Role of the laboratory in AMR surveillance

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Jaipur Declaration on Antimicrobial resistance, 6 September 2011

- Commitment to work together to contain AMR
- Emphasised the need to increase capacity and share best practices for laboratory based surveillance of AMR and foster the effective use of data to modify antibiotic policy.
- Recognises laboratory surveillance as a priority for controlling AMR

Jaipur Declaration on Antimicrobial Resistance

We, the Health Ministers of Member States of the WHO South-East Asia Region participating in the Twenty-ninth Health Ministers' Meeting in Jaipur, India, appreciate the efforts being made by Member States and partners in the South-East Asia Region to adopt a holistic and multidisciplinary approach towards prevention and containment of antimicrobial resistance to improve public health. We also recognize that it is imperative that national governments accord utmost priority to this hitherto neglected problem to preserve efficacy of the antimicrobial agents – in our fight against microbial diseases.

WHO South East Asia Regional flagships

Progress on all eight Flagship Priorities depends on access to quality diagnostic and laboratory services.

- Measles and rubella elimination by 2023
- Prevention & control of noncommunicable diseases through multisectoral policies & plans, with focus on “best buys”
- Accelerate reduction of maternal, neonatal and under five mortality
- Universal health coverage with a focus on human resources for health and essential medicines
- **Building national capacity for preventing & combating antimicrobial resistance**
- Scaling up capacity development in emergency risk management in countries
- Eliminate neglected tropical diseases and other diseases on the verge of elimination
- Accelerating efforts to end TB

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Laboratories & AMR surveillance

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What the laboratory can collaborate with

- **Surveillance data for design of empiric therapy at local level**
  - > 80% of the treatments are empirical
- **Pathogen circulation and its resistance profile**
  - Decision makers need data
  - To design strategies and to evaluate the impact
- **Strategies**
- **Routine use of information provided by the laboratory (standardization and quality assurance) in sentinel units**

What information does surveillance of AMR provide?

- Recognize involved species
- Establish prevalence and resistant profiles (extent of the problem)
- Suggest treatment options
- Design control strategies
- Determine efficacy of control actions

Excellent opportunity to know the quality of the labs and improve it

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Global Action Plan on AMR

Role of the laboratory

1. Improve awareness and understanding

- Training of health care professionals
- Participate in awareness and understanding campaigns to the public
- Participate in pre grade education strategies (schools and universities)

2. Strengthen knowledge through surveillance & research

- Quality of diagnostic
- data production, collection, analysis and report
- Sources of resistance mechanism
- Detection, confirmation, characterization and communication of AMR emergencies
- Provide all the microbiological knowledge to design guidelines for treatment based in local epidemiology
- Measure the impact of antimicrobial resistance

3. Reduce the incidence of infection

- Surveillance cultures from patients and environment
- Evaluation spread of pathogens at the community and nosocomial settings
- Alert the health care staff about the resistance mechanisms under surveillance at the hospital or emergencies of new pathogens or new resistance mechanisms
- Impact evaluation of prevention strategies
- Early detection of events that can become outbreak

4. Optimize the use of antimicrobial medicines

- Accuracy and quality assures optimal diagnostic results
- pharmacokinetic and pharmacodynamics parameters
- Selective report of susceptibility test according to pathogen, infection site, and resistance profile

Global Antimicrobial Resistance and Use Surveillance System

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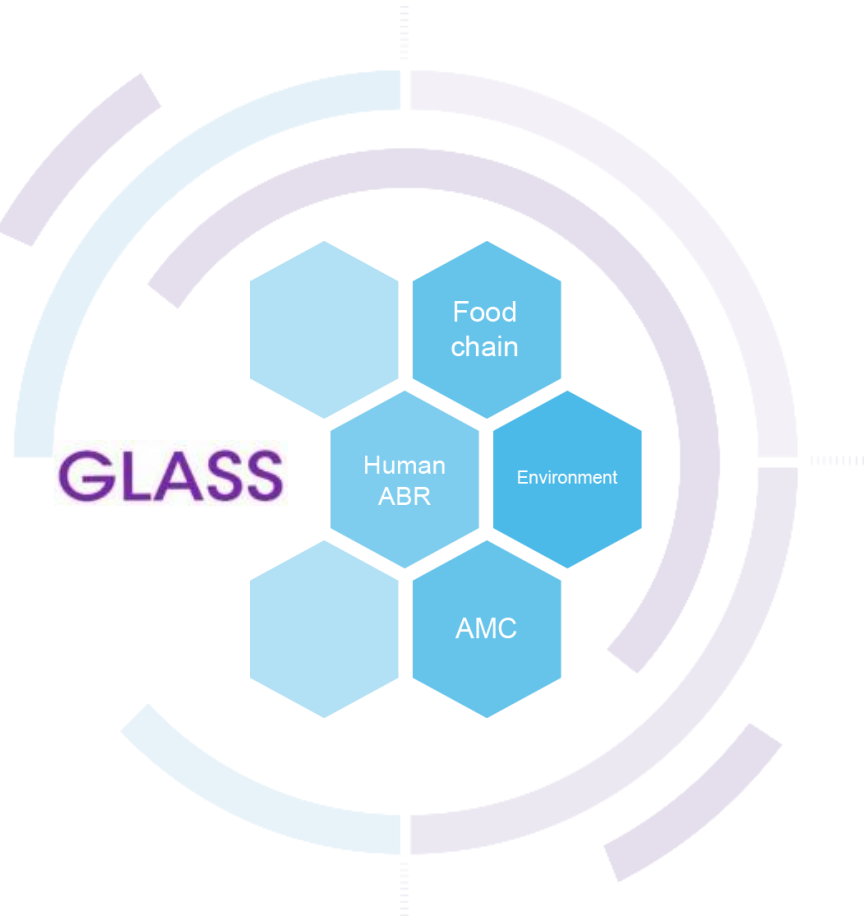
What is GLASS?

Global Antimicrobial Resistance and Use Surveillance System

The first global system to incorporate official national data from surveillance of AMR & AMU

- requested by the WHO Member States (Resolution WHA68.7) & launched in October 2015
- standardized approach to the collection, analysis, and sharing of AMR, AMC and AMU data
- One Health model for AMR surveillance
- epidemiological, clinical, and microbiological data



What is the purpose of GLASS?

- Foster national surveillance systems through harmonised global standards
- Estimate the extent of AMR globally
- Assess patterns of AMU globally
- Detect AMR emergence and spread
- Generate data to inform AMR burden estimates
- Inform strategies to tackle AMR

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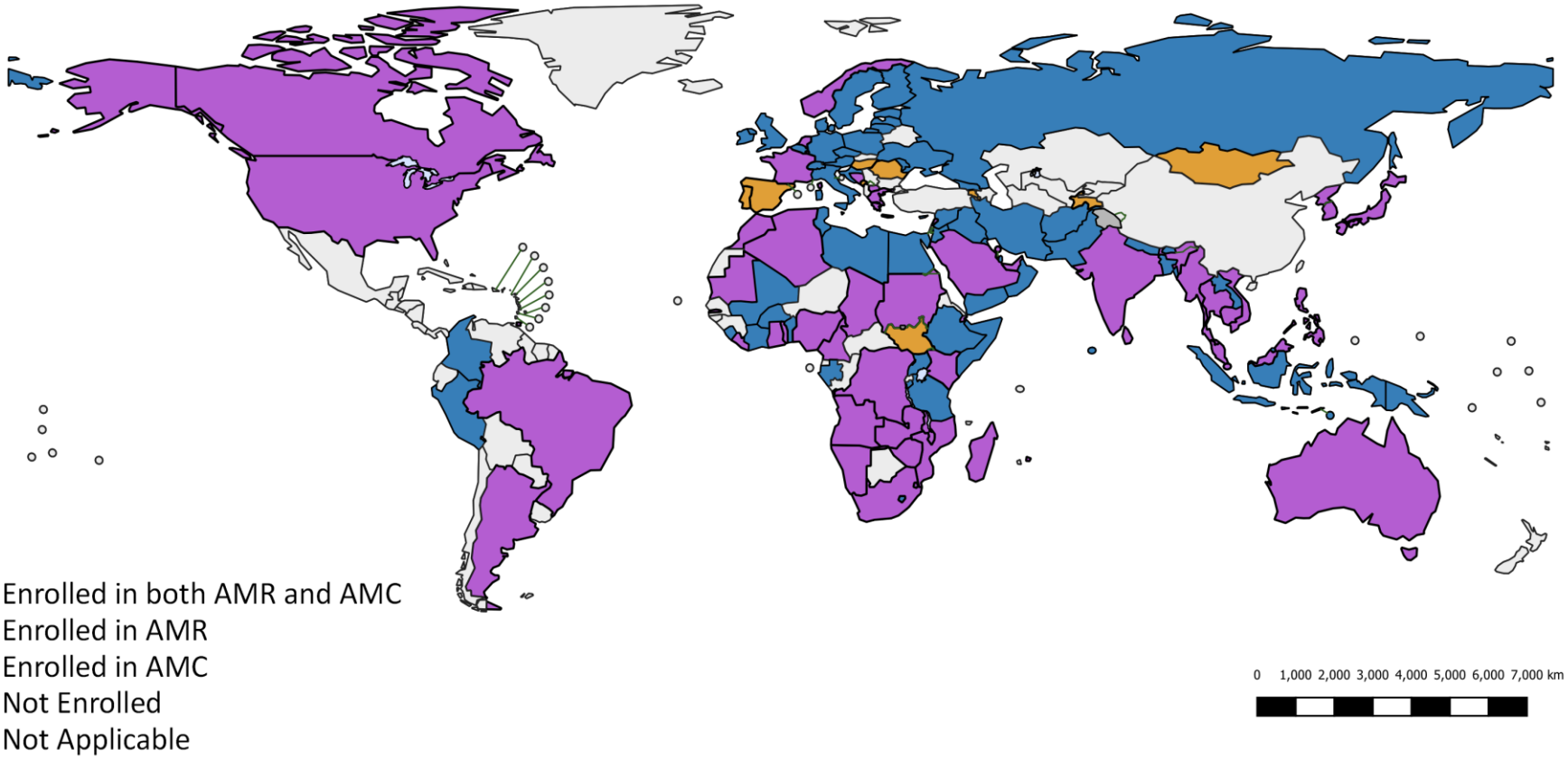
GLASS Enrolment Map July 2022



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Data source: World Health Organization
Map production: Information Evidence and Research (IER)
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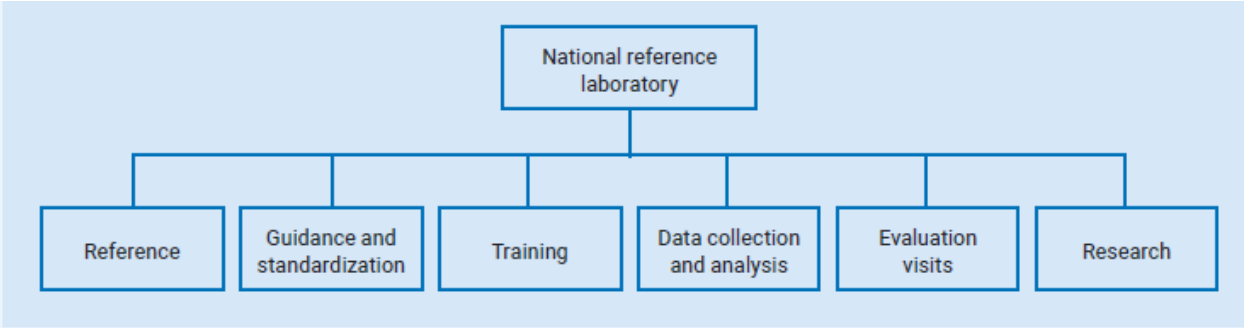
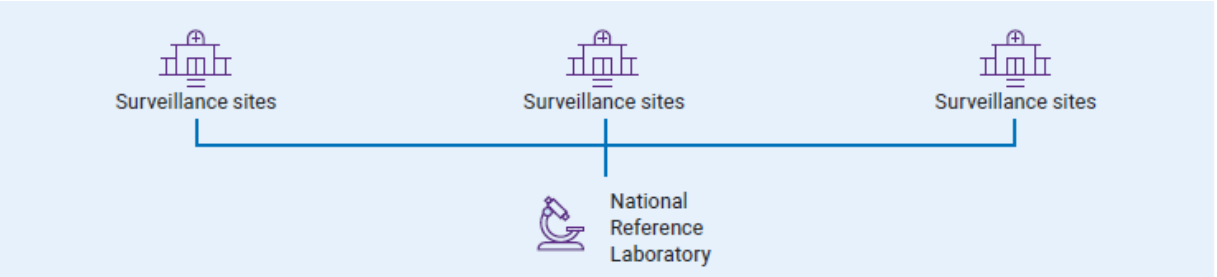
What is needed for a Surveillance network?

- Define the National Reference Lab
- Create a National Advisory Committee



- Develop the network structure: Lab participants
- Develop and consensus of work protocols
- Define strategy of quality assurance



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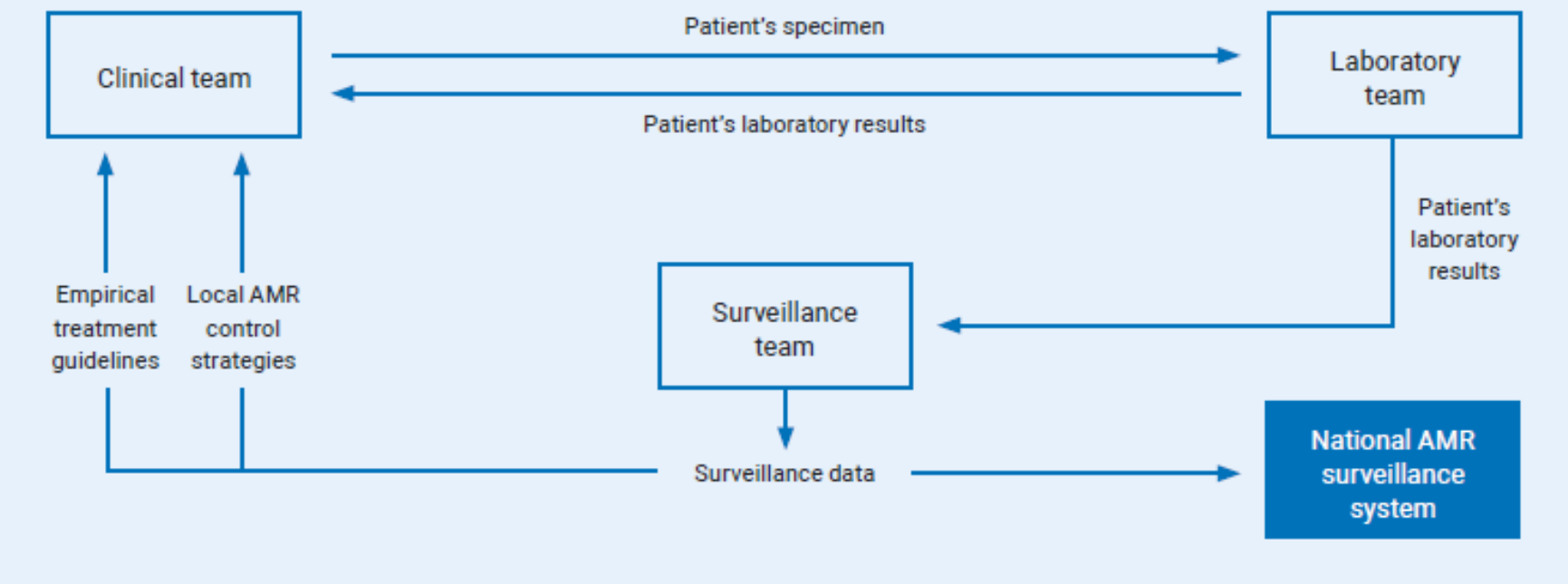
What is needed for a Surveillance network?

- Collect information, analyze quality & improve the surveillance



AMR surveillance in WHO SEAR

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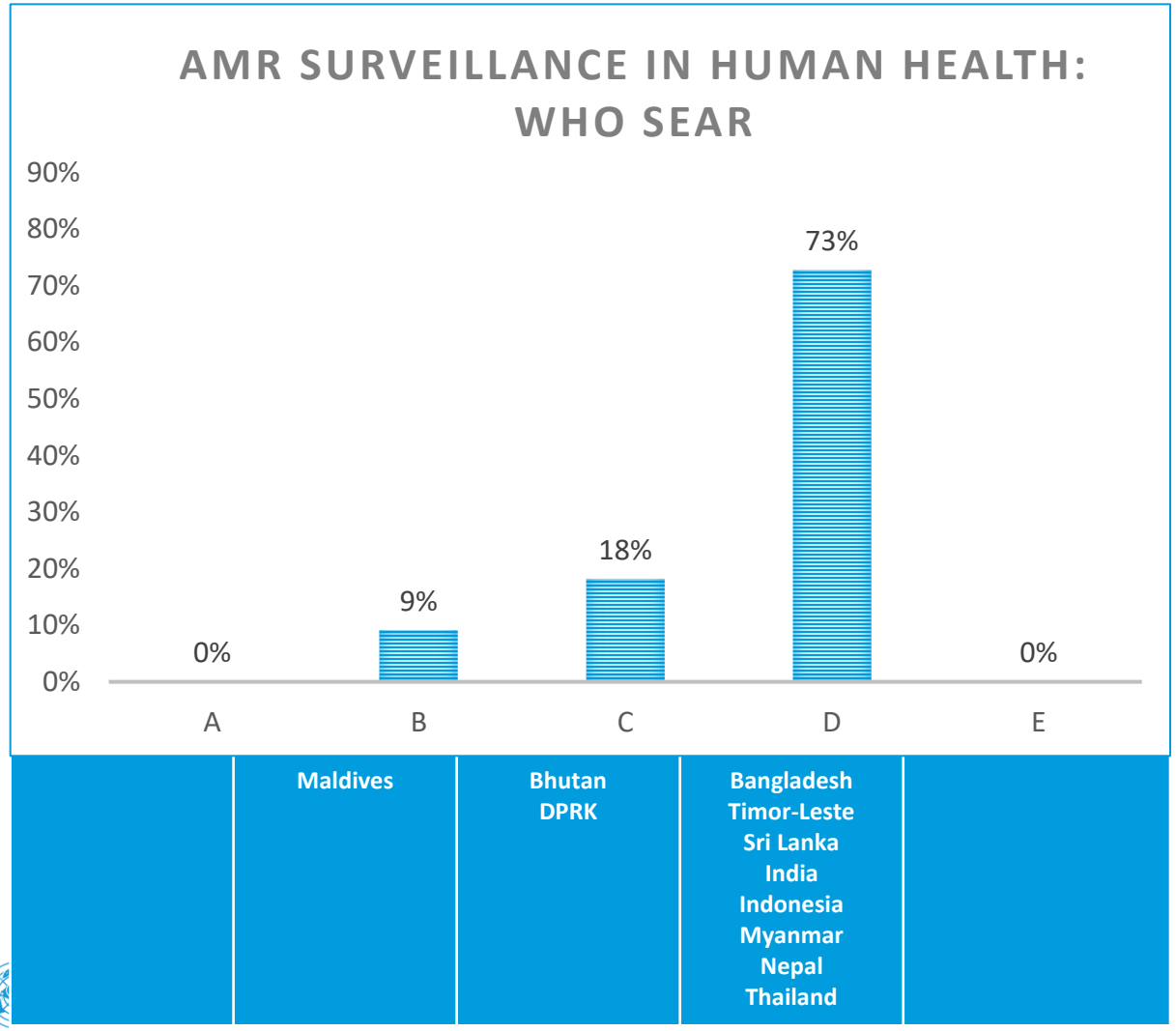
GAP OBJ 2: AMR SURVEILLANCE in SEARO



- Strengthen **SEAR** countries capacity to expand sentinel sites for AMR surveillance and optimize data use
- **India**, **Indonesia**, **Nepal**: support countries to implement integrated surveillance AMR (tricycle project)

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Source: TrACSS 2021 SEAR data, n=11

SEARO surveillance structures

Numbers of surveillance sites reporting to GLASS, by region and year

Region	Surveillance sites	Year 2017	2018	2019	2020
South-East Asia	Hospitals	2	28	34	129
	In- and outpatient facilities		13	25	87
	Laboratories		15	48	26
	Outpatient facilities		1	3	5
	Total	**2**	**57**	**110**	**247**

Provision of EQA to NRLs

EQAs iteration	No. of participating labs	% Correct identification and antimicrobial susceptibility test
2016	3	66.7
2017	5	93.3
2018	10	68.5
2019	10	82.6
2020	3	66.8
2021	13	91.7

- **Support countries capacity on AMR laboratory capacity including by providing EQA for NRLs, in cooperation with WHO collab centres**
  - *Escherichia coli*
  - *Salmonella spp.*

Regional strategy to improve diagnostic preparedness and laboratory networking

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Lessons learnt through the COVID19 laboratory response

Vertical networks key for laboratory preparedness; pandemic influenza, vaccine preventable diseases, HIV, TB, malaria, and antimicrobial resistance (AMR)

Leveraging existing resources were key to successful laboratory responses during the COVID19 pandemic.

- scalability of testing and workforce for surge
- adaptability of testing strategies to changing transmission patterns
- sequencing capacity for rapid pathogen and variant identification
- rapid sharing of information on public domains critical to track pathogen evolution and fast track R&D
- differential diagnosis capacity across referral pathways across the health system
- testing outside the healthcare system
- data science for effective decision making

SEA regional roadmap for diagnostic preparedness and integrated laboratory networking

- **Build on past and current strategies**
  - Asia Pacific Strategy for Emerging Diseases and Public Health Emergencies (APSEDIII) and
  - Asia Specific Strategy for Public Health Laboratories
  - Informal laboratory network
- **Place the value of diagnostics central** to preparedness activities, disease surveillance programmes and healthcare systems
- Build laboratory systems with the ability to be transformed to meet challenges of unknown future emergencies
  - Delivery of services during crisis, surge capacity, repurposing resources
- Regional Roadmap is built around **six interrelated strategic goals**, each comprising of activities and desired outcomes
  - Member States can update existing policies and strategies, adapt to their national priorities, resources, capacities, regulations and specific contexts

Southeast Asia regional roadmap for diagnostic preparedness, integrated laboratory networking and genome surveillance

VISION

Continuous efforts and investments are made towards advancing interconnected disease diagnosis and surveillance through resilient, quality assured, safe and timely laboratory services with efficient linkages to reporting, referrals, and care.

GOAL

To strengthen laboratory diagnostic preparedness for health security through enabling laboratories to rapidly, accurately and safely identify infectious and non-infectious hazards in a “One Health” approach, by improving multi-sectoral collaboration and partnerships, in WHO South East Asia region

Accelerate progress for diagnostic preparedness

- Strengthen national leadership, governance and multisectorial collaboration
- Ensure adequate investment to build and modernise clinical and public health laboratory networks
- Build agile and resilient laboratory policies and systems as an all hazards approach
- Promote research, development of and access to new and innovative technologies
- Facilitate learning for continuous improvement and sustain readiness posture
- Trust architecture for rapid information and sample sharing

Southeast Asia regional roadmap for diagnostic preparedness, integrated laboratory networking and genome surveillance

Issues

- Under investment in diagnostics and laboratory systems
- Low political commitment
- Vertical surveillance and laboratory systems
- Lack of data interoperability
- Lack of regulatory harmonisation
- Limited linkage to clinical care
- Lack of standardisation of sample collection and storage
- Limited coordinated research

Inputs

- **Countries** commit to –
  - Increasing funding and expenditure
  - Multi-sectorial network and establishing public private partnership
- **Donors** commit to funding laboratory systems, away from vertical structures
- **Partners** commit to joint planning and implementation to strengthen interconnected disease surveillance and diagnosis

Outputs

- Strengthen national leadership, governance and multi-sectorial collaboration encompassing the broader “One Health” approach
- Ensure adequate investment to build & modernise clinical and public health lab networks
- Build agile and resilient laboratory systems and policies as an all hazards approach
- Promote research, development of and access to new and innovative technologies
- Facilitate learning for continuous improvement and sustain readiness posture for public health emergencies
- Trust architecture for rapid information and sample sharing

Outcomes

- Modernised and sustainable laboratory systems
  - Regional laboratory network
  - Diagnostic advisory group
- Decentralisation of testing and increased access to testing
- Improved tools for diagnosis and data capture
- Quality assured and safe testing
- Increased awareness and commitment to diagnostics
- Improved sample and data sharing
  - Regional genomic consortium

Impact

- Rapid detection of outbreaks
- Effective use of data for public health actions
- Improved diagnostic stewardship

Conclusions

- Early detection of events that can become outbreaks through the microbiological data reduces the incidence of infections.
- Well-equipped laboratories with well-trained staff that report regularly to functioning surveillance systems allow the detection and tracking of antimicrobial-resistant microorganisms and prompt notification to the relevant authorities when an outbreak occurs
- To facilitate and encourage a standardized approach to AMR surveillance it is important to do it though an integrated surveillance network
- Maintain the gains of laboratory infrastructure improvements made during the COVID19 pandemic
- SEAR regional roadmap will strengthen regional AMR laboratory network and address the initiation of diagnostic stewardship