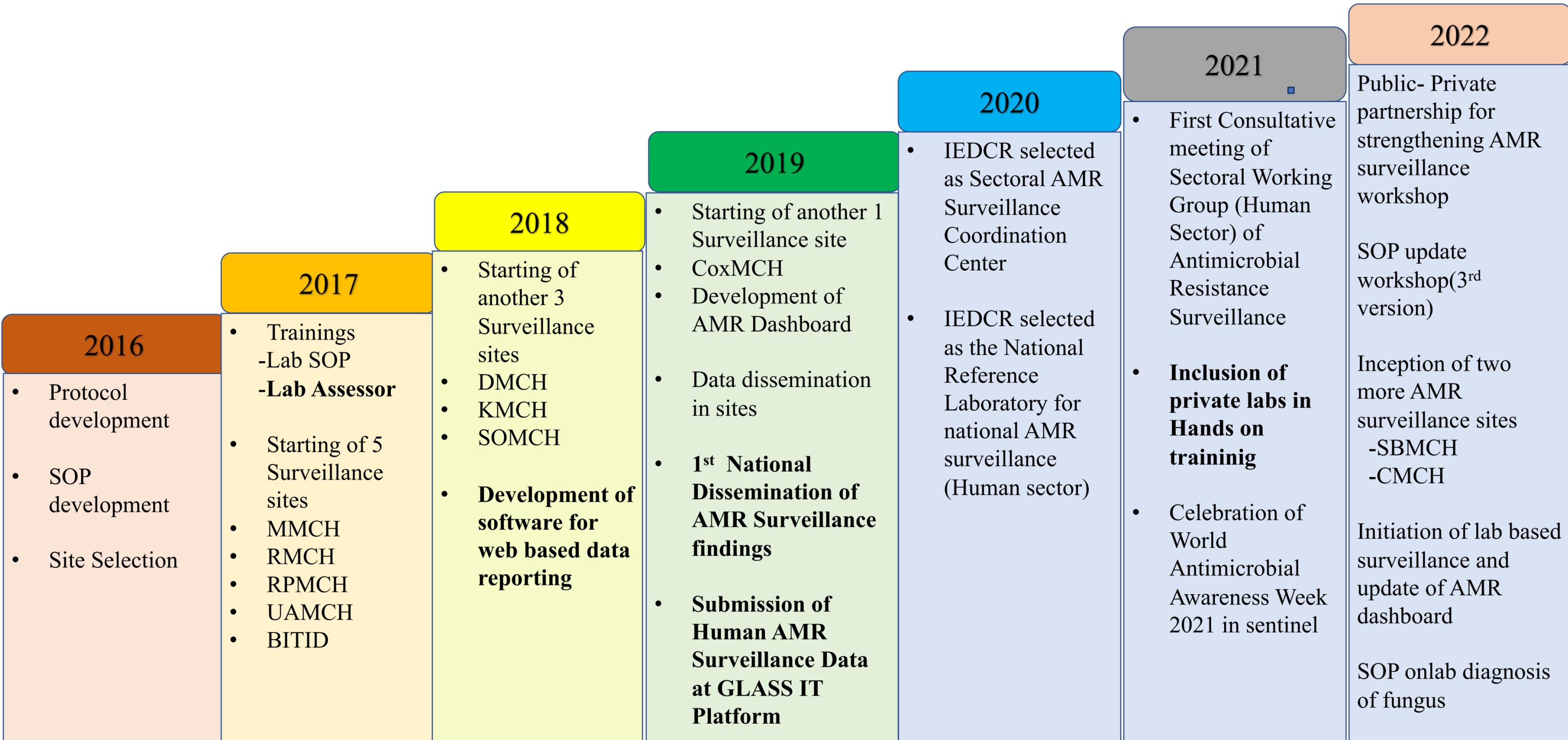
Laboratory activities in the sites are done following the SOPs of NRL including IQC
Bacterial isolates from the sentinel sites are regularly sent to the central repository at
NRL, IEDCR

Quarterly 5-10% of isolates are retested at NRL, root cause analysis is done and
discussed with the sites

NRL and sometimes the sentinel site laboratories participates in international EQA
program provided by CAP (College of American Pathologists), WHO collaborating
center at Thailand

Recently NRL has participated in consecutive six EQA program of EQAsia of
Flemming fund

AMR Surveillance in Bangladesh milestones (Human Sector)



Lab based surveillance

- The majority of microbiological laboratory data is generated from private laboratories.
- Recently in 2022 some of the reputed laboratories are included in the existing AMR surveillance system with the support of Fleming Fund Country Grant to Bangladesh.

1. Popular Diagnostic Centre Ltd.(13 branches)

- ❖ Badda
- ❖ Chattogram
- ❖ Dhanmondi
- ❖ English road
- ❖ Gazipur
- ❖ Khulna
- ❖ Kushtia
- ❖ Mirpur
- ❖ Mymensingh
- ❖ Narayanganj
- ❖ Noakhali and
- ❖ Shantinagar

2. Epic Health Care Ltd.

3. Square Hospitals Ltd (5 branches)

- Banani
- Mirpur
- Panthapath
- Shylet
- Uttara

4. The Ibn Sina Trust (1 branches)

Dhanmondi

5. National Institute Of Neurosciences & Hospital

Case based surveillance

- Started from 2017
- Total 11 labs included till now
- Epidemiological data along with laboratory C/S test data is included
- Mostly public
- Specimen types limited
- Logistics and equipment support given to the sites
- Technical support provided
- Total samples tested-35,537
- Total isolates- 9229
- Data is collected through designated Project facilitators.
- Both growth & no-growth specimen data is collected.

Lab based surveillance

- Started from 2022
- Total 20 branches of 5 labs included
- Only laboratory test data is included
- Mostly private
- Specimen types diverse and many
- Logistics and equipment support not given to the sites
- Technical support provided
- Data is collected from individual laboratories Laboratory Information Management System (LIMS).
- Only growth specimen data is collected.
- **Total Number of isolates: 35,727**

- ❖ AMR surveillance is running in Bangladesh for consecutive 7 years
- ❖ Human AMR Surveillance data of 2017, 2018 & 2019,2020,2021 is entered in GLASS platform from Bangladesh.
- ❖ The analysis of the surveillance data has been disseminated to all the stakeholders in 2019,2021 and 2022 centrally as well as in the sentinel sites
- ❖ AMR awareness week is celebrated in all 11 sentinel sites
- ❖ IEDCR is designated by the Government as Sectoral Coordination Center (Human health) for AMR surveillance and National Reference Laboratory (NRL) for AMR is situated at IEDCR
- ❖ Development of AMR Surveillance One Health data dashboard accessible to everybody
- ❖ The dashboard link is- <https://dashboard.iedcr.gov.bd/amr/>



- ❖ A modern laboratory is established at IEDCR equipped with latest technology equipment's like VITEK-2, MALDI-TOF
- ❖ The software for data collection from sentinel site, monitoring of data from center as well as the dashboard- all are developed maintained by IEDCR IT team
- ❖ Lab based surveillance has been established sidec by side with case based surveillance system
- ❖ AMR dashboard has been upgraded to one health dashboard including case based and lab based surveillance of human health as well as animal health data

Global Antimicrobial Resistance And Use Surveillance System (GLASS) Report-2021



Bangladesh Population 163.05 million

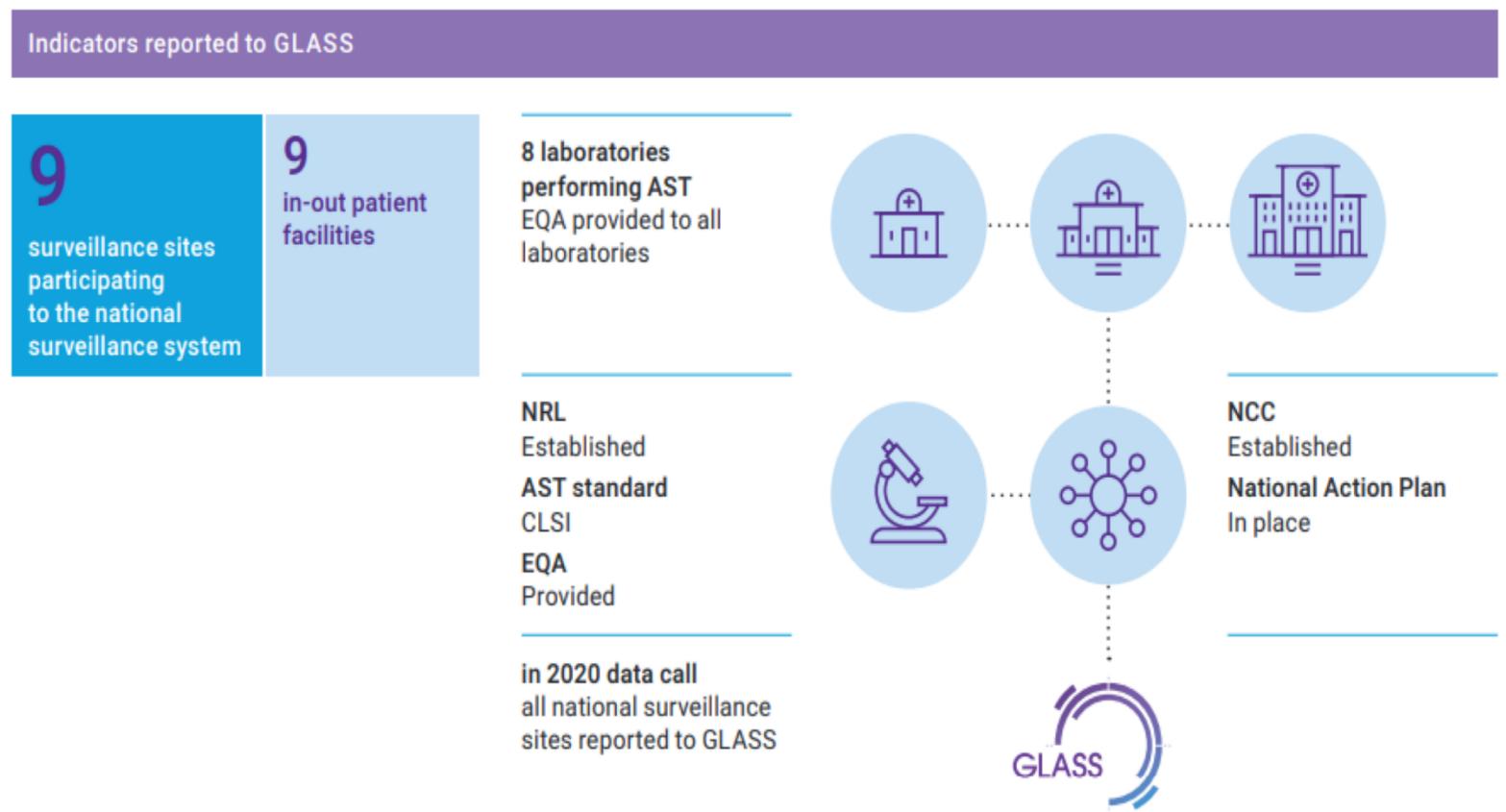
The current AMR surveillance system is based on case-based surveillance of clinical syndromes, which will be complemented by Laboratory based surveillance in a short time.

National AMR surveillance systems key indicators

SURVEILLANCE ACTIVITIES	IMPLEMENTATION
GLASS-AMR	✓
GLASS-AMC	
HIV DR ¹	
DR-TB ²	✓
Malaria TES ³	✓
One health	
EGASP	

1. HIV Drug-Resistance
2. Drug-resistant TB
3. Malaria Therapeutic Efficacy Studies

National AMR surveillance systems key indicators



Global Antimicrobial Resistance And Use Surveillance System (GLASS) Report-2021



Drug-resistant TB surveillance	
High burden country ¹	Yes
Source of data	Survey
Surveillance coverage	Nationwide
Year of most recent activity	2019
Number of data points ²	2
Data on fluorquinolones	Yes

1. This indicates whether the country has been defined by WHO for the period of 2016-2020 as having a high burden of TB and/or multidrug-resistant TB (MDR-TB)
 2. Number of years from which data are available between 1995 and 2019

AMR data submission to GLASS (2020 data call)						
Specimen type	Pathogen	AST results	Age	Gender	Infection origin	Data on number of tested patient
Blood	Acinetobacter spp.	●	●	●	●	●
	E. coli	●	●	●	●	
	K. pneumoniae	●	●	●	●	
	Salmonella spp.	●	●	●	●	
	S. aureus	●	●	●	●	
	S. pneumoniae	●	●	●	●	
Urine	E. coli	●	●	●	●	●
	K. pneumoniae	●	●	●	●	
Stool	Salmonella spp.	●	●	●	●	●
	Shigella spp.	●	●	●	●	
Genital	N. gonorrhoeae	●	●	●	●	●

● 70-100% data reported ● <70% data reported ● No data reported

IEDCR Dashboard for AMR Data management

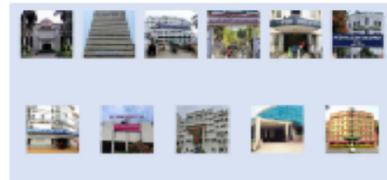


ANTIMICROBIAL RESISTANCE (AMR) SURVEILLANCE IN BANGLADESH

Welcome to Data Dashboard
(This dashboard illustrates two types of AMR surveillance ongoing in public health and animal health sector in Bangladesh)



Public health



Case Based Surveillance

This is an active surveillance. This surveillance is ongoing in eleven sentinel sites since 2017. Surveillance Sites are [click here](#)

[Graphical Representation of this Data](#)



Lab Based Surveillance

This is a passive surveillance started in July 2022. The contributing laboratories have been qualified after assessment by experts from DGHS Bangladesh. The laboratories are [See full list](#)

[Lab Based Surveillance Information at a Glance](#)

Animal health



Department of Livestock Services (DLS)

Department of Livestock Services is a Bangladesh government department under the Ministry of Fisheries and Livestock responsible for Livestock industry in Bangladesh. [click here](#)

[AST data at a Glance](#)



Bangladesh Livestock Research Institute

This is a national research organization under Ministry of Fisheries and Livestock was entrusted to conduct research on livestock and poultry development of the country.

[AST in BLRI at a Glance](#)

IEDCR Dashboard for AMR Data management



The graphical representation of this data is updated real time from the surveillance sites. This may be changed after checking by IEDCR reference laboratory.

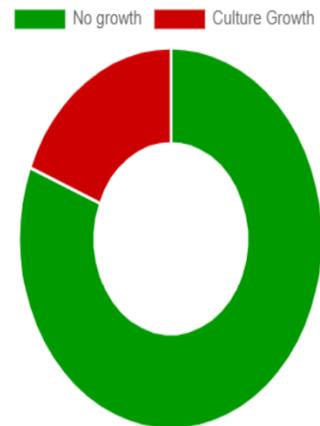
Select specimen type from drop-down list

SHOW

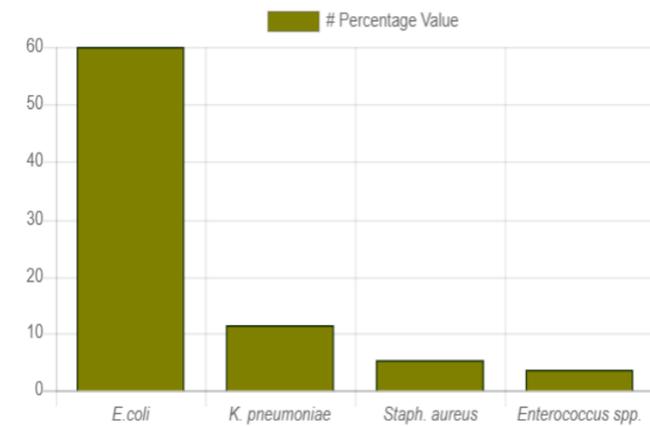
Select site

Select Organism

Distribution of **Urine** sample by growth character from All sites (n=16207)



Isolated organisms from **Urine** Culture from All sites, (n=3060)

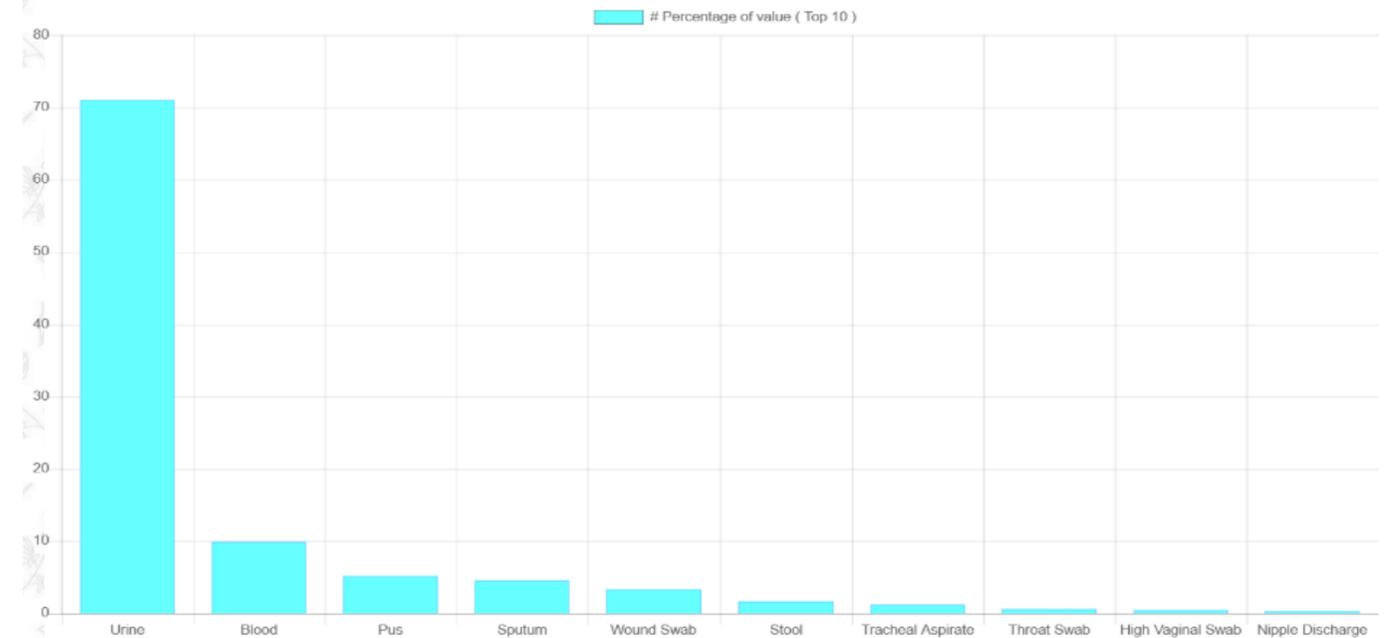


Antimicrobial Resistance (AMR) Surveillance in Bangladesh

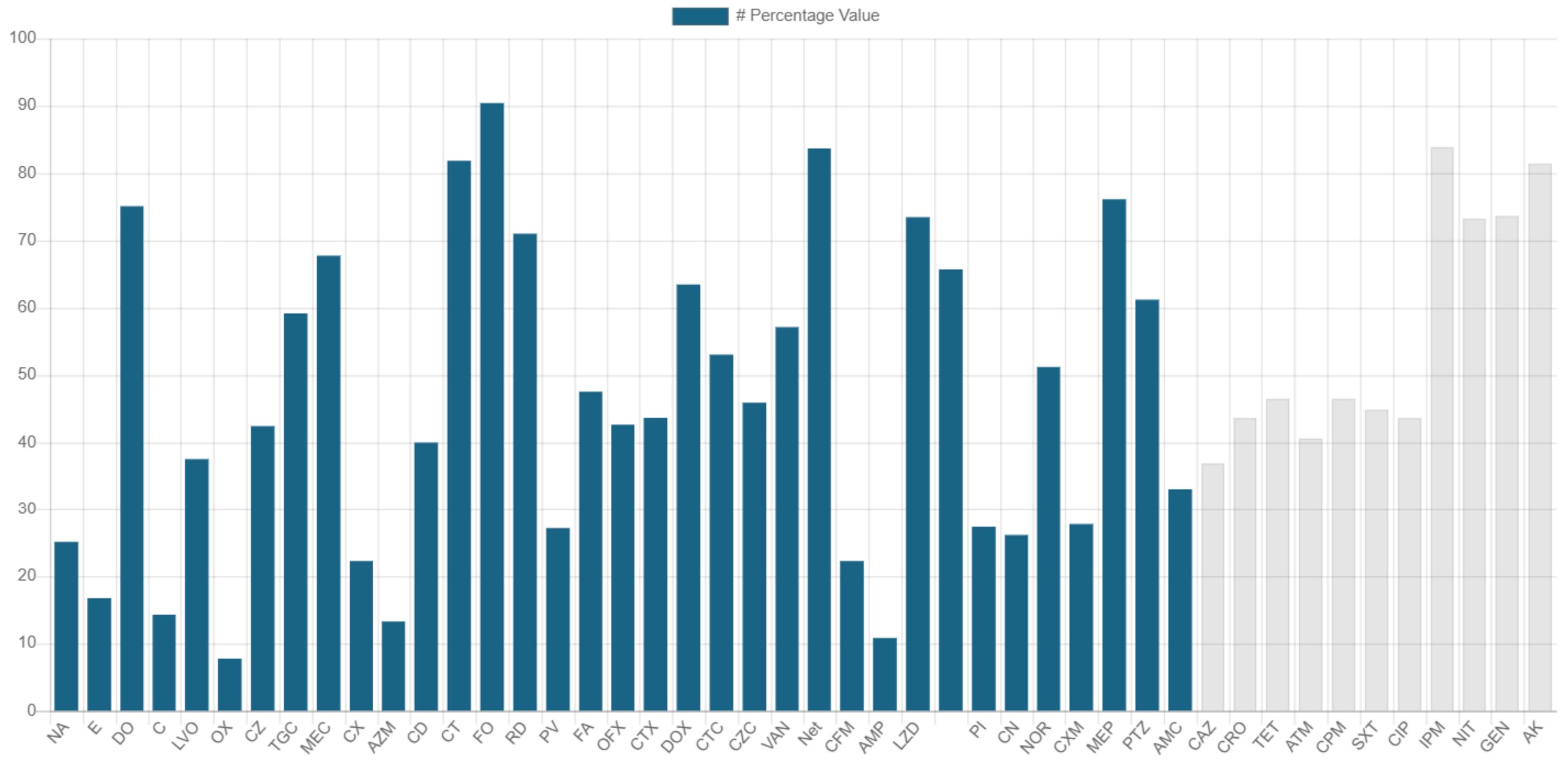
Lab based surveillance information at a glance

Directly uploaded from the supplied data of the participating lab

No of Isolates (n=36,601)



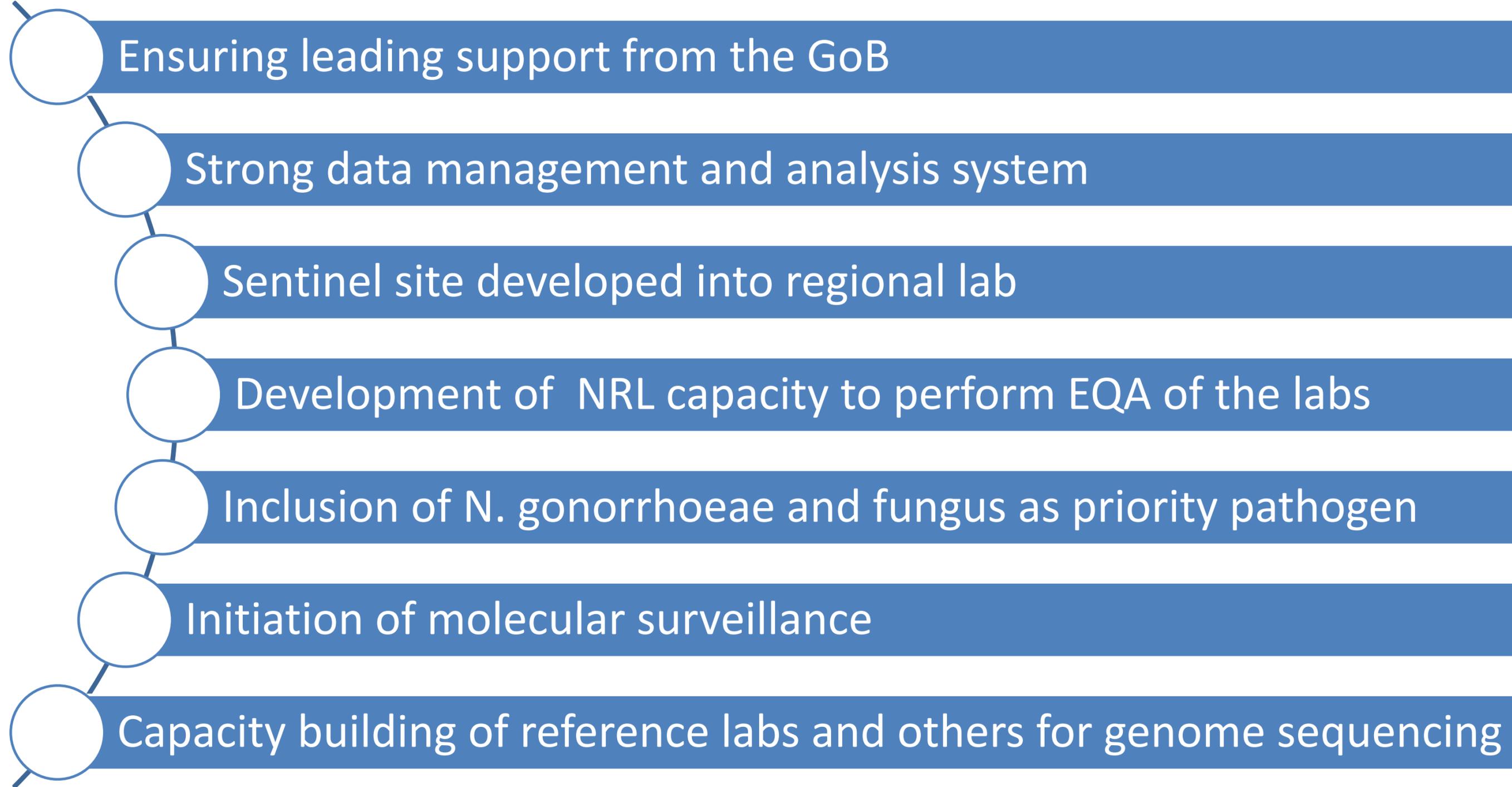
IEDCR Dashboard for AMR Data management



Laboratory Activities at IEDCR



Way forward



- Improving capacity of the repository system of reference lab
- Full utilization of the reference laboratory as a research lab

How will you be involved with IEDCR initiatives?

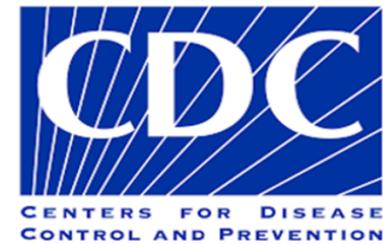


- AMR surveillance One Health Dashboard is open for everybody to have idea of the current situation
- At present NRL with its limited capacity is trying to support the research students
- Different training option is at present limited for the medical laboratories but may be extended to others in the future
- Students can take part in AMR awareness activities initiated by Sectoral coordination center at IEDCR

Thanks and gratitude to:



The
**Fleming
Fund**



THANK YOU

If you have any questions or queries, I will be happy to answer them during the QA session.

Feel free drop an email with your query to: info@jaetech.co