National Antimicrobial Resistance Surveillance System for Human Health Sector

2nd Edition

2024

Ministry of Health and Mass Media, Sri Lanka
in collaboration with

Sri Lanka College of Microbiologists

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Acknowledgement

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As Deputy Director General of Laboratory Services, I am particularly thankful to the SLCM surveillance committee for their dedicated work on this revision. We also appreciate the active participation of the Technical Support Group – Surveillance (Human Health sector), whose insights enriched the content of this document.

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This collaborative effort underscores our shared commitment to addressing antimicrobial resistance and protecting public health in Sri Lanka.

Dr. Priyantha. L. Athapattu

Deputy Director General Laboratory Services
National Focal Point for Combating AMR

Contributors

Committee of the Sri Lanka College of Microbiologists

Dr. Jayanthi Elwitigala	- Consultant Microbiologist
Dr. Kushlani Jayatilleke	- Consultant Microbiologist
Dr. Malika Karunaratne	- Consultant Microbiologist
Dr. Lilani Karunanayake	- Consultant Microbiologist
Dr. Sujatha Pathirage	- Consultant Microbiologist
Dr. Madhumanee Abeywardena	- Consultant Microbiologist
Dr. Samanamalee Gunasekera	- Consultant Microbiologist
Dr. Primali Jayasekara	- Consultant Mycologist
Dr. Vaithehi Francis	- Consultant Microbiologist
Dr. Wasana Kudagammana	- Consultant Microbiologist
Dr. B. Devakanthan	- Consultant Microbiologist

Technical Support Group – Surveillance (Human Health sector)

Dr. P. L. Athapattu	- Deputy Director General (DDG) Laboratory Services
Dr. Sudath Dharmarathne	- Former Deputy Director General Laboratory Services
Dr. Suranga Dolamulla	- Director Laboratory Services
Dr. Hasitha Koralage	- Chief Epidemiologist
Dr. Samitha Ginige	- Former Chief Epidemiologist
Dr. Dedunu Dias	- Director Medical Suppliers Division
Dr. Kushlani Jayathilake	- Consultant Microbiologist, Jayawardenapura Hospital
Dr. Jayanthi Elwitigala	- Consultant Microbiologist, NSACP
Dr. Malika Karunarathne	- Consultant Microbiologist, NIID
Dr. Lilani Karunanayake	- Consultant Microbiologist, MRI
Dr. Primali Jayasekara	- Consultant Mycologist, MRI
Dr. Madumanee Abeywardena	- Consultant Microbiologist, National Hospital, Kandy
Dr. Roshan Jayasooriya	- Consultant Microbiologist, NIHS
Dr. Muditha Hapudeniya	- Consultant Health Informatics, NHSL
Dr. J. Hamsananthy	- Consultant Community Physician, DDG LS unit
Dr. A. K. J. M. Wijerathne	- Consultant Health Informatics (Actg), DDG LS unit

Deputy Director General Laboratory Services Unit

Dr. P. L. Athapattu	- Deputy Director General
Dr. J. Hamsananthy	- Consultant Community Physician
Dr. Krishantha Wijerathne	- Consultant Health Informatics (Actg)
Dr. Asela Dissanayake	- Senior Registrar (Admin)
Dr. Mangala Samarawikrama	- Senior Registrar (Admin)
Dr. Asendra Hikkaduwage	- Medical Officer
Dr. T. Abarna	- Medical Officer
Dr. Thanusha Karunanandan	- Medical Officer (Health Informatics)
Mr. Dammika Saman Kumara	- Data Manager

Director Laboratory Services Unit

Dr. Suranga Dolamulla	- Director
Dr. Nepul Dharmathilake	- Deputy Director

Abbreviations

AMR	Antimicrobial resistance
ARSP	Antibiotic Resistance Surveillance Project
AST	Antibiotic Sensitivity Test
BSI	Blood stream infection
CCP	Consultant Community Physician
CLSI	Clinical and Laboratory Standards Institute
DDG-LS	Deputy Director General – Laboratory services
EBSL	Extended Spectrum Beta-Lactamase
GDP	Gross Domestic Product
GLASS	Global Antimicrobial Resistance Surveillance System
IB-VPD	Invasive Bacterial Vaccine Preventable Diseases
ICU	Intensive Care Unit
KPI	Key Performance Indicator
MIC	Minimum Inhibitory Concentration
MoH	Ministry of Health
MRI	Medical Research Institute
MSD	Medical Suppliers Division
NAC AMR	National Advisory Committee for Antimicrobial Resistance
NAP IST	National Action Plan Implementation and Strengthening Team
NEQAS	National External Quality Assurance Scheme
NRL	National Reference Laboratory
NSACP	National STD/AIDS Control Programme
SLCM	Sri Lanka College of Microbiologists
WHO	World Health Organization

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National Antimicrobial Resistance Surveillance System – Human Health Sector

1. Background

Antimicrobial resistance (AMR) is a global public health threat. It is estimated that bacterial AMR was directly responsible for 1.27 million global deaths in 2019 and contributed to 4.95 million deaths (1). In addition to death and disability, AMR has significant economic costs. The World Bank estimates that AMR could result in US$ 1 trillion additional healthcare costs by 2050, and US$ 1 trillion to US$ 3.4 trillion Gross Domestic Product (GDP) losses per year by 2030 (2).

Despite constituting an important proportion of Blood Stream Infection (BSI) by fungal pathogens, it has received relatively less attention epidemiologically, owing to difficulties in their detection in clinical specimens. Even so, mortality rates of up to 71% and healthcare costs of about 563 million Australian Dollars have been reported in connection with fungal BSIs. *Candida* account for more than 90% of fungal BSIs. They have been ranked fourth in the United States of America and seventh in Europe among BSIs recorded in these regions, as well as third among late-onset sepsis aetiology in neonates.

To strengthen the knowledge and evidence base through surveillance and research is one of the five objectives identified in the global action plan on AMR of World Health Organization (WHO) (3).

2. History

In Sri Lanka, first multi-center project on AMR surveillance was initiated as the Antibiotic Resistance Surveillance Project (ARSP) which produced data from blood culture isolates by the Sri Lanka College of Microbiologists (SLCM) in seven selected hospitals in Colombo, Kandy & Rathnapura in 2009. It was expanded to all hospitals with consultant microbiologists by 2013.

The SLCM has developed the second edition of the laboratory manual in microbiology, which elaborates standard methods of sample processing, identification of the organisms and ABST. When the Laboratory Based Surveillance of Antimicrobial Resistance (ARSP) was started in 2011, a well-organized training was conducted by the SLCM to the relevant sections on all the aspects of the surveillance of blood cultures, including culturing, performing, identification using (commercially available) rapid identification systems, antibiotic sensitivity testing with CLSI methods and, data interpretation and analysis of the results deciding on clinical significance.

The AMR Surveillance was planned in 3 phases to cover blood, urine & other cultures. The first phase, surveillance of blood culture isolates was done in selected centers and the report from the data of the first phase of this project was submitted to the Ministry of Health (MoH) in 2010 and an article was published in CMJ in 2011 (4).

With the Jaipur declaration on 6th September 2011, on AMR of WHO, Sri Lanka, as a member state of the WHO South East Asia region became a signatory to the Jaipur Declaration, with political commitment.

Second phase expanded to cover more centers with added urine isolate results for resistance surveillance. In the meantime, data entry & analysis system of ARSP was changed over to WHONET. In 2014, second report of AMR, sent by the SLCM to the MoH with both urine culture & blood culture isolates highlighting the need for action for combating AMR. The data of urine culture isolates were analyzed and published in 2016 (5).

In 2015, WHO developed the Global action plan (GAP). In March 2016, in response to the request by the WHO, MoH with the collaboration of SLCM to work on AMR to uplift the AMR activity. In 2017, the WHO further supported the development of the first 'National Strategic Plan for Combating Antimicrobial Resistance (NSP-AMR, 2017-2022)', with the multi-sectoral participants.

In 2023, *Candida* BSI resistance surveillance was started at the mycology reference laboratory at Medical Research Institute (MRI). The laboratory receives all the *Candida* isolates from blood stream infections for species identification and anti-fungal sensitivity testing.

3. National Antimicrobial Resistance Surveillance for Human Health Sector

In 2017, with the development of NSP-AMR (2017-2022), as an activity, the National AMR surveillance of human sector was strengthened by the national focal point for combating AMR in MoH collaborated with the SLCM. Twenty-five sentinel sites were identified to collect data island wide. The laboratory staff were trained on WHONET laboratory software which is specifically designed to collect data on antimicrobial resistance.

The first edition of 'National Protocol for AMR for human health sector' was developed and data collection was initiated by June 2018. Data is analyzed quarterly and a committee for data analysis and interpretation was established consisting of health administrators, microbiologists, epidemiologists and medical officers with qualifications in bio-informatics. Sri Lanka became a member of Global AMR Surveillance System (GLASS) in 2018 and participated for the data call in 2019 for the first time.

Candida blood stream infections surveillance was started by modifying 'WHONET' software of bacteriology into medical mycology with the WHO grant under 2022/2023 Biennium project. Data is analyzed annually and will be interpreted by a committee consisting of health administrators, microbiologists, mycologists, epidemiologists and health informatics or medical officers with qualifications in Bio informatics.

The protocol for the surveillance system has been revised to address the issues encountered during the first phase of the surveillance.

4. Establishment of sentinel sites for the AMR surveillance in government health sector

The sentinel sites were selected by the following criteria:

- The laboratory should have an on-site microbiologist
- Should participate in the National External Quality Assurance Scheme (NEQAS) in clinical microbiology, conducted by the Medical Research Institute
- The laboratory should perform and interpret Antibiotic Sensitivity Test (AST) according to the Clinical and Laboratory Standards Institute (CLSI) guidelines
- Selected sentinel sites to cover all nine provinces
- Availability of resource and capacity
- The number of sites will be increased to represent to have a higher proportion of the population

4.1 Survey population

This survey covers the following population/s

- All inpatients [Intensive Care Unit (ICU) and non-ICU] outpatients and clinic attendees
- All age groups
- Both genders

4.2 Priority specimens

This survey will cover only the following specimen types.

- Blood
- Urine
- Faeces/ Stool
- Urethral/cervical swabs for *N. gonorrhoeae*
- For *Candida* surveillance only clinical specimen used is blood.

Table 1: Sentinel sites for AMR surveillance

	Province	Healthcare Institutions
1.	Central	• National Hospital, Kandy • Teaching Hospital, Peradeniya • Sirimavo Bandaranayake specialized Children's Hospital
2.	Eastern	• Teaching Hospital Batticaloa • District General Hospital, Ampara
3.	North Central	• Teaching Hospital Anuradhapura • District General Hospital, Polonnaruwa
4.	Northern	• Teaching Hospital, Jaffna • District General Hospital, Vavuniya
5.	North Western	• Teaching Hospital, Kurunegala • District General Hospital, Chillaw
6.	Sabaragamuwa	• Teaching Hospital, Ratnapura • District General Hospital, Kegalle
7.	Southern	• Teaching Hospital, Karapitiya • District General Hospital, Matara
8.	Uva	• Provincial General Hospital, Badulla • District General Hospital, Monaragala
9.	Western	• National Hospital, Sri Lanka • Colombo North Teaching Hospital Ragama (CNTH) • Apeksha hospital (National Cancer institute), Maharagama • Colombo South Teaching hospital, Kalubowila (CSTH) • National Institute of Health Sciences, Kalutara • Lady Ridgeway Hospital for Children, Colombo (LRH) • National Institute of Infectious diseases (NIID) • Medical Research Institute (MRI)- Clinical Bacteriology Laboratory/ Enteric Bacteriology Laboratory/ Mycology Laboratory • Sri Jayewardenepura General Hospital, Nugegoda (SJGH) • National Reference Laboratory (NRL)*, National STD/AIDS Control Programme, Colombo

*Selected because AST is done centrally for *Neisseria gonorrhoeae*

Institutions wish to become sentinel sites are invited to submit their applications to the Deputy Director General of Laboratory Services (DDG LS), Ministry of Health, by completing the enrollment form provided in Annexure I.

Table 2: Priority Specimens, Pathogens and Antimicrobial class under surveillance with indicator antimicrobials

Specimens	Pathogens	Antimicrobial class	Indicator Antimicrobials
Blood	*Escherichia coli*	3rd generation cephalosporins	ceftriaxone
		fluoroquinolones	ciprofloxacin
		carbapenems	meropenem
	Klebsiella pneumoniae	3rd generation cephalosporins	ceftriaxone
		fluoroquinolones	ciprofloxacin
		carbapenems	meropenem
	Acinetobacter spp.	carbapenems	meropenem
	Staphylococcus aureus	methicillin	cefoxitin
	Streptococcus pneumoniae	3rd generation cephalosporins	ceftriaxone
		penicillin	penicillin
	Salmonella spp.	3rd generation cephalosporins	ceftriaxone
		fluoroquinolones	ciprofloxacin
	Pseudomonas aeruginosa	carbapenems	meropenem imipenem
	Enterococcus faecalis *Enterococcus faecium*	glycopeptide	vancomycin
Urine	*Escherichia coli*	3rd generation cephalosporins	ceftriaxone
		fluoroquinolones	ciprofloxacin
		carbapenems	meropenem
	Klebsiella pneumoniae	3rd generation cephalosporins	ceftriaxone
		fluoroquinolones	ciprofloxacin
		carbapenems	meropenem
	Pseudomonas aeruginosa	carbapenems	meropenem imipenem
	Enterococcus faecalis *Enterococcus faecium*	glycopeptide	vancomycin
Faeces/ stool	*Salmonella spp.*	3rd generation cephalosporins	ceftriaxone
		fluoroquinolones	ciprofloxacin
	Shigella spp.	3rd generation cephalosporins	ceftriaxone
		fluoroquinolones	ciprofloxacin
Urethral/ cervical swabs	*Neisseria gonorrhoeae*	3rd generation cephalosporins	ceftriaxone
Blood	*Candida spp.*	Azoles	fluconazole
		polyenes	amphotericin B

4.3 Identification of priority pathogens

- Identification of priority pathogens in blood cultures should be done by conventional methods or automated identification systems. If the facilities are unavailable, the sentinel sites could send the isolates to the AMR surveillance laboratory at MRI with the duly filled bacteriology special request form.
- Identification of priority pathogens in urine cultures could be done by conventional biochemical methods, commercial rapid biochemical methods or using chromogenic agar media.
- All *Salmonella* and *Shigella* isolates should be sent to the Enteric Bacteriology Laboratory, MRI for species identification. All hospitals will enter the data to WHONET. To be cross checked with the MRI by the center. (suggest the consultant enteric bacteriology lab as the center)
- All *Neisseria gonorrhoeae* isolates should be sent to the reference laboratory at the National STD /AIDS control program.
- Identification of yeasts in blood cultures will be done by phenotypic methods, using biochemicals and molecular methods (for *Candida auris*) at the Mycology reference laboratory, MRI.
- Isolates from all *Candida* blood stream infections from government hospitals will be included to the surveillance by the Mycology reference laboratory, MRI.

4.4 Clinical isolates which should be sent to the National Reference Laboratory for AMR Surveillance - Clinical Microbiology & 'Surveillance for Invasive Bacterial Vaccine Preventable Diseases (IB-VPD) (Annexure III)', department of Bacteriology, MRI

Following bacterial isolates should be sent with a duly filled'Bacteriology special request form' (Annexure IV) with clinical details of the patient and laboratory findings.

- All blood culture isolates of *S. pneumoniae, H. influenzae, N. meningitidis.*
  The isolates should be sent with the duly filled special request form available for IB-VPD surveillance.
- Vancomycin-resistant *S. aureus*
- Colistin-resistant *E. coli, Klebsiella pneumoniae*
- Ceftazidime-Avibactam resistant *E. coli, K. pneumoniae, Pseudomonas aeruginosa, Acinetobacter* spp.

All *Candida* spp. isolated from blood stream infections should be sent to **Mycology Reference Laboratory at the Medical Research Institute.**

4.5 Antimicrobial susceptibility testing and reporting

- Antibiotic susceptibility testing should be done according to the current version of CLSI guideline.
- Extended Spectrum Beta-Lactamase (ESBL) detection is not necessary to interpret 3rd generation cephalosporin resistance.
- All relevant first line antibiotics should be included in the panel.
- If the antibiotic under surveillance is a second line agent, it should be included in the testing panel. Issuing of susceptibility results of the second line agents can be avoided in clinical reports if the isolate is susceptible to the first line agents.
- Ceftriaxone is recommended as an indicator agent to detect 3rd generation cephalosporin susceptibility for Enterobacteria as the CLSI recommends ceftriaxone for direct AST of positive blood cultures and to maintain uniformity among the sentinel sites. However, cefotaxime susceptibility can be inferred through ceftriaxone susceptibility test result and can be reported.
- Meropenem is chosen as an indicator antibacterial for carbapenem resistance to maintain uniformity among the sentinel sites. However, susceptibility to other carbapenems cannot be determined based on meropenem susceptibility alone.
- Susceptibility results for both anti-fungal drugs should be reported.

5. WHONET Setup and Configuration

WHONET, a laboratory software developed and supported by the WHO Collaborating Centre for Surveillance of AMR at the Brigham and Women's Hospital in Boston, Massachusetts, has been selected as the tool for data collection, storage, and analysis in the National AMR Surveillance Program. This software is available free of charge and can be downloaded from the official website https://whonet.org/.

Currently, WHONET operates exclusively on the Windows operating system, requiring a desktop or laptop computer with Windows for installation and usage.

Upon installation, the software must be properly configured by adding the relevant antibiotics used in the laboratory, along with hospital wards and units, and specifying the required data collection fields. It is essential to include the fields required for the AMR surveillance program. The laboratory has the option to add additional fields based on the specific needs of the laboratory.

Training programs for WHONET are periodically conducted by the AMR National Coordinating Center (NCC) under the MoH. Laboratory staff are encouraged to attend these training sessions. For assistance with WHONET setup and configuration, laboratory staff may contact the AMR NCC. Additionally, training materials are available through the WHONET Learning Center for further guidance [https://whonet.org/training.html].

5.1 Data elements for WHONET

1. Hospital (Name of the hospital)
2. Laboratory name (Name of the laboratory)
3. Age
4. Sex
5. Date of receipt of specimen
6. Specimen number
7. Department (ICU/ Non-ICU)
8. Specimen Type
9. Organism (name of the pathogen)
10. Antibiotic name
11. Antibiotic sensitivity pattern (Sensitive/intermediate/resistant)

5.2 WHONET Data entry

- Susceptibility test results of ALL antibacterials tested should be entered into WHONET. Second line agents can be hidden when printing the clinical reports if the First line agents are susceptible.
- Maintaining a same file for all sample types would be easy for analysis.
- Data of all isolates (except *Neisseria gonorrhoeae*) sent to the reference laboratories should be entered by the relevant sentinel sites when the identification results are available.
- Data of *Neisseria gonorrhoeae* will be entered to WHONET by the reference laboratory, NSACP
- Cefoxitin susceptibility result should be entered into WHONET for *Staphylococcus aureus* disk diffusion or MIC method. Cloxacillin should be reported for the clinical report and cefoxitin should be hidden from the report.
- Pneumococcal susceptibility to penicillin should be entered as penicillin but not by the tested agent (E.g. oxacillin).
- Susceptibility test results of ALL antifungals tested, should be entered into WHONET - Mycology.

6. Supply of consumables and reagents

- Sentinel sites should estimate the annual requirements of consumables for AMR surveillance.
- Estimated annual requirement should be sent to Medical Suppliers Division (MSD) through provincial/ line ministry authorities.
- Annual requirement of sentinel sites should be monitored by the National Coordinating Center DDG LS office, MoH.
- Periodic stock monitoring should be conducted by the National Coordinating Center to ensure uninterrupted supply of reagents.
- MSD should have a continuous supply of consumables to hospitals.
- The focal point should have quarterly review of the consumables and a report should be issued.

7. Data analysis

Data management and statistical analysis will be performed by the Data Analysis Technical Working Group (Human Health Sector) at National coordinating center, DDGLS unit (Annexure II).

Statistical analysis will be done on aggregated data on quarterly basis. Data analysis and interpretation will be conducted by a panel of experts including:

- Deputy Director General Laboratory Services
- Director Laboratory Services
- Chief Epidemiologist/ Consultant Community Physician/Representative
- President SLCM/ Representative from SLCM
- Consultant Microbiologists (Past committee members - 2, NRL MRI-1)
- Consultant from the institution with highest data contribution
- Consultant Mycologist/ Representative from SLCM
- Consultant Health Informatics/ Representative

The resistance rate for each selected pathogen and antibiotic combinations will be presented in stratified tables against basic demographic variables as below.

- Age groups
- Gender
- Inpatient in the ICU and Non-ICU
- Hospital-acquired infections
- Out patients and clinic patients- Community acquired infections

The resistance rate for *Candida* sp. will be presented in stratified tables against basic demographic variables as below.

- Age
- Gender
- *Candida* spp. and percentage
- Antifungal sensitivity for each isolate of *Candida* sp.
- Risk factors for candidemia

8. Dissemination of Data

The primary objective is to enhance awareness regarding AMR within the country and to provide accurate data to clinicians as well as decision-makers across the country and beyond. The report will be displayed on SLCM, Sri Lanka Medical Association (SLMA) and Ministry of Health website.

9. Monitoring and Evaluation

The following key performance indicator (KPI) will be used for monitoring and evaluation.

KPI 1: Percentage of healthcare facilities participating in the AMR surveillance network.

$$X = \frac{\begin{array}{c}Number\ of healthcare\ institution \\ sending\ data\ for\ the\ AMR\ data\ call\end{array}}{\begin{array}{c}Total\ number\ of\ healthcare\ institution\ enrolled \\ in\ the\ AMR\ surveillance\ network\end{array}}\%$$

Target: 100% of designated hospitals and laboratories involved in the program.

KPI 2: Percentage of surveillance reports with complete patient, specimen, and laboratory data.

$$\mathrm{X} = \frac{Number\ of\ complete\ reports\ received}{Total\ number\ of\ reports\ received}\%$$

Target: ≥ 95% of reports with all required data fields filled.

KPI 3: Percentage of reports submitted within the required timeframe (e.g., monthly or quarterly).

$$X = \frac{\begin{array}{c}Number\ of\ reports\ received\ from\ sentinel\ sites \\ within\ the\ timeframe\end{array}}{Total\ number\ of\ reports\ received}\%$$

Target: ≥ 90% of facilities submitting data within the specified period.

KPI 4: Frequency and quality of national AMR reports published (e.g., annual reports).

Target: Regular publication of comprehensive reports, at least once a year.

10. References

1. Antimicrobial Resistance Collaborators. (2022). Global burden of bacterial antimicrobial resistance in 2019: a systematic analysis. The Lancet; 399(10325): P629-655. DOI: https://doi.org/10.1016/S0140-6736(21)02724-0
2. Drug-Resistant Infections: A Threat to Our Economic future (March 2027) https://www.worldbank.org/en/topic/health/publication/drug-resistant-infections-a-threat-to-our-economic-future
3. Global action plan on antimicrobial resistance; World Health Organization, who.int
4. P Chandrasiri, JP Elwitigala, G Nanayakkara, S Chandrasiri, G Patabendige, L Karuna- nayake, J Perera, P Somaratne, K Jayathilleke; A multi-center laboratory study of Gram-negative bacterial blood stream infections in Sri Lanka; Ceylon Medical Journal 2013; 58: 56-61; http://dx.doi.org/10.4038/cmj.v58i2.5680
5. SK Jayatilleke, G Patabendige, M Dassanayake, GKD Karunaratne, J Perera, RRDP Perera, WRPLI Wijesooriya, NP Sunil-Chandra, J Kottahachchi, D Athukorala, T Dis-sanayake;Analysis of urine culture isolates from seven laboratories of Sri Lanka: Na- tional Laboratory Based Surveillance of Sri Lanka College of Microbiologists in 2014; Sri Lankan Journal of Infectious Diseases, 2016; Volume: 6 Issue: 1; 17-24;, http://dx.doi.org/10.4038/sljid.v6i1.8105
6. Global Antimicrobial Resistance and Use Surveillance System (GLASS); https://worldhealthorg.shinyapps.io/glass-dash-board/_w_b75d56dd/_w_588b29c4/#!/amr
7. Perera YK, Chulasiri PU, Jayatilleke SK; Prevalence, Phenotypes of Beta Lactamase and Clinical Response to Empirical Therapy of Urinary Tract Infections Caused by Third Generation Cephalosporin Resistant Enterobacteriaceae in a Tertiary Care Hos- pital, Sri Lanka; oral presentation with abstract publication, 14th International Sympo- sium on Antimicrobial Agents and Resistance 2024 /Annual Conference of the Korean Society for Antimicrobial Therapy; April 8 - 10, 20

Annexure I

Enrollment form for AMR Surveillance sentinel sites

Name of the institution: ……

District: ……

Type of institution: ……

Institution population coverage: ……

1. Do you have enough capacity to perform AMR laboratory tests ?	
2. Does your laboratory have on-site microbiologist ?	
3. Do you participate in the National External Quality Assurance Scheme (NEQAS) in Clinical Microbiology, conducted by the Medical Research Institute ?	
4. Does your laboratory perform and interpret AST according to the CLSI guidelines ?	
5. Do you have human resource ?	

Head of the Unit:

Name : ----------

Signature:----------

Contact Number : ----------

Email Address : ----------

Head of the Institution

Name : ----------

Signature:----------

Contact Number : ----------

Email Address : ----------

Annexure II

Terms of Reference for the Technical Working Group for Antimicrobial Resistance (AMR) Surveillance Data Analysis (Human Health)

The emergence of Antimicrobial Resistance (AMR) is a growing challenge, impacting public health, economic stability, and healthcare systems. To address this challenge, operative surveillance of AMR is essential. In response, the Ministry of Health has established a comprehensive surveillance program with the enrollment of 25 sentinel sites including major hospitals and research institutes across the country.

The Technical Working Group (TWG) for AMR Surveillance Data Analysis (Human Health) serves as a national platform dedicated to analyze AMR surveillance data within the human health sector, along with related activities conducted by the Technical Support Group (TSG) for AMR Surveillance.

1. Purpose

The surveillance Data Analysis (Human Health) focuses on the data collected from various healthcare settings across the country, aiming to identify prevalence and trends in resistance patterns, evaluate the effectiveness of current antimicrobial therapies and antimicrobial stewardship programs, GLASS data submission, and inform policy decisions.

2. Scope

The Technical Working Group (TWG) for AMR surveillance data analysis (Human Health) is responsible to generate timely, quality, accurate and reliable report.

3. Role and responsibilities of the committee

Role : The Technical Working Group for AMR surveillance data analysis (Human Health) is expected to lead facilitation of data analysis related surveillance activities according to National Action Plan for combating AMR.

Responsibilities:

- Strengthen the national antimicrobial resistance surveillance programme by ensuring the quality of surveillance data and submission of accurate data according to the guideline
- Support timely data submission from the sentinel sites
- Provide timely feedback to sentinel sites for data quality improvements
- Ensure the proper data management and secure data storage
- Provide the report to TSG surveillance for the observation and recommendations regarding the AMR surveillance data.
- Provide technical support for data collection, data entry and analysis including WHONET software
- Support GLASS data submission after approval by the TSG Surveillance

4. Membership

The membership of the Technical Working Group for AMR surveillance data analysis (Human Health) is as follows:

- Deputy Director General Laboratory Services (DDG-LS) (Chairperson)

Members includes;

- Director-Laboratory Services
- Chief Epidemiologist/ Consultant Community Physician/ Representative
- President SLCM/ Representative from SLCM
- Consultant Microbiologists (Past committee members – 2, NRL MRI – 1)
- Consultant Microbiologist from the institution with highest data contribution
- Consultant Mycologist/ Representative from SLCM
- Consultant Health Informatics/ Representative

Members will not receive any remuneration for their involvement in regular TWG activities.

5. **Duration of membership** – Two-year period

6. **Role of Chairperson:**

The Chairperson has responsibility for providing effective leadership of the group, governance and decision making. All meetings must be presided over by a chairperson or his/her delegate. The chairperson will be responsible for signing off the minutes once the committee has agreed them.

7. **Role of members:**

Members are expected to:

- Familiarize themselves with background material (if any) sent to members prior to meetings
- Commit to attending all meetings and actively participate in meetings (face to face or teleconference) or provide electronic comments as required
- Undertake any additional activities agreed by the group and share expert knowledge and engage constructively in discussions
- Work together in a collegial manner, seeking consensus wherever possible
- Assume collective responsibility for advice

8. **Meeting**

The Technical Working Group for AMR surveillance data analysis (Human Health) meeting is facilitated by the 'National AMR Focal Point', Ministry of Health. The national AMR focal point is responsible for the logistics for the meetings: minute-taking: preparation and circulation of documents, and storage and archive.

9. **Meeting Frequency**:

The group shall meet at least four times a year. Where important matters require consideration, outside this schedule, additional meetings may be held.

10. **Reporting**

The Technical Working Group for AMR surveillance data analysis (Human Health) will report to the TSG-AMR Surveillance.

11. **Ceasing of membership:**

Any member can request to cease membership by a 'letter of request' to the chairperson, one month prior to due date of the next TWG meeting. New officer will be appointed within one month in case of ceasing membership.

Annexure III

MEDICAL RESERCH INSTITUTE

Ministry of Health

Invasive Bacterial-Vaccine Preventable Disease (IB-VPD) Surveillance

National Reference Laboratory for Clinical Microbiology

Department of Bacteriology

Request Form

Patients' Name: Hospital

Age: Sex : Female / Male Ward ICU

Occupation BHT

Resident District

Vaccination (doses/ type) Pneumococcal/ Hib/ Meningococcal;
Completed/ incomplete (how many doses)

Isolate original source: Blood/CSF/ other sterile fluid .....
Primary specimen collection Date:
Test/s requested on the isolate: Confirmation of Bacterial isolate / AST/ Other:.....

Brief Summary of clinical illness and diagnosis

Duration of illness on admission:
Date of admission:
Day of Fever ....., skin rash: Purpuric/petechial ..... SOB, LOA, vomiting, bulging fontanelle, fits, Other-
Complications:

Clinical diagnosis; pneumonia/ meningitis/ sepsis/ other.....
Antibiotics patient on;

Patient outcome;

Laboratory Investigation Results

Test results if any; CSF full report:

CSF gram stain: Antigen/ PCR test result:
Full Blood Count

Culture available; Probable organism/ identification method;

AST done; methodology and results:

Signature of Medical Officer Name and seal of the consultant
Telephone No.
Mode of delivery of the Report:
E mail address:

Annexure IV

MEDICAL RESERCH INSTITUTE

Ministry of Health

National Reference Laboratory for Clinical Microbiology

Request for Examination of Bacteriological Specimens

Patients' Name | Hospital

Age | Sex Female / Male | Ward

Occupation | BHT

Specimen type: Blood / Serum / CSF/ Urine (MSU, Catheterized, Surgical) / Sputum / ET secretions/ Pus / Wound Swab/ Eye / Ear / CVP tip / CVP blood / other:

Test requested: Culture /AST/Gram stain /serology /PCR / Other:

Date & Time of collection:

Brief Summary of clinical illness

Duration of fever/ illness at the time of admission and testing: ....

Symptoms:

Complications:

Investigation results:

Clinical diagnosis:

Antimicrobials patient on :

Antimicrobials taken previously (within 2 weeks):

Name & Signature of Medical Officer
Contact No (optional)

Seal of the consultant

Mode of delivery of Report:

E mail address:

Mobile No.

Annexure V

දුරකථන) 0112669192 , 0112675011
தொலைபேசி) 0112698507 , 0112694033
Telephone) 0112675449 , 0112675280

ෆැක්ස්) 0112693866
பக்ஸ்) 0112693869
Fax) 0112692913

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மின்னஞ்சல் முகவரி) postmaster@health.gov.lk
e-mail)

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இணையத் தளம்) www.health.gov.lk
website)

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சுகசிரிபாய
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சுகாதார அமைச்சகம்
Ministry of Health

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My No.) DDG/LS/ED/GLASS/2024

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Your No.)

දිනය)
நிகதி) 26.10.2024
Date)

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Implementation of Guideline on National Antimicrobial Resistance Surveillance System for Human Health Sector in AMR sentinel sites

Antimicrobial resistance (AMR) is a global public health threat as an increasing proportion of microbes can no longer be treated effectively by readily available antibiotics. Overuse, and inappropriate use, of antimicrobials have been the main driver for the development of resistance and this has occurred in countries all around the world. It is estimated that bacterial AMR was directly responsible for 1.27 million global deaths in 2019 and contributed to 4.95 million deaths. In addition to death and disability, AMR has significant economic costs. The World Bank estimates that AMR could result in US$ 1 trillion additional healthcare costs by 2050, and US$ 1 trillion to US$ 3.4 trillion Gross Domestic Product losses per year by 2030.

The first edition of 'National Protocol for AMR for human health sector' was developed and data collection was initiated by June 2018. Sri Lanka has participated in the Global Antimicrobial Resistance Surveillance System (GLASS) data call since 2019. The protocol for the AMR surveillance system has been revised to address the issues encountered during the first phase and to strengthen the current AMR surveillance system, as "**National Antimicrobial Resistance Surveillance System for the Human Health Sector**"(Annexure 1).

This guideline applies to the healthcare institutions enrolled as sentinel site in AMR surveillance.

You are hereby instructed to abide by this guideline on **"National Antimicrobial Resistance Surveillance System for Human Health Sector"** in your institution to support AMR surveillance.

Dr. Asela Gunawardena
Director General of Health Services

Dr. ASELA GUNAWARDENA
Director General of Health Services
Ministry of Health
"Suwasiripaya"
385, Rev. Baddegama Wimalawansa Thero Mawatha,
Colombo 10.