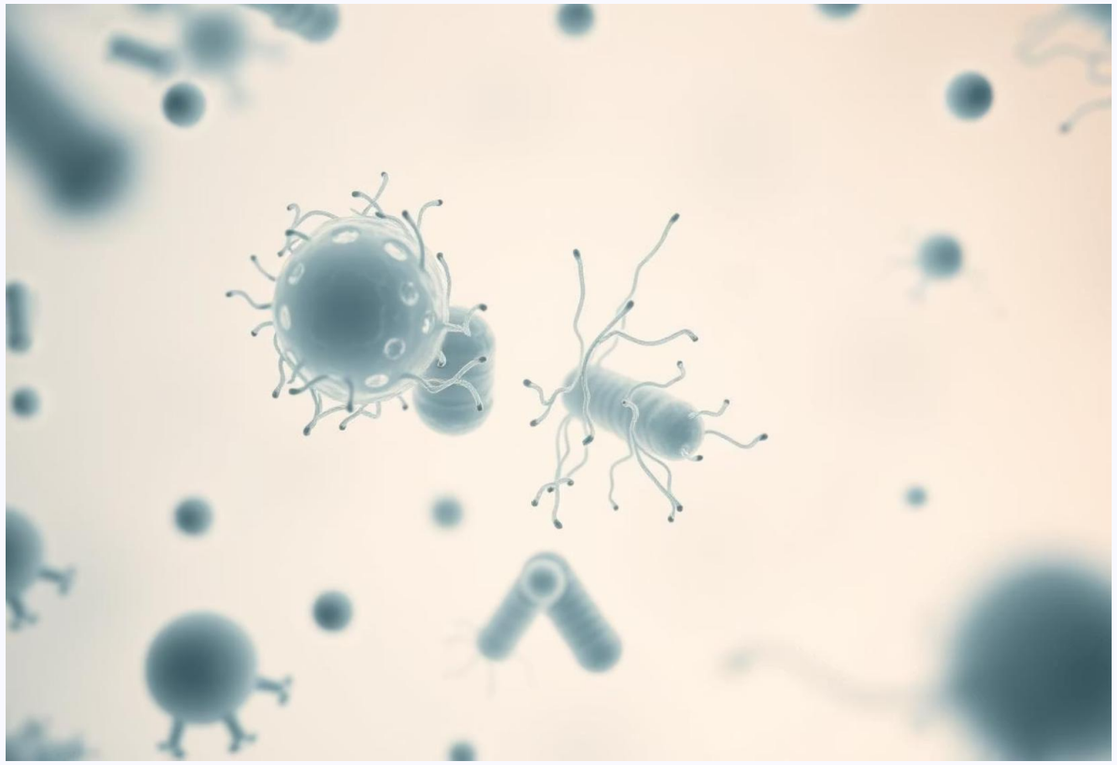
A Study on Antimicrobial Resistance Surveillance Systems in selected public and private hospital in Jaipur, Rajasthan



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Enhancing Antimicrobial Resistance Surveillance in Jaipur, Rajasthan

Antimicrobial resistance (AMR) is a significant global health issue, compromising medical progress. It occurs when bacteria, viruses, fungi, and parasites evolve, becoming unresponsive to drugs. This makes common infections harder to treat, increasing transmission, prolonging illness, and raising mortality rates. Misuse of antibiotics and inadequate infection control are primary causes, leading to longer hospital stays and higher healthcare costs.

INTRODUCTION

AMR: A Growing Threat in India

India's Vulnerability

India faces an acute AMR challenge due to high population density and widespread, uncontrolled antibiotic use in human and animal sectors.

Rajasthan's Role

Rajasthan, particularly Jaipur, is a key centre for tertiary care, with hospitals handling complex, drug-resistant infections.

Surveillance Imperative

Effective AMR surveillance in these healthcare settings is crucial for containment and improving patient outcomes.

Importance of Effective Surveillance and Research Objectives

Effective antimicrobial medications are indispensable for treating a wide array of infections, from common ailments to complex conditions. The rise of AMR not only makes treatment more expensive and time-consuming but also undermines other vital medical procedures, such as organ transplantation, cancer chemotherapy, and surgery, which rely heavily on antibiotic prophylaxis.

Purpose of the Research Study

This study aims to examine and evaluate existing AMR surveillance systems in Rajasthan, India. We intend to assess their strengths, weaknesses, the challenges in data collection and reporting, and how this data informs clinical judgment. The ultimate goal is to provide evidence-based recommendations for improving these systems.

Key Research Question

What are the key strengths and weaknesses of current antimicrobial resistance surveillance systems in Rajasthan, and how can these systems be improved to provide more effective and timely data for informing interventions and policies to combat AMR?

Importance of Effective Surveillance and Research Study Objectives

Protecting Healthcare Efficacy

Effective AMR surveillance is crucial as it directly impacts the ability to treat infections. Without it, common conditions become dangerous, and essential procedures like organ transplants and cancer chemotherapy are jeopardized, relying heavily on antibiotic prophylaxis.

Informing Policy and Action

Robust surveillance systems provide the essential, evidence-based data needed for informed policy choices and effective public health initiatives. This ensures continuous provision of high-quality healthcare and mitigates severe economic consequences, including productivity losses.

Purpose of the Research Study

This study aims to examine and evaluate current AMR surveillance systems in Rajasthan, India. We will assess their strengths and weaknesses, identify challenges in data collection and reporting, and analyze how this data informs clinical judgment. The ultimate goal is to provide evidence-based recommendations for improving surveillance effectiveness and patient outcomes.

Our primary research question is: What are the key strengths and weaknesses of current antimicrobial resistance surveillance systems in Rajasthan, and how can these systems be improved to provide more effective and timely data for informing interventions and policies to combat AMR?

The Urgency of Effective Surveillance

1 Preserving Treatments

AMR threatens the efficacy of essential drugs for infections like sepsis and pneumonia, and critical procedures like organ transplants.

2 Economic Impact

AMR is projected to have significant economic consequences, including productivity losses and increased healthcare expenses.

3 Informing Policy

Robust surveillance systems provide essential data for evidence-based policy choices and public health initiatives.

Research Study: Examining AMR Surveillance in Rajasthan

1

Assess Current Systems

Evaluate strengths and weaknesses of existing AMR surveillance practices in Rajasthan.

2

Identify Challenges

Examine obstacles hospitals face in collecting and reporting AMR data.

3

Analyse Data Utilisation

Investigate how AMR data informs clinical judgment and decision-making.

4

Provide Recommendations

Offer evidence-based suggestions to enhance surveillance effectiveness and patient outcomes.

Literature Review: Global and National Efforts

Organisation	Key Finding	Relevance
WHO (2014)	AMR is a global crisis; initiated GLASS.	Provides international framework.
O'Neill (2016)	10M annual deaths by 2050; enhanced surveillance needed.	Supports study's urgency.
CDC (2019)	Outlined resistance threat levels; promoted integrated surveillance.	Comparative high-standard model.
ICMR / NCDC (Ongoing)	Coordinates AMR monitoring across India.	National protocol baseline for evaluation.

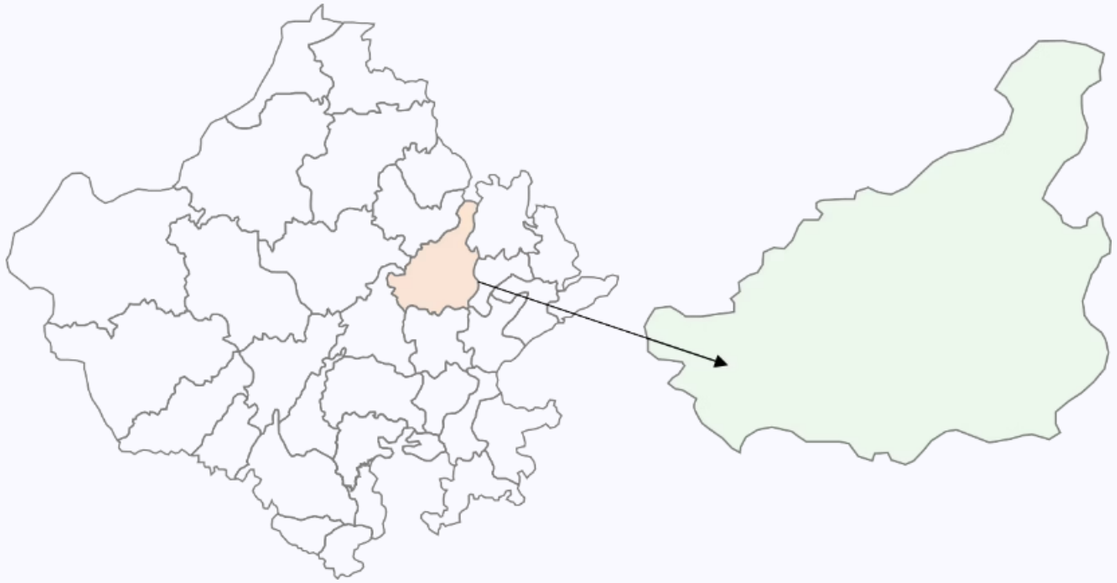
Methodology: Mixed-Methods Approach

Study Design

A mixed-methods study combining a cross-sectional survey of tertiary care hospitals with qualitative, semi-structured interviews. This triangulation provides a comprehensive understanding.

Study Setting

Conducted in Jaipur, Rajasthan, focusing on both public and private tertiary care hospitals due to their high concentration and diverse patient population with a significant AMR burden.



The study aims to assess current surveillance practices, challenges, and data utilisation to improve AMR containment and patient outcomes.

Study Population and Sampling

Inclusion Criteria

- Microbiology labs performing antibiotic susceptibility tests.
- Hospitals admitting patients susceptible to AMR infections (e.g., ICU, transplant).
- Healthcare providers involved in antimicrobial prescribing and infection control.

Exclusion Criteria

- Hospitals without routine antibiotic susceptibility testing or functional microbiology labs.
- Hospitals treating only one condition (e.g., maternity, eye hospitals).
- Primary care clinics without on-site laboratory facilities.

Sample Size & Technique

3-5 healthcare facilities. For qualitative data, 15 key informants (5 microbiologists, 5 lab technicians, 5 Nodal Officers) will be selected using purposive sampling to capture diverse perspectives.

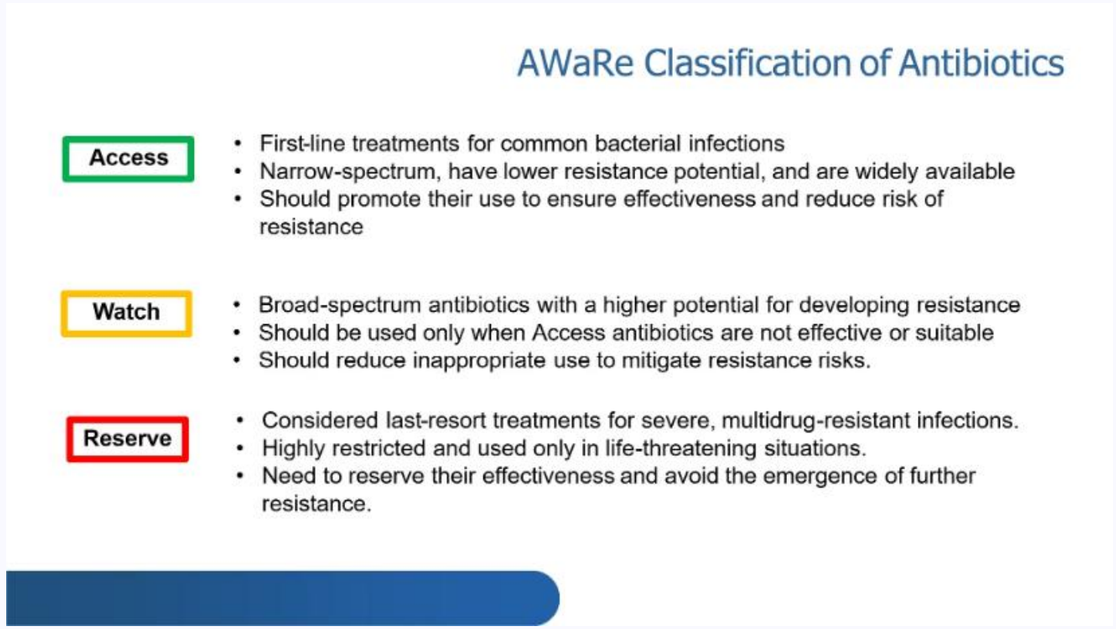
Data Collection and Analysis

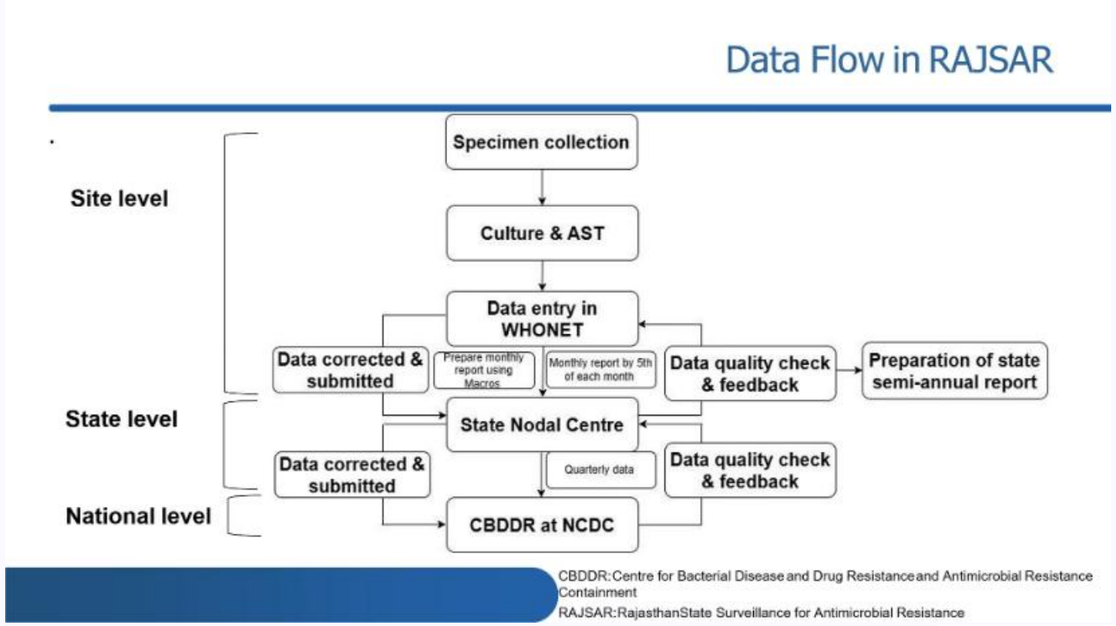
Quantitative Data

Structured questionnaires will gather information on hospital attributes, lab capacity, surveillance methods, reporting, resources, and data utilisation. Data will be analysed using SPSS 27.0 and Excel for descriptive statistics.

Qualitative Data

Qualitative data was collected through semi-structured, in-person interviews with microbiologists, lab technicians, and nodal officers at their respective workplaces. Informed consent was obtained prior to each interview, and participants were assured of confidentiality. An interview guide was used to direct the conversation while allowing flexibility to explore emerging insights.





Key Qualitative Findings

1

Active Involvement

Microbiologists actively perform AST, compile data, and report to committees.

2

Staffing Shortages

Labs have semi-automated tools but face manpower limitations.

3

Data Underutilisation

Data is not real-time and only partially used by clinicians.

4

Weak Feedback

Limited informal feedback; no formal mechanisms in place.

Key Findings: Qualitative Insights from Stakeholders

Qualitative interviews with microbiologists, laboratory technicians, and nodal officers revealed consistent patterns in AMR surveillance practices, along with recurring systemic challenges and critical areas for improvement.

Roles and Responsibilities

Microbiologists actively perform Antimicrobial Susceptibility Testing (AST), compile data, and report to Hospital Infection Control Committees (HICC) and national networks. HICCs are multidisciplinary teams integral to surveillance.

Infrastructure and Guidelines

While labs utilise semi-automated systems like VITEK 2 and adhere to CLSI guidelines, staffing is suboptimal, leading to efficiency concerns. Limited manpower significantly impacts testing and reporting throughput.

Reporting and Utilization

AMR data is reported monthly to hospital committees and quarterly to national authorities. However, data underutilization by clinicians is prevalent, primarily due to lack of real-time access and non-integration with Electronic Health Record (EHR) systems.

Challenges and Suggestions

Participants consistently cited high workload, insufficient trained staff, irregular training, and poor infrastructure as primary challenges. Suggestions for improvement include increased staffing, structured training, EHR-Laboratory Information System (LIS) integration, and formal feedback mechanisms.

Recommendations for Improvement

Increase Staffing

Hire more dedicated manpower for AMR surveillance at all sites.

Integrate Systems

Promote EHR-LIS integration for real-time reporting and data quality.

Structured Training

Implement regular training on data validation and facility-wise antibiograms.

Formal Feedback

Establish formal communication channels between labs and clinical teams.

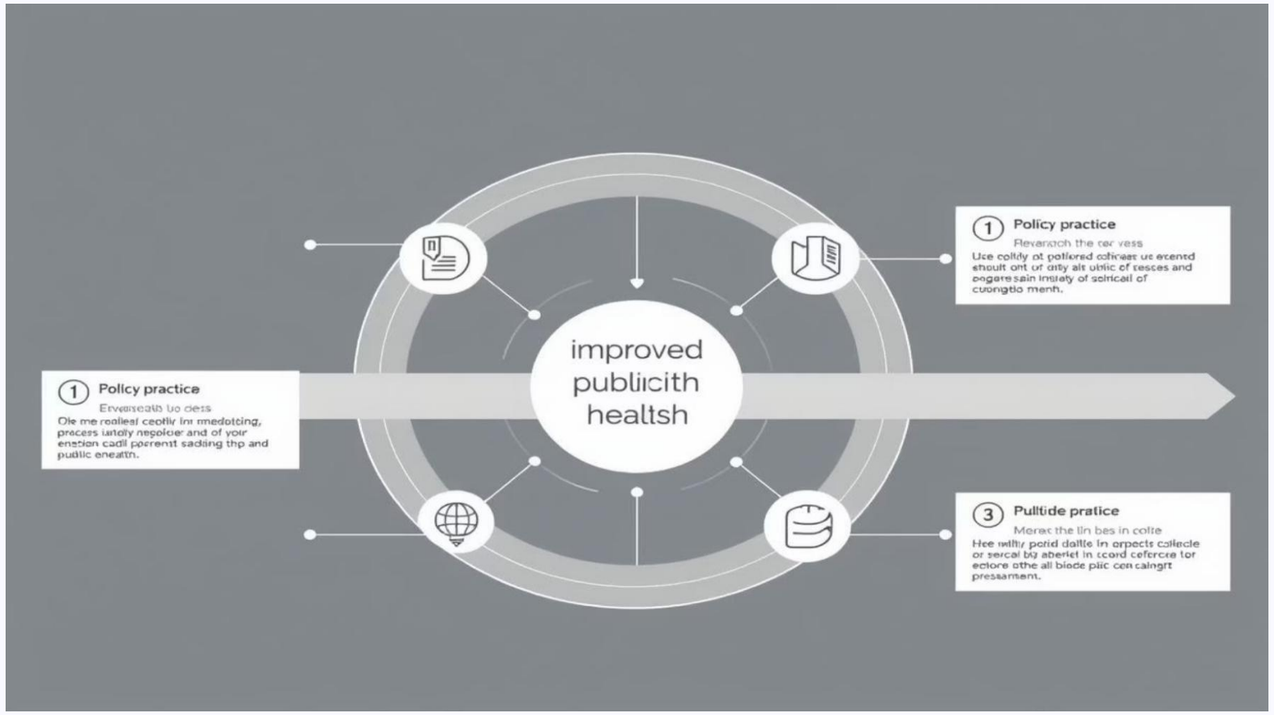
Conclusion and Recommendations

Summary of Findings

- Need for standardized, real-time, and integrated AMR surveillance.
- Digital systems like LIS and EHR are underutilized.
- Improved communication and training are essential for data use.

Implications of Findings

The study highlights an urgent need for increased funding to bolster laboratory capacity and provide comprehensive training for healthcare professionals. This includes upgrading lab equipment, ensuring quality control compliance, and offering continuous professional development. Promoting the adoption of LIS and EHR systems is crucial to enhance data efficiency and quality, necessitating policy incentives and investment. Measures are also required to improve the utilization of AMR data in clinical settings through user-friendly decision support tools and regular feedback to clinicians.



Recommendations for Policy

- Ministry of Health and Family Welfare to create national AMR surveillance standards
- aligned with WHO guidelines.
- Government to allocate specific funds for lab equipment, staff development, and electronic reporting systems.
- Mandate LIS and EHR systems in tertiary care hospitals, with financial and technical assistance for adoption and interoperability.
- Establish clear lines of authority for data sharing and feedback between hospitals, public health agencies , and policymakers.

Recommendations for Practice-

Strengthen Infrastructure and Digital Integration (Addresses Objectives 1, 2, and 4)

- Hospital administrators to prioritize strengthening lab capacity with adequate funds, staff, and regular training.
- Install/update integrated LIS and EHR systems for efficient data collection, storage, and reporting.
- Form multidisciplinary AMR stewardship committees for proper antibiotic use and surveillance oversight.
- Regularly audit AMR surveillance data quality and provide feedback to lab/clinical personnel.
- Enhance clinician access to AMR data through electronic dashboards, reports, and educational sessions.

Thank you for listening.