

Short Communication

Learnings from select Indian public welfare programs to catalyze the implementation of India's national action plan on antimicrobial resistance

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ABSTRACT

Antibiotics are an easy, rapid and quick replacement to improved care within fragmented health systems with poor access and infection control measures in many countries, including India. India announced its national action plan for antimicrobial resistance (NAP-AMR) 2017-2021 but has made limited progress. Successful public welfare programs (Delhi metro rail corporation DMRC, swachh bharat mission (SBM), beti bachao beti padao (B3P) and national green tribunal NGT) were reviewed that had addressed critical national concerns similar to AMR. Valuable lessons from their implementation provide the opportunity to improve the governance and operationalization of the NAP-AMR. Unique features of the four programs identified above include resilient leadership, multi-stakeholder coordination with oversight and accountability of partnerships, innovation in program design and implementation and data-driven real-time monitoring for sustained behavior change. Incorporating these strategies into the program design and implementation of India's NAP-AMR will reinvigorate the program to accelerate the achievement of program targets.

Keywords: National action plan, Antimicrobial resistance, Public welfare programs, India

INTRODUCTION

AMR is the ability of microorganisms to resist antimicrobials, kills more than 700,000 people today and is likely to cause 10 million deaths annually by 2050. Antibiotics, the driver for AMR, have long been used as a short-term quick-fix to improve care, repair broken health systems, increase productivity, substitute for hygiene and inequality, especially in low and middle-income countries (LMICs).¹ Since 2010-2015, antibiotic use has risen exponentially in LMICs, including India, driven by the easy availability of over-the-counter antibiotics without prescription, preference for broad-spectrum antibiotics, lack of robust AMR surveillance systems and stewardship, poor infection control practices, lack of human resources for health and widespread use of antibiotics in animals.^{2,3}

The WHO, food and agriculture organization (FAO), world organization for animal health (OIE) and the united nations environment program (UNEP) acknowledge the wide-ranging causes of AMR and advocate the 'one health' approach to address it.⁴ One health aimed at optimal health for people, animals, plants and the environment by preventing and combating health threats through an integrated approach.⁵ Containment of AMR requires effective governance structures, sustained multi-stakeholder collaboration, inter-sectoral partnerships to ensure the appropriate use of antibiotics across sectors to ensure and reduce drug-resistant infections.⁶ The WHO endorsed a global action plan (GAP) for AMR on which most national action plans (NAP) for AMR are based includes five strategic priorities- improves awareness and understanding of AMR through effective communication,

education and training; strengthen knowledge and evidence through surveillance; reduce the incidence of infection through adequate infection prevention and control; optimize the use of antimicrobial agents in health, animals and food; promote investments for AMR activities, research and innovations. In 2017, when India announced its NAP-AMR (2017-2022), it added a sixth pillar-strengthen India's leadership on AMR.⁷

The ongoing COVID-19 pandemic has worsened the silent, invisible pandemic of AMR with unnecessary prescription of antibiotics to COVID-19 patients.⁸ Data suggests that 70% of patients (either in-home isolation or intensive critical care units) have been prescribed a range of antimicrobials even though their use is justified in less than 10% of cases.^{9,10} Recent outbreaks of mucormycosis, now a notifiable disease in India, highlight the outbreak potential of AMR.¹¹ As COVID-19 overwhelms country health systems and disrupts health services, AMR threatens to wreak further damage unless NAP-AMR implementation accelerates in India.¹²

METHODS

Translating AMR plans to action

In 2019, WHO acknowledged that most LMICs would find it challenging to implement the NAP-AMR unless the national AMR coordination committees prioritize activities at the country level.¹³ In India, since the announcement of the NAP-AMR in 2017, implementation has been patchy with uneven progress due partly to a lack of dedicated financial resources. Moreover, health is a state subject and only three states have announced their state action plans.¹⁴

We have aimed to undertake a landscape analysis of public welfare programs in India, implemented within the last decade, that successfully attained their primary objectives at scale and produced a measurable impact in the field. We studied these to identify the critical elements that contributed to their success and inform the implementation of the AMR-NAP in India.

RESULTS

Using policy documents, program guidelines, peer-reviewed articles and evaluation reports, we identified four public welfare initiatives. They were DMRC, B3P implementation in Haryana, the NGT, and the swachh bharat abhiyan. Our analysis highlighted four *a priori* selected domains that contributed to their success (Table 1).

Resilient leadership-DMRC

Decisive leadership with authority at the administrative level (national/state) that takes responsibility for time-bound implementation is the key for success. A committed leader can visualize the public impact of the

program and steer it towards critical short-term and mid-term targets (Table 1). At the DMRC, the leadership crafted a success story with its sheer scale, complexity and efficient use of resources. Profitable from day one of operation, much of its success was a credit to the extraordinary leadership of Sreedharan.¹⁵ Also known as the metro man, his previous success with the Konkan railway and high ethical standards resulted in the government giving him unprecedented autonomy in planning, recruitment, delegation and decision making on the Delhi metro. He was even successful in generating funds from the Japanese government, without which the project would not have materialized and ensured the completion of the project per timelines.

Multi-stakeholder coordination with oversight and accountability) B3P in Haryana

AMR, characterized by the interconnectedness of human health, animal health, food security, safety and environment in the ecosystem, needs a synchronized response from these different departments. In practice, such cohesive coordination demands oversight and supportive supervision to ensure progress, as seen in the B3P scheme in Haryana.¹⁶ With one of the lowest sex ratios at birth (SRB) (857 females per 1000 males in 2012), the urgency to act prompted the state health department to develop successful linkages with five other departments of police, prosecution, woman and child development, education and food and drug administration as well as other stakeholders like the judiciary, mass media and civil society, panchayats and village leaders (Table 1). These, together with the district administration at each district, provided implementation support (joint training, reviews and innovations such as mystery customers in antenatal clinics and activities to promote awareness about the scheme). This synergy ensured a conscientiously monitored implementation of the pre-natal diagnostic techniques acronym (PNDT Act) and resulted in significantly improving its sex ratio by 1.696 per month within a year. It resulted in an ideological change in communities regarding the value of the girl child and increased school enrolment and retention for girls.

Innovative design and implementation-NGT

Antibiotic use and AMR is a complex scientific issue complicated by the influence of the organized pharmaceutical industry which produces, uses and pushes the use of antibiotics, adversely impacting public health, animal welfare, environment and biodiversity. India has the distinction of being the only developing nation (Australia and New Zealand being others) to have introduced an environmental tribunal to address cases that require an objective assessment of scientific data such as damage caused by toxins in domestic or industrial effluents. Simplification of interpretation scientific evidence helps deliver justice and preserve the environment.¹⁷ The NGT, which was established in 2010

to fast-track civil cases related to the environmental dispute, draws upon the expertise of both judges and qualified environmentalists with at least 15 years of professional experience. The innovative design of the NGT ensures science informs issues related to environmental justice and nurtures the use of science to

develop faith in the judiciary (Table 1). NGT is the first body in India to apply the polluter-pay principle, the precautionary principle and sustainable development principle and provides easy and inexpensive access to justice.

Table 1: Principle domains for success in select Indian programs/initiatives for NAP-AMR success.

Domain needed for implementation of NAP-AMR	Selected public welfare scheme /program			
	B3P	SBM	NGT	DMRC
Resilient leadership	State	National	Sectoral	Individual
Multi-stakeholder coordination with oversight and accountability of partnerships	Inter-departmental	Public-private	Judiciary-science	Public-private
Innovation in program design and implementation	Mystery customers to detect sex-selective abortion	ODF scoring of cities and villages	Scientific and judicial collaboration to address environmental disputes	Meticulous execution and planning
Data-driven real-time monitoring for behaviour change communication initiatives to build awareness	Online monitoring system	Real-time GIS-based	Website based	Website based

Data-driven real-time monitoring for sustained behavior change-SBM

Tackling AMR demands monitoring and surveillance of antibiotic use and resistance in the one health sectors. It is essential to leverage information technology to gather and analyze data. While launching the SBM in 2014, the prime minister of India set the goal of India becoming open-defecation free (ODF) by 2 October 2019, the 150th birth anniversary of Mahatma Gandhi. SBM undertook real-time monitoring of progress to ODF status in towns, cities and villages. The website interface and social media tools increased citizen interaction and involvement in the scheme. Early wins with 100 districts becoming open defecation free and publication of this data on an annual basis (SBM status) spurred citizen participation over social media. In 2017-2018, ODF villages increased from 50% to nearly 90% and the country recorded the lowest number of acute diarrheal disease outbreaks compared with all of the previous eight years.¹⁸ The sustained mass communication campaign of SBM with active inputs from the private sector through corporate social responsibility initiatives has left a lasting impact on the Indian mindset and contributed to the uprooting of age-old customs and rural bias against toilets and improved sanitation (Table 1).

DISCUSSION

How can these learnings support accelerated implementation of India's NAP-AMR?

So far, the implementation of India's NAP-AMR has been patchy. Our analysis highlights the prerequisite for operationalizing the NAP is a well-delineated governance structure with a transparent chain of command, dedicated human resources and budget, as in DMRC. The B3P program provides valuable process learnings for ensuring that a consistent message (antibiotics only on prescription, in line with strategic priority 1 of India's NAP-AMR) is disseminated to the community through various stakeholders, performing different roles and regularly interacting with them. Similarly, a critical driver of inter-sectoral collaboration in SBM is the real-time monitoring of community acceptance of toilet use across ministries and sectors using information technology. Such evidence-based monitoring systems are essential to attain strategic priority 1 (increase AMR awareness and understanding) and strategic priority 3 (reduce the incidence of infection through adequate infection prevention and control) and ensure antibiotic stewardship across one health sectors. Institutional innovations in governance like NGT are needed to achieve strategic priority 4 (optimum use of antibiotics) to balance the push for antibiotic use (from industry and trade) with the

cohesive assessment of the negative impact of antibiotic pollution from hospital and pharma effluent on public health and biodiversity.

This review highlighted the domains that need leverage for the achievement of NAP AMR objectives in India by collaborating with stakeholders in all sectors such as hospitals, animal farms, pharmacies, industry and retail food outlets. With the current momentum of AatmaNirbhar Bharat Abhiyan, India's pledges to be self-reliant.¹⁹ Resilient one health systems that utilize its indigenous capacity for vaccines and antibiotic production together with an efficient surveillance system that prevent antibiotic misuse and prevent AMR are essential to tackle AMR.

CONCLUSION

We attempted this review to emphasize the critical need for addressing the rapidly increasing burden of AMR, especially with the context of the COVID-19 pandemic. Today, more than ever, it is essential to implement India's NAP-AMR activities to improve AMR awareness, education and regulation for optimum use of antibiotics in India. We trust this paper will be helpful to reinvigorate the implementation of NAP-AMR in India for timely achievement of its objectives within the current policy momentum of becoming self-reliant or truly Aatma Nirbhar Bharat.

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