Approaches and Tools for Strengthening Pharmaceutical Systems

Containing Antimicrobial Resistance Through Stewardship

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Why is antimicrobial stewardship important?

The pharmaceutical system is a subset of the broader health system and aims to ensure access to and appropriate use of safe, effective, quality-assured, affordable medical products and related services to improve health. Low- and middle-income countries (LMICs) face key challenges in their pharmaceutical systems, including high out-of-pocket expenses for medicines, substandard and falsified products (WHO estimates that these account for approximately 10% of medical products in LMICs[1]), and inappropriate use of medicines.

These challenges all contribute to antimicrobial resistance (AMR). The challenge of inappropriate use of medicines is particularly significant: A 2011 World Health Organization (WHO) report found that only 30–40% of patients are treated according to clinical guidelines and only about 50% of patients adhere to treatment regimens.[2]

AMR refers to changes in microbes that render antimicrobial medicines less effective. The increasing rate of AMR is making treating infections harder—and, in some cases, impossible—with existing antimicrobial medicines. Preserving the effectiveness of existing antimicrobials is necessary for treating infections and saving lives. WHO ranks AMR as one of the 10 greatest global public health challenges, and the challenge cannot be overstated: An estimated 1.27 million deaths worldwide were directly attributable to antimicrobial-resistant bacterial infections in 2019, more deaths than those caused by HIV/AIDS or malaria. The burden is highest in LMICs, with sub-Saharan African countries experiencing the greatest number of deaths attributable to AMR, followed by South Asia.[3]

Effective antimicrobial stewardship (AMS) programs—at both the national and facility levels—are important for AMR containment. These programs focus on optimizing the use of antimicrobial medicines and curtailing their misuse to prevent infections caused by multidrug-resistant organisms and ensure sustainable access to effective therapies.

In this document, we present approaches and tools that MTaPS has found effective to improve AMS and describe how other organizations can apply them in their context.

Approaches and tools to improve AMS

The USAID Medicines, Technologies, and Pharmaceutical Services (MTaPS) Program is supporting LMICs in combating AMR as part of USAID's efforts under the

[1] WHO. Substandard and falsified medical products. 2018. https://www.who.int/news-room/fact-sheets/detail/substandard-and-falsified-medical-products

[2] Holloway K, van Dijk L. The world medicines situation 2011: rational use of medicines (3rd ed.). 2011. World Health Organization.

[3] Antimicrobial resistance collaborators. Global burden of bacterial antimicrobial resistance in 2019: a systematic analysis. Lancet. 2022. 399, 629-55. https://doi.org/10.1016/S0140-6736(21)02724-0

Global Health Security Agenda. MTaPS' strategy to support AMR containment is rooted in a systems strengthening approach that focuses on three critical technical areas: effective multisectoral coordination on AMR, infection prevention and control (IPC), and AMS. Combating AMR requires strong pharmaceutical systems that address access to and appropriate use of antimicrobials. As part of its objective of improving pharmaceutical services to achieve health outcomes, MTaPS uses a range of approaches to assist countries in strengthening AMS. These approaches are based on an iterative process to help countries make incremental progress to reach established WHO benchmarks and advance countries' Joint External Evaluation (JEE) scores for sections *P4.4, Optimize use of antimicrobial medicines in human and animal health* and *P4.5, Optimize use of antimicrobial medicines in human and animal health and agriculture*. The JEE "is a voluntary, collaborative, multisectoral process to assess country capacities to prevent, detect, and rapidly respond to public health risks, whether occurring naturally or due to deliberate or accidental events. The JEE helps countries identify the most critical gaps within their human and animal health systems to prioritize opportunities for enhanced preparedness and response."[4]

MTaPS' efforts are directed to building countries' capacities to optimize their use of antimicrobials and avert infectious disease threats, securing health nationally and globally.

Central-level approaches and tools

At the central level, MTaPS supports countries to:

- Assess AMS capacity develop action plans
- Mobilize stakeholders and build coalitions around AMS activities
- Help develop national-level policies, guidelines, and standard operating procedures
- Reform pre-service and in-service curricula, focusing on core competencies
- Educate patients and the public through customized materials/messages and the media
- Build capacity through tools, job aids, supportive supervision, and continuous quality improvement
- Monitor country adherence to recommended policies, guidelines, and practices
- Provide technical support to group antibiotics into the access, watch, and reserve (AWaRe) categories, according to WHO guidance

Facility-level approaches and tools

MTaPS supports health facilities to strengthen their AMS programs by implementing the steps for establishing AMS programs detailed in WHO's AMS toolkit. MTaPS uses a detailed guide and checklist it has developed that elaborates on the steps from the WHO toolkit and provides a visual way to track progress. Support is tailored to the facility, recognizing the strengths and weaknesses of each facility, as well as the current level of support for AMS in the facility. The steps for establishing facility AMS programs identified in WHO's AMS toolkit[5] are:

1. Undertake a facility AMS situational/strengths, opportunities, weaknesses, threats analysis of:
   1.1. Health care facility core elements—identify what is in place and implementation level required
   1.2. Available data on antimicrobial consumption and/or use, prescription audits, and AMR surveillance data
   1.3. Existing AMS competencies at the facility
2. Establish a sustainable AMS governance structure based on existing structures
3. Prioritize the health care facility core elements based on the situational analysis:
   3.1. Identify immediate priorities
   3.2. Identify resources required
4. Identify AMS interventions, starting with low-hanging fruit:
   4.1. Identify who, what, where, and when
5. Develop a health care facility AMS action plan that specifies the human and financial resources required
6. Implement AMS interventions
7. Monitor and evaluate AMS interventions
8. Offer basic and continued educational resources and training on optimized antimicrobial prescribing

[4] WHO (n.d.). Joint External Evaluation (JEE). https://www.who.int/emergencies/operations/international-health-regulations-monitoring-evaluation-framework/joint-external-evaluations#:~:text=A%20Joint%20External%20Evaluation%20(JEE,to%20deliberate%20or%20accidental%20events

[5] WHO. Antimicrobial stewardship programmes in health-care facilities in low- and middle-income countries. A practical toolkit. 2019. https://apps.who.int/iris/bitstream/handle/10665/329404/9789241515481-eng.pdf

Case studies on strengthening AMS

Institutionalizing AMS learning in Kenya

MTaPS has been supporting efforts to institutionalize learning on AMS for pre- and in-service training:

- Pre-service: MTaPS collaborated with the University of Nairobi to develop pre-service curricula and training for undergraduate and postgraduate students in health sciences. MTaPS and the university then launched the training.
- In-service: MTaPS collaborated with regulatory authorities and professional associations to develop and launch an in-service, continuing professional development (CPD) course on AMS. The virtual nine-module course targets health professionals and provides training on the practical aspects of AMS in health care settings. Between October 2020 and June 2022, over 1,700 health care workers were trained, including medical laboratory scientists, doctors, nurses, and pharmacists. Completion of the course earned participants CPD points from their respective regulatory bodies (including the Pharmacy and Poisons Board, Nursing Council of Kenya, and Kenya Medical Practitioners and Dentists Council). These points are important for annual renewal of practice licenses.

Together, these efforts are helping Kenya move along the pathway to sustainability and strengthening the capacities of the current and future health workforce on AMS.

Monitoring hospital antibiotic use in Uganda

Having established strong AMS governance and planning, MTaPS collaborated with the Ugandan Ministry of Health to monitor antibiotic use in 13 hospitals by using the WHO standardized point prevalence survey methodology, an activity under the national AMS plan.[6]

Data collection took place between December 2020 and April 2021 and looked at 1,387 prescriptions among 1,077 patients. The study aimed not only to understand the prevalence of antibiotics used in the facilities, but also to evaluate the facilities' compliance with the country's clinical guidelines. The data showed that 74% of patients were prescribed at least one antibiotic; there was low compliance with the national clinical guidelines (30%); and there was high use of antibiotics from the WHO's watch category (44%, although WHO aims for at least 60% of countries' antibiotic consumption to come from medicines in the access category). Monitoring antibiotic use is essential for effective AMS programs, and the results of the study helped point to areas for improving the effectiveness of the facilities' AMS programs and provided ongoing points for action to be embedded in future facility-level AMS plans.

How can organizations apply these approaches?

Below are resources that can equip organizations with the knowledge and tools to improve the effectiveness of AMS activities and combat AMR in local contexts.

Tools

- MTaPS Global Health Security Agenda Mini-Guides: These documents provide concise stepwise guidance and checklists for implementing activities to contain AMR. In addition to providing practical guidance on implementing facility-level AMS programs, the guides also cover IPC programs and plans, multisectoral coordination, and implementing WHO's AWaRE antibiotic classification.

- Antimicrobial Stewardship Programmes in Health-Care Facilities in Low- and Middle-Income Countries: A WHO Practical Toolkit (WHO 2019): This toolkit provides practical guidance on AMS, including planning, implementing, and assessing AMS programs; the competencies for health care workers involved in facility-level AMS programs; and education and training to strengthen AMS-related competencies. The toolkit also provides sample documents that users can adapt (e.g., sample terms of reference for national- and facility-level working groups and committees).

[6] Kiggundu R, Wittenauer R, Waswa J, et al. (2022). Point prevalence survey of antibiotic use across 13 hospitals in Uganda. *Antibiotics, 11,* 199. https://doi.org/10.3390/antibiotics11020199

Tools, continued

- Joint External Evaluation Tool: International Health Regulations (2005) – Third Edition (WHO 2022): The JEE allows countries to assess their capacity to prepare for and respond to public health threats. The tool includes specific indicators on AMR with clearly defined capacity levels.
- Uganda Guidelines for Infection Prevention and Appropriate Antimicrobial Use in the Animal Sector (2020): Uganda's Ministry of Agriculture, Animal Industry, and Fisheries, in collaboration with MTaPS, developed and published practical guidelines on IPC and antimicrobial use for cattle farming, fish farming, and goat and sheep farming.

Additional readings and resources

- Identifying and Addressing Challenges to Antimicrobial Use Surveillance in the Human Health Sector in Low- and Middle-Income Countries: Experiences and Lessons Learned from Tanzania and Uganda (Kiggundu et al. 2023)
- Strengthening Drug and Therapeutics Committee Utilization in Health Facilities in Burkina Faso (December 2022)
- MTaPS Sets Up Centers of Excellence for AMS and Infection Prevention and Control in Uganda (February 2022)
- A Call for Policies and Regulations to Strengthen Antimicrobial Stewardship (November 2021)
- Uganda's Current Policies and Regulations on Antimicrobial Stewardship for Human Health, Animal Health, and Agriculture (October 2021)
- Integrating Antimicrobial Stewardship into Continuing Professional Development in Kenya (October 2021)
- DRC Completes its First National Survey on Antimicrobial Consumption (June 2021)
- Côte d'Ivoire Launches First-ever AMS Multisectoral Plan to Combat AMR (December 2020)

e-Learning resources

- Pharmaceutical Systems Strengthening 101 (available in English and in French): This course introduces learners to the basic principles of PSS, including how addressing pharmaceutical system problems advances universal health coverage; combats AMR, HIV and AIDS, malaria, tuberculosis, and other public health threats; and promotes maternal and child health.
- Antimicrobial Resistance (Part 1): This course addresses basic principles of AMR, including its impact on individuals and society.
- Antimicrobial Resistance (Part 2): This course presents the contributing factors to development and spread of AMR, including interventions to address these factors.
- Mapping Educational Opportunities and Resources for Health-Care Workers to Learn About Antimicrobial Resistance and Stewardship (WHO 2017): This resource identifies a range of educational resources available on AMR that targets both health care workers and students. Appendix 2 of the report provides a list of these resources, with associated links.
- Mapping educational opportunities for healthcare workers on antimicrobial resistance and stewardship around the world (Rogers et al. 2018): This article provides a table (with associated links) of various educational resources available on AMR and AMS.

Contact

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About USAID MTaPS:
The USAID Medicines, Technologies, and Pharmaceutical Services (MTaPS) Program (2018–2023) enables low- and middle-income countries to strengthen their pharmaceutical systems, which is pivotal to better health outcomes and higher-performing health systems. The program is implemented by a consortium of global and local partners, led by Management Sciences for Health (MSH), a global health nonprofit.

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