



TECHNICAL
PROGRAM
UPDATE

COMBATING ANTIMICROBIAL RESISTANCE WITH STRONGER HEALTH SYSTEMS



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SIAPS
Systems for Improved Access
to Pharmaceuticals and Services

Antimicrobial resistance (AMR) is one of the world's most pressing and urgent global health threats—one that could erode gains against tuberculosis (TB), malaria, HIV/AIDS, and many other infectious diseases. AMR poses an enormous threat to the safety and feasibility of complex surgeries and procedures like organ transplantation and chemotherapy and can make childbirth, minor infections, and hospital stays more perilous. While AMR has emerged as a critical issue at the global level, current efforts to address AMR are insufficient to curb its spread. Immediate, cross-cutting, and multidisciplinary action is required to adequately address the multidimensional drivers of AMR. In the health sector, strengthening the systems through which health services and medicines are provided is a prerequisite to making progress against AMR.

This technical brief discusses how the Systems for Improved Access to Pharmaceuticals and Services (SIAPS) Program, funded by the US Agency for International Development (USAID), is working to address AMR through a health system strengthening approach with interventions spanning the global, regional, national, and local levels.

GLOBAL CONTEXT

AMR can be found in every corner of the globe and in all populations—cutting across geographic divides, political boundaries, and socioeconomic groups. Although high-income countries are continuing to struggle to contain AMR, the problem is even more worrisome in low- and middle-income countries (LMICs), where resources, capacity, and political will are frequently insufficient to adequately address the issue.

Patients with drug-resistant infections typically require more difficult and expensive treatment options. Such infections increase morbidity and mortality in individual patients and leave them infectious for longer periods of time, putting others in the community at greater risk of becoming infected. The wide-ranging effects of AMR go far beyond individuals and the community. Left unchecked, AMR has the potential to derail global

Box 1. What is AMR?

Antimicrobial resistance (AMR) is the resistance of a microorganism (bacterium, fungus, virus, or parasite) to a drug that was originally effective in treating infections caused by that microorganism.¹

public health efforts, undermine sustainable trade and economic development, and block the achievement of global initiatives such as the Sustainable Development Goals. In one scenario, the World Bank estimates that AMR could cost the global economy as much as USD 3.4 trillion by 2030.²

Microbes naturally develop resistance to antimicrobials over time; however, AMR is accelerated by the overuse and misuse of antimicrobial medicines, improper infection control or prevention practices, and nonadherence to treatment regimens.

To raise awareness of the potentially dire consequences of AMR and catalyze global action, the World Health Organization (WHO) published the Global Strategy for Containment of Antimicrobial Resistance in 2001; devoted World Health Day in 2011 to AMR; and passed several World Health Assembly resolutions, most recently resolution [WHA68.7](#) that endorsed the [Global Action Plan on AMR](#). In September 2016, the United Nations General Assembly also elevated AMR as a major area of concern for global leaders by holding a high-level meeting on the issue—only the fourth time a health issue was raised to that level. Recent G7 and G20 ministerial meetings have also made high-level commitments to contain AMR.

STRATEGIC RESPONSE

SIAPS recognizes that AMR is a fundamental threat to expanding universal health coverage, creating an AIDS-free generation, ending preventable child and maternal deaths, and combating other infectious disease threats. Investing in strong and resilient health systems that are able to provide equitable access to safe and effective medicines and quality services and optimize medicine use is a critical component of WHO's strategy against AMR. The SIAPS approach, rooted in the WHO health system building blocks model and the key principles of the Global Health Initiative, works to address AMR through health system-strengthening interventions at the global, regional, national, and local levels.

Building on the work of its predecessor projects, SIAPS supports counterparts in LMICs in building awareness of the threat of AMR, advocating for a coordinated response, and implementing interventions that support the goals of WHO's Global Action Plan on AMR. SIAPS works across disease-specific programs with multiple professional disciplines and a wide spectrum of stakeholders in both the private and public sectors to build resilient health systems, increase local capacity, and advance tools

and technologies that help contain AMR. SIAPS has implemented activities in more than 25 countries (table 1) that directly or indirectly contribute to AMR containment.

SIAPS and its predecessor projects have published multiple resources, tools, and publications that support key aspects of AMR containment, including rational medicine use, advocacy and coalition building, standards and guidelines, infection prevention and control (IPC), preservice curriculum reform, pharmacovigilance, and medication adherence, among many others (box 2). These materials are rooted in each project's experience in implementing rational medicine use and AMR containment activities in LMICs and are intended for program implementers and health care providers working in those settings. The following sections describe examples of SIAPS implementation experiences in four key areas where our efforts have helped to directly or indirectly combat AMR.

ADVOCATING FOR AWARENESS AND ACTION

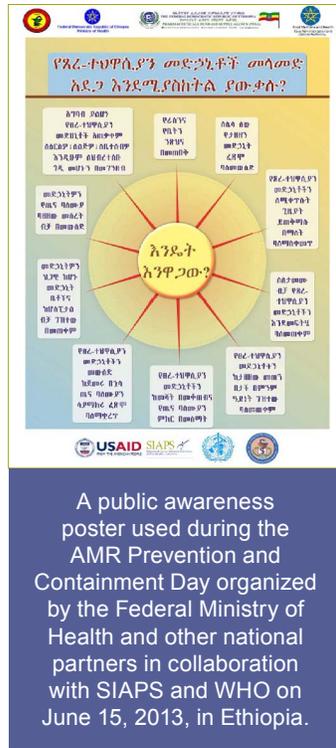
As highlighted in WHO's Global Action Plan, raising awareness and improving understanding of AMR are necessary first steps toward making long-term strides against this global threat. SIAPS collaborates at the global level with WHO and other partners and at the regional and national levels to help raise awareness, share knowledge, and advocate for greater investment in AMR containment.

AMR Advocacy. By leveraging strong partnerships with regional and national organizations, SIAPS supports local advocacy initiatives against the common threat of AMR and advances these efforts by training advocates, journalists, and partners to ensure that accurate messages, effective interventions, and appropriate tools are disseminated across these networks.



Journalists raise their hands in solidarity to support AMR advocacy and containment at the close of a SIAPS-supported workshop organized by the Food, Medicine and Health Care Administration and Control Authority of Ethiopia in June 2012.

On a regional scale, SIAPS supported the Ecumenical Pharmaceutical Network (EPN), a faith-based regional network with member organizations in multiple countries, to conduct a training of trainers workshop on AMR and appropriate antibiotic use; participants included EPN experts from Zimbabwe, Tanzania, and Zambia. Equipped with the necessary tools and resources to train others, participants developed action plans for carrying out AMR-related trainings and interventions tailored to their unique country context. SIAPS also partnered with EPN and ReAct to issue the [Call to Action: Combat Antimicrobial Resistance and Preserve Antimicrobials for Future Generations](#), which was adopted during EPN's 2016 Biennial Forum.



A public awareness poster used during the AMR Prevention and Containment Day organized by the Federal Ministry of Health and other national partners in collaboration with SIAPS and WHO on June 15, 2013, in Ethiopia.

To help increase the public's awareness of AMR and improve the quality of reporting on the topic, SIAPS assisted Ethiopia's regulatory authority in training journalists from an array of media outlets on how to accurately report issues surrounding rational medicine use and AMR. As a result, between 2012 and 2014, 218 news pieces were published to inform and educate the public on these topics.

National AMR Action Plans and Strategies. WHO has recommended that all member states develop national action plans on AMR that align with the Global Action Plan to ensure a coordinated and widespread response. SIAPS supported country counterparts in finalizing and publishing the Strategy for the Prevention and Containment of AMR (2015–2020) in Ethiopia. In addition, in South Africa, SIAPS has supported both national- and provincial-level government entities in developing AMR plans and strategies. SIAPS also recently collaborated with the WHO country offices in Swaziland and Sierra Leone to facilitate the development of draft national AMR strategies based on the One Health concept.

Multisectoral Coordinating Groups and Coalition Building. AMR is an issue that cuts across many disease programs and sectors of society, including finance, agriculture, and trade. The potential for AMR to affect a wide range of stakeholders calls for a multisectoral approach so that different actors are working in coordination toward a common goal.

In Namibia, SIAPS helped build a multisectoral coalition against AMR by mobilizing policy makers, program managers, and health practitioners to issue a call for action to minimize the risk of AMR. An action framework and action plan were developed and agreed upon by stakeholders to guide the implementation of activities to enhance rational medicine use and contain AMR in the country.



An awareness-raising poster developed for South Africa's 2014 Pharmacy Week.

of Health to develop and print communication material for the campaigns. The 2014 campaign focused on the responsible and rational use of antibiotics. In Namibia, SIAPS worked with the Pharmaceutical Society of Namibia (PSN) to execute its annual pharmacy week in 2013, which focused specifically on AMR. SIAPS, the Ministry of Health and Social Services, and PSN developed and customized material for an accredited continuing professional development seminar and supported the development and placement of AMR-related articles in local newspapers and the airing of a one-hour live television special on AMR.

Partnering with Professional Associations to Raise Awareness. In South Africa, SIAPS supported national and provincial efforts to promote the role of pharmacists and pharmacy services during National Pharmacy Week campaigns in 2013 and 2014. SIAPS partnered with the South African Pharmacy Council, the Pharmaceutical Society of South Africa, and the National Department



Namibia's official television station, NBC TV, airs a segment on "pharmacists against antimicrobial resistance" in September 2013.

STRENGTHENING SYSTEMS FOR APPROPRIATE USE

Effective governance and transparent management of medicine supply chains and the pharmaceutical services through which they are provided are central to country-level interventions that help curb the spread of AMR. Strengthening national pharmaceutical systems helps to reduce the number of falsified medicines available, reduces inappropriate distribution and dispensing of antimicrobials, and helps to create an enabling environment that reduces the barriers patients face in seeking and staying on treatment.

SIAPS works with ministries of health, national regulatory authorities, and private-sector stakeholders to improve medicine use and address AMR through strengthened regulatory functions; the development and implementation of standard treatment guidelines (STGs), essential medicines lists (EMLs), and formularies; surveillance of medicine safety, effectiveness, and quality (pharmacovigilance); improved infection control practices; and human resource capacity building.

Standard Treatment Guidelines and Essential Medicines Lists. STGs and EMLs guide the selection of medicines and outline appropriate treatment regimens. Combined with a national formulary, these documents are the cornerstones of rational medicine use and reduce excessive, unnecessary, and inappropriate prescribing practices that can be major contributors to the spread of AMR.

SIAPS has supported 15 countries in developing or revising STGs. In South Africa, SIAPS provided technical assistance to South Africa's National Essential Drug List Committee to develop the 2012 hospital-level STGs and EML as well as to complete, publish, and implement the primary health care STGs and EML.

SIAPS has supported the development or revision of national EMLs in Angola, DRC, Dominican Republic, Guinea, Lesotho, Mozambique, and Namibia.

Strengthening Regulatory Systems. More than 70% of countries in sub-Saharan Africa have minimal or no regulatory capacity, which severely limits their ability to manage and provide access to safe, effective, and quality medicines.³ This lack of regulation increases the availability of falsified or substandard medicines on the market, which can endanger patients and accelerate the spread of AMR. By strengthening the management of key national

regulatory functions and pharmacovigilance activities, SIAPS is working to improve in-country processes that can help slow the spread of AMR.

SIAPS has worked to strengthen regulatory capacity and improving processes for medicine registration in Angola, Bangladesh, DRC, Ethiopia, Mozambique, and Namibia. Bangladesh, Mozambique, and Namibia have adopted and/or implemented the internationally endorsed Common Technical Document format and specifications to standardize the medicine registration application process and, along with Ethiopia, are implementing the medicine registration module of SIAPS' web-based regulatory information system (Pharmadex) to make their processes more efficient and transparent.

In Ethiopia, SIAPS worked with the Food, Medicine and Health Care Administration and Control Authority to improve medicine quality through systematic and frequent inspections. SIAPS also supported national efforts to monitor adverse drug reactions by strengthening a centralized pharmacovigilance center within the regulatory authority. In Swaziland, SIAPS partnered with the National Pharmacovigilance Center, the National Tuberculosis Program, and the National AIDS Program to develop and strengthen the pharmacovigilance system for TB and HIV programs. Specifically, SIAPS helped develop an active surveillance and reporting system to collect data on adverse drug events associated with antiretroviral (ARV) and TB medicines. These data are collected, analyzed, and disseminated at the national and regional levels through Medicine Safety Watch, a quarterly newsletter. This new reporting mechanism enables stakeholders in Swaziland to effectively monitor the safety and effectiveness of medicines and identify potential contributors to AMR early.

To ensure patient safety when using new multidrug-resistant TB (MDR-TB) medicines and novel regimens, SIAPS collaborated with the Food and Drug Administration of the Philippines and other agencies to establish implementation guidelines for active pharmacovigilance surveillance of a new nine-month MDR-TB regimen and to introduce bedaquiline, a new TB medicine. The program also supported national stakeholders in Swaziland in introducing bedaquiline for the management of MDR- and extremely drug-resistant TB.

SIAPS helped introduce chlorhexidine (7.1%) for newborn cord care in DRC, Pakistan, and Afghanistan by developing an introduction strategy that took appropriate regulatory frameworks into account. For example, in DRC, SIAPS supported product registration and the revision of the EML and treatment guidelines to include chlorhexidine, which is now used in all regions.

SIAPS has worked with other global partners, including WHO, on advocacy documents to support the introduction and implementation of amoxicillin dispersible tablet (DT) for pneumonia treatment for children under five, which is expected to significantly reduce medication administration issues. However, DTs are a relatively new intervention and it is critical to ensure that the formulation is prescribed and used accurately. SIAPS facilitated registration of DT in DRC and its inclusion in the EML. The program then conducted a pilot study in the country using job aids for community and facility health care workers and providing dispensing envelopes. The tools were found to be feasible, acceptable, and usable by providers and caregivers.

Engaging the Private Sector. Working across the public and private sectors is critical to ensuring comprehensive coverage of quality services for patients regardless of whether they visit a government-run or privately run health facility or pharmacy. However, engagement of the private sector remains largely untapped in many countries. Involving the private sector in TB care and treatment has the potential to improve the referral, diagnosis, and treatment systems.

With support from SIAPS, the Tanzania National Tuberculosis and Leprosy Program piloted an intervention designed to increase early TB case detection by engaging private-sector medicine dispensers to identify and refer persons with presumptive TB. The results of the pilot intervention demonstrated that the private pharmaceutical retail sector has the potential to contribute to early TB case detection. A similar program is being initiated with medicine dispensers in Pakistan, where the initiative has gained support from national stakeholders and the program is being scaled up.

BUILDING LOCAL CAPACITY

“The resilient, multifaceted, and permanent nature of the microbial threat has important implications for how the battle against AMR should be fought. Instead of viewing AMR as a distinct issue isolated from other health challenges, it will be more effective and less costly over time to build a common core of permanent capabilities.”

—Drug Resistant Infections: A Threat to Our Economic Future, World Bank Group

Appropriately managing the use of medicines in hospitals, health facilities, and community settings is integral to slowing the spread of AMR. SIAPS supports antimicrobial stewardship by strengthening drug and therapeutics committees (DTCs), revising preservice curricula, improving infection control and case management practices, and evaluating medicine use and prescribing practices.

Drug and Therapeutics Committees. DTCs help health facilities and hospitals select and manage medicines for the formulary, evaluate medicine use, and implement strategies to improve medicine use. Many facilities in resource-limited settings, however, either do not have DTCs or lack the capacity to manage them efficiently. SIAPS helps to strengthen the functionality and management of DTCs by providing trainings; supporting studies evaluating medicine use; and assisting with the planning, management, and monitoring processes.

SIAPS has enhanced the capacity of DTCs in DRC, Ethiopia, Jordan, Mozambique, South Africa, and Swaziland. In collaboration with in-country stakeholders, SIAPS has worked in these six countries to strengthen the functioning and effectiveness of DTCs. As of April 2015, 51 trainings that included 1,411 participants had been held, and ongoing support, such as onsite technical assistance and supportive supervision, had been provided. With SIAPS support, 447 DTCs were created and 49 were revitalized. DTCs helped conduct 36 medicine use studies or evaluations and 68 ABC/ VEN analyses; develop or implement five treatment/ prophylaxis guidelines and two formularies; develop five DTC- or rational medicine use-related policies; conduct 15 in-service trainings on rational medicine use or DTC topics; and revise two preservice curricula to include DTC-related topics.

To aid Sierra Leone in recovering and strengthening its pharmaceutical system after the Ebola outbreak, SIAPS worked with government stakeholders to fast track the launch of four hospital DTCs in 2017. This included developing terms of reference for establishing and operationalizing DTCs and creating a new rational medicine use unit to support them. SIAPS, in collaboration with the Directorate of Drugs and Medical Supplies, conducted a rapid baseline assessment on tracer medicines in four hospitals and used the findings of the assessment to conduct a DTC familiarization



and establishment workshop. SIAPS also conducted a pharmaceutical leadership and management training that included supporting the role of DTCs.

To address variations in the operations and effectiveness of DTCs in South Africa's Gauteng province, SIAPS collaborated with national counterparts to develop **guidance** that outlines governance structures, operating procedures, accountability systems, roles and responsibilities, and communication strategies. SIAPS also collaborated with committees in three provinces, including Gauteng, to analyze

pharmaceutical data and design corrective interventions to address medicine use problems.

Infection Prevention and Control. IPC programs in health facilities help minimize the risk of hospital-acquired infections, including those that are drug resistant. Using an infection control self-assessment tool (ICAT), combined with a continuous quality improvement (CQI) methodology, SIAPS helps to develop, implement, and monitor infection control practices. SIAPS developed a version of the ICAT specifically for use in primary health care settings.

In South Africa, the ICAT tool was adopted nationwide as the official standardized IPC approach. It was adapted to align with the levels of care described in South Africa's National Core Standards for Health Establishment and has been identified as a key tool to contain AMR. This checklist-style tool provides the necessary governance, support, and guidance needed by health care professionals to provide quality care and strengthen the effectiveness of the health system. ICAT and the CQI methodology were also adopted nationally in Namibia. A pool of 40 health professionals was trained to help disseminate and roll out the IPC guidelines and tools, which have since been implemented at all 35 district-level hospitals.

Medicine Use Reviews/ Evaluations and Operational Research.

Reviewing and evaluating how medicines are prescribed, dispensed, and used is vital to optimizing their use. SIAPS helps DTCs, program managers, and health facilities conduct medicine use evaluations (MUEs) or reviews to detect and correct inappropriate or excessive medicine use that can lead to shortages and cost overruns and accelerate AMR.

SIAPS has supported reviews and evaluations of medicines used in TB and HIV/AIDS treatment settings in Bangladesh, Ethiopia, Ukraine, and Uzbekistan. In Jordan, SIAPS facilitated an MUE and established a CQI system in three hospitals to improve the use of antibiotic prophylaxis during cesarean sections. Reviewing the use of antibiotics led to standardized antibiotic prophylaxis protocols and procedures, improvements in the correct administration of antibiotics, and overall cost savings for

each facility. Since the first MUE for cesarean sections, this approach has been adopted by other hospitals and for other surgical procedures.

Operational research can also shed light on how patients, pharmacists, and physicians influence and affect antimicrobial use. SIAPS provided minigrants to three EPN member organizations and supported EPN headquarters by providing technical assistance and oversight to design, implement, and report on antimicrobial stewardship- and containment-related interventions. Results are as follows:

- The Zimbabwe Association of Church-Related Hospitals (ZACH) aimed to increase AMR awareness and the accuracy of reporting by engaging the media. ZACH held a training workshop for 23 journalists, and 23 publications and/or broadcasts were produced in the five months following the workshop, compared to approximately 20 articles published in the year prior to the workshop.
- In Kenya, Gertrude's Children's Hospital focused its efforts on improving adherence to STGs. Following an educational intervention with 70 prescribers and 15 pharmacy staff, a post-intervention audit showed an STG adherence rate of 31.2% compared to a baseline rate of 26.2%.
- The Christian Health Association of Malawi trained 109 health care workers on proper hand washing, restocked participating facilities with hand-washing supplies, and supported the recruitment of new members for IPC committees. Post-intervention assessments showed greater availability of soap in sinks (from 67% to 96%) and increases in the presence of hand-washing posters (from 7.5% to 57.5%), health care workers carrying hand rubs (from 0% to 13%), and health care workers using hand rubs (from 0% to 20%). Hand-washing committees were established in two hospitals.

In addition, SIAPS is helping national counterparts conduct operational research using data from SIAPS-supported tools to determine the rates of treatment enrollment, regimen switches, and medicine resistance among pediatric HIV/AIDS patients in Swaziland and Namibia. In South Africa, SIAPS helped conduct a study using SIAPS' RxSolution, an electronic tool used in more than 400 district- and provincial-level hospitals to monitor outpatient antibiotic prescribing practices and consumption levels. The data revealed that some locations were prescribing antibiotics and regimens not recommended in the STGs and EML.

Preservice Curriculum Development and Training.

Ensuring that the current and future cadres of health care workers have the required skills to effectively manage medicines, implement infection control practices, and support surveillance activities is a key



strategy to curb AMR. Using the guidance document, *Revising Pre-service Curriculum to Incorporate Rational Medicine Use Topics*, SIAPS helps national stakeholders carry out preservice trainings and establish rational use and AMR-related competencies for health care workers.

In Namibia, SIAPS collaborated with the School of Pharmacy at the University of Namibia to integrate case-based and self-directed learning on AMR and rational medicine use into the preservice training of undergraduate pharmacy students to equip them to fight AMR in their future careers. SIAPS also helped design and develop courses on rational medicine use at the University of Western Cape in South Africa and at the Universidad Central del Este in the Dominican Republic.

Community Case Management. Planning, coordinating, delivering, and reviewing health services provided to an individual within a health facility or community setting is referred to as community case management. Through proactive, supportive, and patient-centered care, effective community case management can help maintain the therapeutic efficacy of medicines, improve health outcomes, and minimize the risk of drug resistance.

Working with the Ministry of Health and community health workers (CHWs) in Burundi, SIAPS developed job aids, checklists, and consistent reporting mechanisms to improve outreach, response, and referral times for treating sick children. With the help of these interventions, 86% of children under the age of five that presented with a fever were seen by CHWs within 24 hours. Of these, 98% were tested with rapid diagnostic kits, and 97% of those who tested positive for malaria were treated with artemisinin-based combination therapies. By helping CHWs to identify and treat malaria symptoms at the outset, SIAPS accelerated access to appropriate treatment regimens while also putting into place mechanisms that help to ensure the completion of treatment and adequate follow-up with patients.

TECHNOLOGY AND TOOLS

Online and mHealth Tools. While not feasible in all situations, online and mHealth tools can make it easier for program managers, providers, and patients to access the information they need when they need it, which helps improve decision making by providers and encourages healthy behavior by patients. For providers, these types of tools can provide access to the latest treatment guidelines and medicines lists and can also improve health services through improved record and appointment keeping systems. Improving access to information can help providers ensure that they prescribe medicines in a way that minimizes the

risk of AMR. Through these types of tools, patients can also receive additional information about their diagnosis, treatment regimen, and potential side effects and can be reminded to take medications or refill prescriptions.

After South Africa's National Essential Drug List Committee published the 2012 hospital-level STGs and EML with SIAPS support, the committee recognized that even when these documents are available, it is not always easy for providers to reference them during patient consultations because some prescribers have reservations about using them in front of their patients. To help encourage widespread use of the hospital-level STGs and EML, SIAPS worked with government partners to make the documents available through a smart phone application and to optimize the online, digital versions of both. By leveraging online and mobile technology, SIAPS made these documents easier for prescribers to use and access, which in turn can help avoid prescribing unnecessary or inappropriate medicines.

In Namibia, SIAPS piloted an SMS-based adherence reminder system that sends text message reminders to patients to remind them to stay on ARV treatment. The adherence reminder system integrates directly with information from SIAPS' electronic dispensing tool (EDT) and has already been implemented at 10 health facilities.

Informing and educating a wide range of stakeholders—including clinicians, program managers, government officials, public health practitioners, and the general public—is critical in the fight against AMR and has been called out as a key action by WHO and others. Working toward this goal, SIAPS has developed, and partnered with K4Health to publish two free eLearning courses on AMR on USAID's [Global Health eLearning Center](#). These courses feature updated content, infographics, quizzes, and a completion certificate and can be used as an AMR primer for a wide variety of public- and private-sector stakeholders. Part 1 is a primer on AMR; its impact on individuals and societies; and why it warrants major, concerted global action. Part 2 explores the factors that drive AMR and interventions that can combat it. From its publication on September 16, 2016, to September 30, 2017, 1,454 individuals from 83 countries earned certificates for Part 1. For Part 2, from November 11, 2015, to September 30, 2017, 1,168 individuals from 80 countries earned certificates.

In addition, SIAPS supports a variety of online tools to support more effective supply chains and pharmaceutical services. For example, SIAPS' e-TB Manager was developed to address the difficulty in managing the medicine regimens of patients diagnosed with drug-resistant TB (DR-TB). The web-based tool

integrates data across all aspects of TB and DR-TB control, including information on patients, medicines, laboratory testing, diagnosis, treatment, and outcomes. In Ukraine, which has the second highest burden of TB in the WHO European region, e-TB Manager is being used to manage nearly 130,000 cases of TB/DR-TB and has helped to increase adherence to STGs by monitoring the use of nonstandard TB treatment regimens.

Early Warning Indicators. The number of people presenting with resistance to primary and secondary lines of ARV medicines is expected to grow as the number of people receiving therapy increases. To preserve the future effectiveness of ARVs, WHO recommends using early warning indicators to detect and minimize the risk of AMR.

SIAPS is assisting partners in Namibia to use the EDT to monitor early warning indicators for HIV drug resistance and treatment adherence in public hospitals and HIV/AIDS treatment facilities. Monitoring early warning indicators through platforms such as the [EDT](#) improves the accuracy of data, helps standardize dispensing practices, and enhances collaboration among antiretroviral therapy sites to improve service delivery.

Diagnostic Services. Too often, antimicrobial medicines are prescribed and dispensed unnecessarily or inappropriately for conditions that may not be effectively treated with antimicrobials. For example, in many low-resource settings, patients presenting with a fever may be presumptively treated with antimalarial medicines even though malaria may not be the cause of the fever. In many cases, diagnostic tests exist that can confirm a patient's diagnosis and help ensure that the appropriate medicine is prescribed.

A SIAPS-supported study showed that in Suriname, 45% of miners (a key population at risk for malaria) treat themselves presumptively with over-the-counter medications without first being tested to see whether they actually have malaria. The results of this study helped to establish mobile diagnostic and treatment centers to reach "hot spot" areas. In addition, SIAPS has worked with National TB Programs in Rwanda and Uganda to assess the potential to scale up the GeneXpert diagnostic tool, which can diagnose TB and some types of drug resistance in two hours. These efforts have yielded plans in both countries to mobilize additional funding to scale up the use of this important diagnostic tool.

In Swaziland, to advocate and act for AMR containment, the Raleigh Fitkin Memorial Hospital DTC implemented a quality improvement program that included performing culture and sensitivity tests on inpatients who were prescribed antibiotics. The results showed high levels of pathogen resistance to several antibiotics, including ceftriaxone and vancomycin. In response, the DTC

led the development and implementation of hospital guidelines on prescribing antibiotics and switching from intravenous to oral antibiotic therapy. The Laboratory Department provides monthly culture and sensitivity test reports to the DTC to monitor drug sensitivity patterns for appropriate antibiotic prescribing.

To improve case management of malaria in Liberia, SIAPS conducted a study to determine the feasibility of offering rapid diagnostic tests (RDTs) in private-sector pharmacies and medicine shops. The study showed that all owners of medicines stores were willing to use RDTs (n=26) and that 80% would accept a regulation stating that antimalarial medicines could only be given following a positive RDT test. In pharmacies, while three out of four pharmacists were willing to conduct RDTs, only one would accept a regulation requiring a positive RDT before dispensing an antimalarial. These results help to advance programmatic priorities that aim to reduce excess medicine use.

Job Aids and Adherence Support. Globally, only 50% of patients are able to adhere to treatment,⁴ and adherence tends to decrease over time. Ensuring that patients know when to take antimicrobial medicines, in what quantities, and for how long is crucial to curbing AMR.

Building on previous work carried out by the Strengthening Pharmaceutical Systems Program on HIV treatment adherence, SIAPS adapted a [medication adherence tool](#) to train adherence officers and treatment supporters [in Swaziland](#) to assess adherence to TB treatment regimens. With this tool, the National TB Control Program can help patients who are struggling to adhere to treatment regimens through follow up with regional TB coordinators and adherence officers.

Publications. SIAPS produces and disseminates AMR and rational medicine use-related technical publications to share best practices (box 2). In August 2017, SIAPS published an updated guide to [Building Coalitions for Containing Antimicrobial Resistance](#). The guide is included as a resource in WHO's Manual for Developing National Action Plans. It describes a field-tested approach and lessons learned to help countries forge multidisciplinary and multisectoral coalitions to fight AMR.

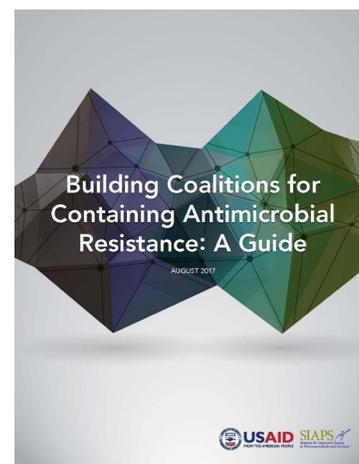


Table 1. SIAPS-supported capacity building efforts that directly or indirectly contribute to AMR prevention and containment

Country	Activities														
	Coalition Building/Advocacy	National Strategy or Action Plan on AMR	STGs/EMLs/ Formulary	Regulatory Systems/PV	Private-sector Engagement in TB	Drug and Therapeutics Committees	Infection Prevention and Control	Medicine Use Reviews/ Evaluations and Research	Pre- and In-service Training	Community Case Management	Online and mHealth Tools	HIV-DR Early Warning Indicators	Diagnostic Services	Job Aids and Adherence Support	Introduction of Chlorhexidine for Newborn Cord Care
Afghanistan															X
Angola			X	X											
Bangladesh			X	X				X							
Burundi				X						X				X	
Dominican Republic			X						X						
DRC			X	X		X		X		X				X	X
Ethiopia	X	X	X	X		X		X	X					X	
Guinea			X							X					
Jordan			X			X		X							
Kenya					X			X							
Lesotho			X												
Liberia			X										X		
Mali			X							X					
Mozambique			X	X		X								X	
Namibia	X	X	X	X		X	X	X	X		X	X		X	
Pakistan					X										X
Philippines			X	X											
Sierra Leone		X	X			X									
South Africa		X	X	X		X	X	X	X		X				
South Sudan				X		X				X					
Suriname													X		
Swaziland	X	X	X	X		X		X	X				X	X	
Tanzania					X										
Ukraine			X	X				X							
Uzbekistan								X							
Zimbabwe									X						

THE WAY FORWARD

To ensure that people in every part of the world have access to safe and effective medicines, SIAPS is committed to continuing to build on our work, increase local capacity and ownership, engage with the global health community to share best practices, and collaborate with stakeholders at all levels of the health system to help accelerate the response to AMR.

SIAPS understands that the multifaceted and multidimensional drivers of AMR require systems-level approaches to truly make progress against its continuing spread. Through the strategic implementation of proven interventions, SIAPS is working to build stronger health systems that are better equipped to respond to the challenges of preventing and containing AMR.

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4. WHO 2011. The World Medicines Situation 2011. Geneva, Switzerland.

Box 2. Key publications, resources, and tools developed by SIAPS and its predecessor programs

- [Building Coalitions for Containing Antimicrobial Resistance: A Guide](#)
- [Revising Preservice Curriculum to Incorporate Rational Medicine Use Topics: A Guide](#)
- [Antimicrobial Resistance Module for Population-Based Surveys](#)
- [Drug Use Reviews: A Practical Strategy to Ensure the Rational Use of Anti-Tuberculosis Medicines](#)
- [Developing, Implementing, and Monitoring the Use of Standard Treatment Guidelines: A SIAPS How-To Manual](#)
- [Systems-Based Approaches to Improving Medication Adherence](#)
- [Drug and Therapeutics Training Course](#) - Trainer's Guide, Participant's Guide, and presentations (available in English and French)
- [Infection Control Assessment Tool](#) for hospitals and [User Manual](#)
- [Infection Control Assessment Tool for Primary Health Care Settings](#)
- [Patient Adherence Record](#) to measure adherence to antiretroviral therapy
- [How to Investigate Antimicrobial Use in Hospitals: Selected Indicators](#) (English, French, Spanish)
- [Supporting Pharmacovigilance in Developing Countries: The Systems Perspective](#)
- [Enhancing Health Outcomes for Chronic Diseases in Resource-Limited Settings by Improving the Use of Medicines: The Role of Pharmaceutical Care](#)

ABOUT SIAPS | The Systems for Improved Access to Pharmaceuticals and Services (SIAPS) program works to assure access to quality pharmaceutical products and effective pharmaceutical services through systems-strengthening approaches to achieve positive and lasting health outcomes. SIAPS is funded by the US Agency for International Development (USAID) and is implemented by Management Sciences for Health. For more information, visit www.SIAPSprogram.org.

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