

Commentary

Minding the gap: Rethinking implementation of antimicrobial stewardship in India

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By conservative estimates, 700,000 deaths this year will be attributable globally to antimicrobial-resistant bacteria, and this number will rise to 10 million deaths by 2050 if trends in antimicrobial resistance do not change.¹ Reversing trends in antimicrobial resistance could have the biggest impact in India, which has the highest infectious disease burden in the world.² Recent India-wide estimates of *Escherichia coli* resistance demonstrate 77% resistance to third-generation cephalosporins, 84% resistance to fluoroquinolones, and up to 59% resistance to carbapenems for *Klebsiella pneumoniae* isolates.³ The concept of antimicrobial stewardship can be hard to reconcile in this setting—particularly with overwhelming barriers including inadequate sanitation, unrestricted access to antibiotics in the community, antibiotic use in agriculture, and antibiograms that warn of a post-antibiotic era.

Applying a tiered framework like the Centers for Disease Control and Prevention (CDC) Core Elements of Human Antibiotic Stewardship Programs in Resource-Limited Settings points out how deploying antimicrobial stewardship in India necessitates revision of constructs that have been used commonly in the United States due to the vastly different healthcare infrastructure.^{4,5} In this issue of *Infection Control and Hospital Epidemiology*, Rupali *et al*⁶ describe incorporating stewardship principles into infectious disease consultation in a South Indian hospital.⁶ They focused on the intensive care unit and found that 73.3% of antibiotic prescriptions were inappropriate, indicating that an effective inpatient antimicrobial stewardship program would make substantial impact. The authors indicate that they will present results from this initial effort to administration to obtain leadership support for an antimicrobial stewardship program—often thought of as the first and perhaps most critical core element of stewardship.^{4,7} Leadership support has been associated with successful implementation in India.⁸ Rupali *et al* used consultative-based stewardship, which would be difficult to implement in most Indian hospitals due to lack of infectious disease specialists. Drug expertise is a vital part of an effective stewardship program, and the hospital in their study houses the first infectious diseases fellowship training program in

the country.⁶ However, most hospitals in India do not have infectious disease physicians, and almost none have infectious disease pharmacists. Training more infectious diseases physicians and infectious disease pharmacists would bolster the ability to implement stewardship. Recently, infectious disease fellowship programs have increased in India, but medical microbiologists can also play a role in stewardship in India.⁸ Adding a medical microbiologist to the stewardship team can lead to diagnostic stewardship interventions and support common tracking and reporting stewardship practices such as maintaining hospital antibiograms.⁵

Stewardship programs often use interventions such as prior authorization or formulary restriction, but innovative methods of delivery may be needed in India. Traditional stewardship interventions could be augmented by nontraditional cost initiatives that make narrower antibiotics less expensive than broad-spectrum antibiotics because patients often buy antibiotics on their own from the pharmacy rather than being given an antibiotic as an inpatient. The authors mention several socioadaptive barriers in the acceptance of antimicrobial stewardship. Like infection prevention work, hierarchy and empowerment can be a barrier in stewardship.⁹ Applying a qualitative lens to identify India-specific barriers to implementation of stewardship and construction of stewardship interventions could be valuable and may be an additional core element needed in India.¹⁰

Large Indian tertiary-care centers have begun to try to implement antimicrobial stewardship, but expansion of these programs nationally is problematic with current resources—a problem akin to incorporating stewardship into long-term care centers nationally in the United States.¹¹ However, it is more important than ever to implement antimicrobial stewardship in India. The Indian government on the state and national levels has been supportive of incorporating stewardship concepts into policy such as the Red Line Campaign, which marks antibiotics with a red line to curb inappropriate use and to raise public awareness of the side effects of antibiotics (Table 1).¹² Implementation of stewardship in India needs a fresh lens. Much has been written about the factors that have led to the current state of antimicrobial resistance in India, and antimicrobial stewardship in acute-care hospitals is only a part of the overall process that can curb antimicrobial resistance. But it is time to act, and nascent hospital antimicrobial stewardship programs like those highlighted in this article should be applauded and duplicated.

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Table 1. Selected Contributing Barriers to Antimicrobial Stewardship in India and Tactics that May Help

Barriers	Proposed Tactics
Unregulated antibiotic use in the community	National policy change (eg, the Red Line Campaign)
Few existing hospital antimicrobial stewardship programs	Build stewardship into hospital accreditation standards
Lack of infectious diseases (ID)-trained pharmacists and ID physicians	Build capacity for infectious diseases fellowship programs and construct infectious disease pharmacy training programs in large academic centers/ pharmacy schools; involve medical microbiologists
Lack of empowerment of pharmacists	Socioadaptive tactics, employing multidisciplinary stewardship teams
Disconnected process for inpatients obtaining antibiotics (eg, families will often buy antibiotics from a separate pharmacy while patient is inpatient)	Engage insurance and pharmacy stakeholders in cost-related stewardship interventions (eg, narrow-spectrum antibiotics should be priced lower than broad-spectrum antibiotics)

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