

# The Role of Diagnostic Stewardship in Combating Antimicrobial Resistance

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## ABSTRACT

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Emergence of antimicrobial resistance is a threat to human which can be controlled by antimicrobial stewardship program. One of the key element of AMSP is diagnostic stewardship which implies judicious selection, analysis and timely reporting of diagnostic tests and hence assisting the clinician for targeted antimicrobial therapy. A clinical microbiologist can perform selective reporting and cascade reporting of antibiotics and can help to differentiate contaminant from pathogen.

**Keywords:** Antimicrobial stewardship program (AMSP), Diagnostic stewardship, Antimicrobial resistance (AMR), Microbiology

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Antimicrobial resistance (AMR) poses a grave global threat, similar to a silent pandemic, gradually weakening our ability to combat infections. Recognizing its severity, the World Health Organization has elevated AMR to a top priority, prompting the implementation of a One Health approach to tackle this issue. Kerala has taken proactive steps by launching the Kerala Antimicrobial Resistance Strategic Action Plan (KARSAP) and recently developing an antibiogram.<sup>2</sup> In a significant move, the Government of Kerala has mandated that antibiotics be dispensed only with prescriptions and in distinctive blue packaging.

The Antimicrobial Stewardship Program aims to curtail the overuse of antimicrobials. Customizing antimicrobial therapy based on culture and sensitivity, alongside rapid microbiological diagnostic techniques, is crucial. Antimicrobial stewardship, diagnostic stewardship, and infection prevention and control collectively contribute to enhancing healthcare quality and patient outcomes. Diagnostic stewardship, which implies judicious selection, analysis, and timely reporting of diagnostic tests, holds promise in refining diagnostics and patient care.

Ordering the right tests, for the right patient, at the right time, to provide the right treatment is called diagnostic stewardship. The definition of diagnostic stewardship by Global Antimicrobial Resistance and Use Surveillance System (GLASS) manual is “Coordinated

guidance and interventions to improve appropriate use of microbiological diagnostics to guide therapeutic decisions. It should promote appropriate, timely diagnostic testing, including specimen collection, and pathogen identification and accurate, timely reporting of results to guide patient treatment.”<sup>1</sup>

The three phases of the microbiological diagnostic cycle—pre-analytical, analytical, and post-analytical—each play a crucial role in ensuring the accuracy and reliability of microbiology reports.

The reliability and quality of the microbiology report depend on the sample received, otherwise known as the Preanalytical parameters. The sample must be collected only when absolutely indicated from suspected site of infection before the initiation of antibiotic therapy. It must be collected under strict aseptic precautions avoiding contamination. It must be transported immediately and must be accompanied by a request form with clinical, demographic and epidemiological information.

Urine should be collected as a midstream clean-catch sample or as a suprapubic aspirate or catheter aspirate. For blood culture, at least two sets of blood, each containing 8 to 10 ml of blood, must be collected for adults. In the event of any delay in transport, all samples may be refrigerated except CSF and blood, which must be stored either in an incubator or at room temperature.

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Aspirated pus samples are always preferable to swabs for pus culture.

Once the sample reaches the laboratory, it must be evaluated for adequacy and quality, and processed according to standard guidelines after validation. This is the Analytical phase of the diagnostic test. The microbiology laboratory team is responsible for ensuring the quality of the report, which should adhere to the latest Clinical and Laboratory Standards Institute (CLSI) or European Committee on Antimicrobial Susceptibility Testing (EUCAST) standards. The microbiology laboratory adheres to the latest standards for reporting, such as selective and cascade reporting, to guide appropriate antibiotic selection. Examples of selective reporting include reporting Nitrofurantoin only for urinary isolates and not reporting daptomycin for respiratory isolates. For cascade reporting, results of secondary or broad-spectrum antibiotics are reported only for isolates that are resistant to primary and narrow-spectrum antibiotics. For example, Cefepime is reported in *Klebsiella pneumoniae* infections only if ceftriaxone is resistant. If possible, minimum inhibitory concentrations can be tested and reported for choosing the right antibiotic.

In the Post-analytic phase, effective communication between the laboratory and clinicians is paramount. The microbiologist can help the clinician to rule out contamination and colonization from genuine infection. When the patient was started on an antibiotic that the isolated organism was intrinsically resistant to, the communication of clinical microbiologist to the clinician is crucial for treating the patient. Integration of remarks in culture and sensitivity reports regarding intrinsic resistance patterns enhances clinical decision-making. For example, intrinsic resistance of *Klebsiella*

*pneumoniae* to Ampicillin, *Proteus* species to Nitrofurantoin, Gram negative organisms to Penicillin, *Stenotrophomonas* to Meropenem, *Enterococcus* species to Cephalosporins etc may be added in the report.

Additionally, leveraging Hospital Information Systems (HIS) and Laboratory Information Systems (LIS) strengthens the effectiveness of the Antimicrobial Stewardship Programme.

While progress has been made in implementing AMSP, there is still untapped potential in fully integrating diagnostic stewardship into AMSP initiatives. Cultivating a “culture of cultures” among clinicians, prioritizing pathogen-based therapy, and fostering cooperation between microbiology laboratories and clinicians are essential steps in optimizing AMSP outcomes.

In conclusion, the convergence of antimicrobial stewardship and diagnostic stewardship is instrumental in combating antimicrobial resistance. Through concerted efforts and continued cooperation, we can mitigate the threat of AMR and safeguard the effectiveness of antimicrobial therapy for generations to come.

## END NOTE

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**Conflict of Interest:** None declared

## REFERENCES

1. Global Antimicrobial Resistance Surveillance System (GLASS)-WHO-Diagnostic stewardship: a guide to implementation in antimicrobial resistance surveillance sites
2. Kerala antimicrobial strategic action plan -One health response to AMR containment-October 2018, Government of Kerala