USAID MEDICINES, TECHNOLOGIES, AND PHARMACEUTICAL SERVICES (MTaPS) PROGRAM

BUILDING RESILIENT PHARMACEUTICAL SYSTEMS

MTaPS Global End-of-Project Report

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Cover photo: Pharmacy of the Mbouda District Hospital, Cameroon. Photo credit: Timothé Chevaux

ABOUT MTaPS

Program Name:		USAID Medicines, Technologies, and Pharmaceutical Services (MTaPS) Program
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MTaPS Partners:	Core Partners:	Boston University, FHI360, Overseas Strategic Consulting, Results for Development, International Law Institute-Africa Centre for Legal Excellence, AUDA-NEPAD
	Global Expert Partners:	Brandeis University, Celsian Consulting, Deloitte USA, Duke-National University of Singapore, El Instituto de Evaluación Tecnológica en Salud, IC Consultants, MedSource, IQVIA, University of Washington
	Capacity Resource Partners:	African Health Economics and Policy Association, Ecumenical Pharmaceutical Network, U3 Systems Work, University of Ibadan, African Collaborating Centre for Pharmacovigilance and Surveillance, Kilimanjaro School of Pharmacy, Muhimbili University, Pharmaceutical Systems Africa
	Collaborators:	International Pharmaceutical Federation, Howard University, University of Notre Dame, WHO, World Bank

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ACRONYMS AND ABBREVIATIONS

AEFI	adverse events following immunization
AfyaSS	Afya Supportive Supervision System
AMR	antimicrobial resistance
AMRHI	African Medicines Regulatory Harmonization Initiative
AMS	antimicrobial stewardship
ARVs	antiretroviral medicines
AUDA-NEPAD	African Union Development Agency's New Partnership for Africa's Development
AWaRe	Access, Watch, and Reserve
CHUK	University Teaching Hospital of Kigali
DOH	Department of Health (Philippines)
DRC	Democratic Republic of the Congo
eLMIS	electronic logistics management information system
FDA	Food and Drugs Authority (Rwanda)
GBT	Global Benchmarking Tool
GHSA	Global Health Security Agenda
HTA	health technology assessment
IGAD	Intergovernmental Authority on Development
IPC	infection prevention and control
IPCAT2	Infection Prevention and Control Assessment Tool 2
JEE	Joint External Evaluation
LMICs	low- and middle-income countries
ML	maturity level
MNCH	maternal, newborn, and child health
MOH	Ministry of Health
MSC	multisectoral coordination
MSC-AMR	multisectoral coordination on AMR
MSH	Management Sciences for Health
MTaPS	Medicines, Technologies, and Pharmaceutical Services
NAP-AMR	national action plan on AMR
NRA	national regulatory authority
PSS	pharmaceutical systems strengthening
PV	pharmacovigilance
PViMS	PV monitoring system
SIAPS	Systems for Improved Access to Pharmaceuticals and Services
TB	tuberculosis
TWG	technical working group
UHC	universal health coverage
USAID	US Agency for International Development
WASH	water, sanitation, and hygiene
WHO	World Health Organization

MESSAGE from the MTaPS DIRECTOR

As we look back on a fulfilling journey—six years of the US Agency for International Development (USAID) Medicines, Technologies, and Pharmaceutical Services (MTaPS) Program and the foundation set by its predecessor Systems for Improved Access to Pharmaceuticals and Services (SIAPS)—we reflect on our continued progress to address system-strengthening gaps in 18 low- and middle-income countries. Our focus has shifted from product to patient and health outcomes, and we have studied challenges and opportunities to improve pharmaceutical systems.

We have seen inspiring progress in the strengthening of pharmaceutical systems across various countries—from Nepal to Cameroon to Uganda. The comprehensive electronic logistics management information system implementation in Bangladesh has enabled better health commodities management and evidence-based decision making. In Indonesia, decision-making mechanisms have been strengthened to support the institutionalization of a transparent and accountable health technology assessment process. In Ethiopia, we have enabled critical tools and documents to be readily available, paving the way for sustainability in combating antimicrobial resistance.

We have intensified external activities and thought leadership through our representation at global conferences and the publication of major papers in well-regarded journals on topics related to antimicrobial resistance and our learning on global pharmaceutical systems strengthening. And our achievements would not have been possible without the support and investment of USAID. I extend my thanks and gratitude to the governments we work with, our dedicated staff, and our partners, who consistently and incessantly worked to finish MTaPS strong. We are excited to continue our work in pharmaceutical systems strengthening, which advances stronger regulatory systems, integrated information systems and supply chains, improved service-delivery capacities, and optimized allocation and use of resources.

As we move toward the future, we have a strong team and a clear vision. We are confident that, together with our partners, we will achieve robust systems that integrate the supply chain with pharmaceutical systems. We move forward with the conviction that all of this will only be possible through the continued investment of not only USAID but other donors.

Kofi Nyame
USAID MTaPS Program Director

EXECUTIVE SUMMARY

Medical products and related pharmaceutical services play an enormous role in determining health outcomes. Without them, countries cannot meet public health goals of preventing maternal and child deaths, creating an AIDS-free generation, or protecting their communities from infectious disease threats; however, the critical need for robust pharmaceutical systems can be overlooked as low- and middle-income countries (LMICs) struggle with issues such as high out-of-pocket expenses and patient safety. The six-year Medicines, Technologies, and Pharmaceutical Services (MTaPS) Program (2018–2025), funded by the US Agency for International Development (USAID), focused on the pharmaceutical system's holistic nature—which supports the entire health system—in its pharmaceutical systems–strengthening (PSS) approach. MTaPS blended its experience with global best practices and local expertise to help LMICs reach the goal of sustainable access to and appropriate use of safe, effective, quality-assured, and affordable essential medicines, vaccines, and other health technologies.

To achieve this goal, MTaPS addressed the entirety of the pharmaceutical system through the following objectives, working at the global, regional, national, and facility level:

Strengthen governance. Strong governance in a pharmaceutical system fosters efficiency, accountability, and inclusivity, and reduces corruption risk. MTaPS convened international experts to develop World Health Organization (WHO)–endorsed guidance on preventing conflicts of interest.[1] A complementary e-Learning course, developed in collaboration with WHO, was completed by 1,400 learners in its first 6 months.

Strengthen capacity. Country organizations such as local governments, academic institutions, and professional associations are increasingly leading improvements to their countries' pharmaceutical systems. Therefore, MTaPS strengthened organizational and individual capacities through multiple methods, including traditional in-person training and also e-Learning and local centers of excellence. When the global pandemic hit, countries were able to quickly provide health care workers—almost 50,000—with lifesaving COVID-19 and infection prevention and control (IPC) skills by building on e-Learning platforms supported by MTaPS. Notably, MTaPS also developed PSS 101, which is an online course on the basic principles of pharmaceutical strengthening that is available to anyone on USAID's global health learning platform.

Enhance regulatory systems. At the country level, MTaPS based its support on national regulatory authority (NRA) performance on the WHO Global Benchmarking Tool (GBT), focusing on areas ranging from pharmacovigilance (PV) to document management. In addition, MTaPS worked with regional organizations such as the African Union Development Agency's New Partnership for Africa's Development (AUDA-NEPAD) and the African Medicines Regulatory Harmonization Initiative (AMRHI) to harmonize regulatory standards and streamline processes to improve medicine safety and availability on the continent. Important global contributions included guidance to streamline medicine evaluation, particularly for maternal, newborn, and child health (MNCH) products.

[1] Guidance Manual: Managing conflicts of interest, a how-to guide for public pharmaceutical-sector committees in low- and middle-income countries (who.int)

Improve information for decision making. MTaPS approached the challenges of manually collected LMIC health data never used for decision making and information systems operating in silos by assessing countries' information system infrastructure, boosting data management strategies and building capacity to use and maintain information systems. MTaPS also developed freely available tools such as OpenRIMS for NRAs and optimized and expanded the use of tools such as e-TB Manager and PSS Insight, used to evaluate PSS. MTaPS supported 9,517 facilities to create interoperable information systems that effectively link patients and products in countries such as Bangladesh, Philippines, Rwanda, Mozambique, and Mali.

Optimize pharmaceutical financing. LMICs continue to struggle with high out-of-pocket health spending, which thwarts universal health coverage (UHC). To reduce financial burden and use funding more efficiently, MTaPS worked with governments to address the problem from multiple directions; for example, MTaPS co-developed a road map for systematic priority setting in health spending and health technology assessment (HTA) used by Ethiopia, Indonesia, Kenya, and the Philippines, highlighting its value to LMICs.[2] The program also worked with stakeholders in multiple Asian and African countries to track pharmaceutical expenditure, which allows counterparts to improve planning and resource allocation.

Improve pharmaceutical services. Patient-centered pharmaceutical services should respond to patients' needs and help combat antimicrobial resistance (AMR), but pharmaceutical care in LMICs can be inadequate due to a lack of effective systems and understanding of what pharmaceutical services encompass. MTaPS collaborated with stakeholders to incorporate good pharmaceutical care practices that ensure appropriate use of medicines and patient safety using proven tools, interventions, and quality-improvement techniques. As a result, 15 countries strengthened their multisectoral coordination (MSC) of AMR control through a One Health approach, antimicrobial stewardship (AMS), and IPC—critical for the pandemic. Moreover, MTaPS helped many African and Asian countries to improve their PV systems.

Strengthen supply chain management. A strong, resilient pharmaceutical supply chain reliably delivers quality health supplies from the manufacturer to the user even during public health emergencies. After taking a more systems-strengthening approach, LMICs have dramatically improved their supply chain performance; however, MTaPS helped advance this progress through an array of initiatives focused on electronic logistics management information systems (eLMIS), good procurement and pharmaceutical practices, and taking advantage of the private sector. For example, the program helped many countries including Bangladesh and the Philippines establish eLMIS for COVID-19-related products and published global guidelines on how to optimize subnational procurement for MNCH.

Throughout its life, MTaPS persistently reiterated that supply chain management is just one element of the overall pharmaceutical system, and that to attain a truly effective pharmaceutical—and therefore an effective health—system, PSS must include all aspects. The pandemic reminded the world about the importance of health supply chains, but also highlighted how global health security rests on myriad components, including an adequate regulatory framework and IPC and AMR control. Future focus in PSS should build on the gains that LMICs have made and should continue to transition PSS responsibilities and funding to local stakeholders by building adequate organizational and individual capacity and institutionalizing evidence-based best practices.

[2] HTA allows countries to determine the cost-effectiveness of pharmaceutical products and decide whether a product should be adopted for use, given its benefits and the countries' resources.

MTaPS GOALS AND OBJECTIVES

Reaching global goals including ending the HIV/AIDS epidemic as a public health threat by 2030 and preventing unnecessary deaths from infectious diseases such as COVID-19 is impossible without access to medicines and other health products such as diagnostic test kits and vaccines—memories are still vivid of the acute shortage of personal protective equipment during the pandemic, which left health care workers worldwide without lifesaving supplies.

The six-year MTaPS program (2018–2025), funded by USAID, blended its experience with global best practices and local expertise to help LMICs strengthen their pharmaceutical systems to reach the goal of sustainable access to and appropriate use of safe, effective, quality-assured, and affordable essential medicines, vaccines, and other health technologies.

MTaPS' work has helped governments develop data-driven improvement strategies to better manage their pharmaceutical systems, enabling prescribers to prescribe the right medicines, dispensers to dispense the correct products, and patients to know how to use the products safely and appropriately.

From drug research and development to post-marketing surveillance, and from policymakers to pharmacists to patients, MTaPS' approach addressed the entire pharmaceutical system, as illustrated in USAID's vision for pharmaceutical strengthening below. The program structured its work around five major objectives with a focus on the role of medical products to improve health system performance and achieve sustained and equitable access to essential, high-quality health services and better health outcomes for all.

MTaPS' OBJECTIVES:

1. Pharmaceutical-sector governance strengthened
2. Institutional and human resource capacity for pharmaceutical management and services increased, including regulation of medical products
3. Availability and use of pharmaceutical information for decision making and the global learning agenda advanced
4. Pharmaceutical-sector financing, including resource allocation and use, optimized
5. Pharmaceutical services, including product availability and patient-centered care, improved to better achieve desired health outcomes

Staff at Malagasy Laboratory for Medical Analysis in Antananarivo. Photo credit: Timothé Chevaux

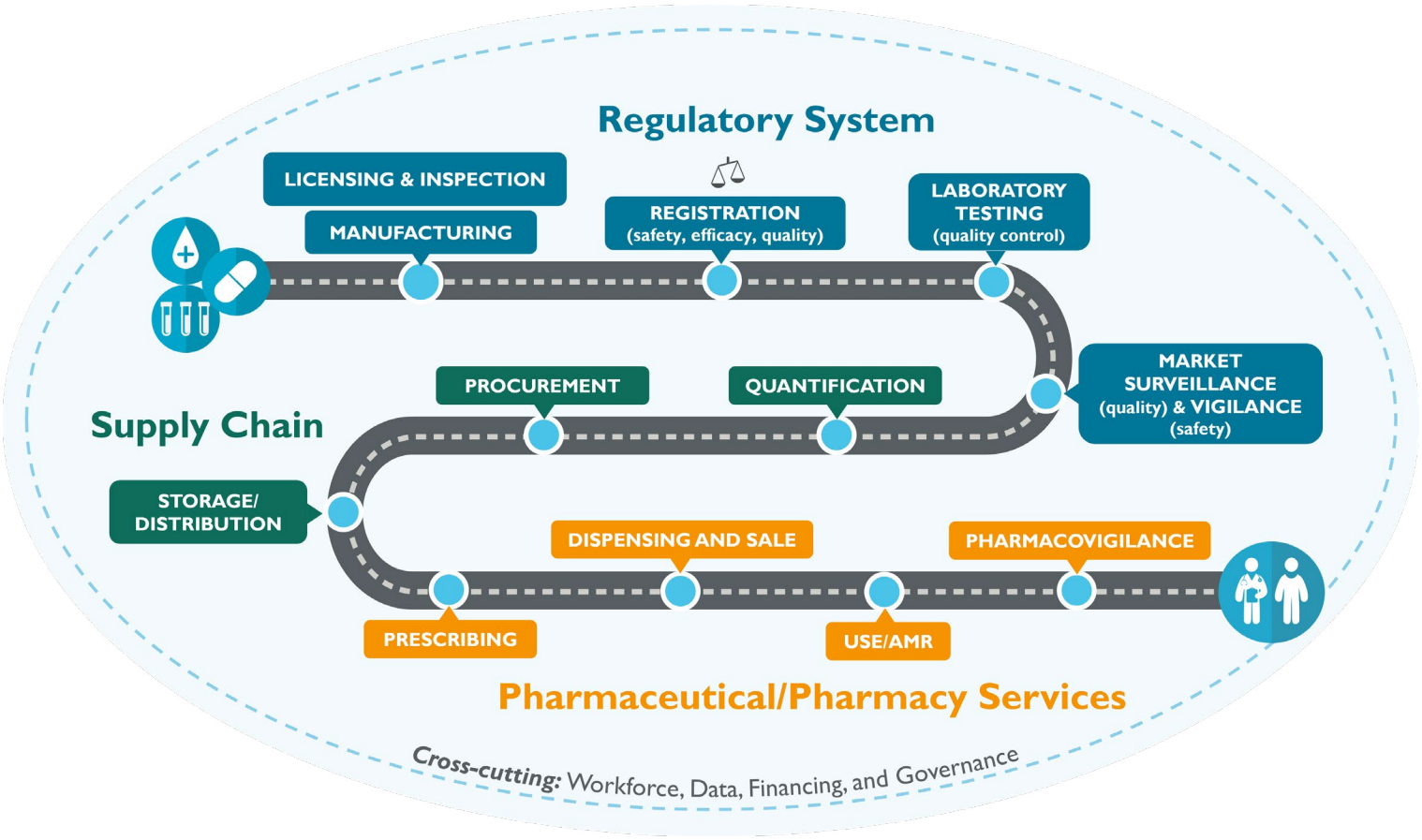
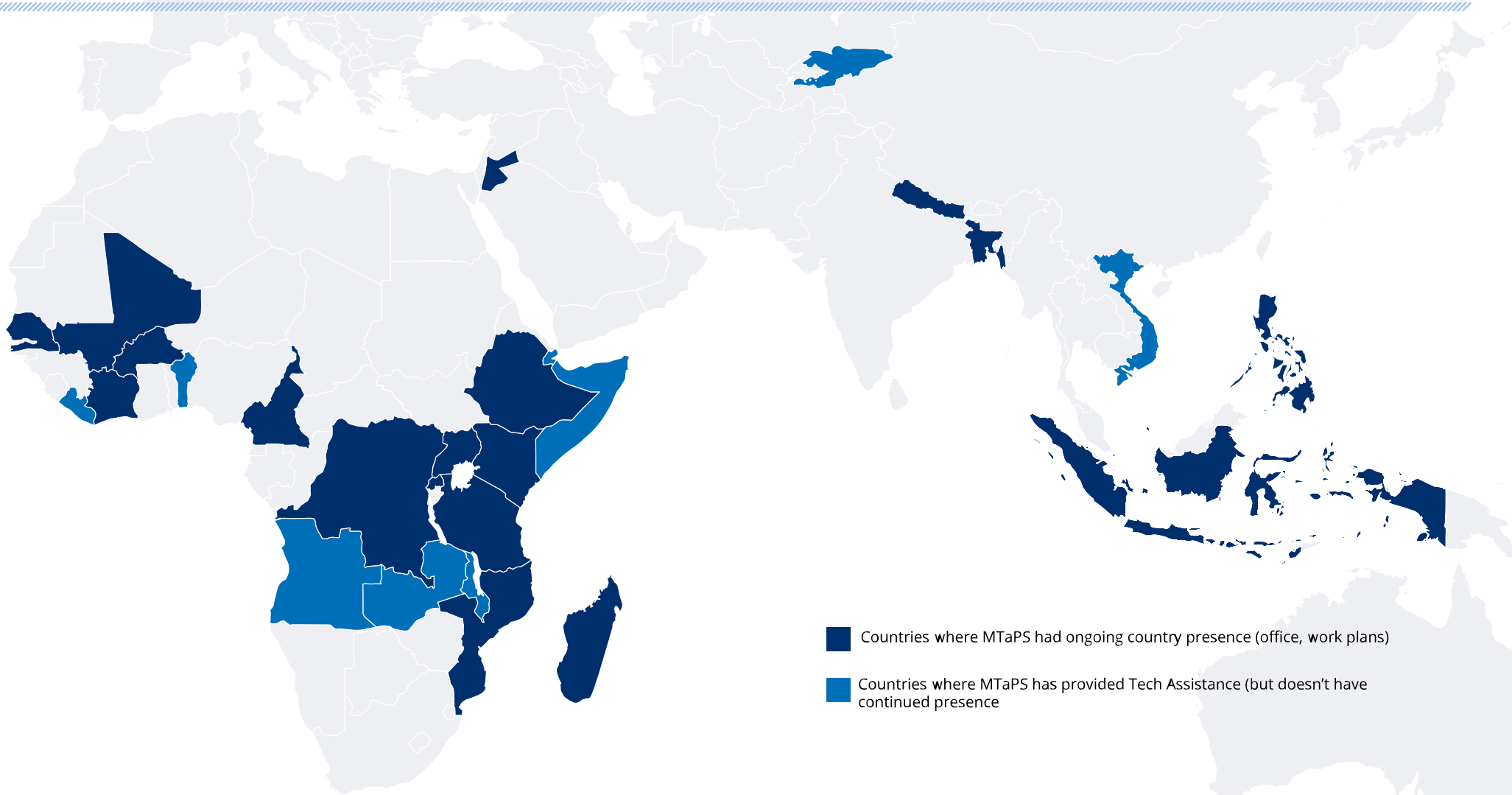


Figure 1. The pharmaceutical systems pathway

Source : https://www.mtapsprogram.org/our-resources/approaches-and-tools-for-strengthening-pharmaceutical-systems/

Diagram based on concepts from: from The Many Faces of Corruption: Tracking Vulnerabilities at the Sector Level (page 35) and WHO Good Governance for Medicines Programme: an innovative approach to prevent corruption in the pharmaceutical sector (page 5)

WHERE WE WORK



Countries where MTaPS had ongoing country presence (office, work plans)

Countries where MTaPS has provided Tech Assistance (but doesn't have continued presence

- Asia Bureau
- Bangladesh
- Burkina Faso
- Cameroon
- Cote d'Ivoire
- Democratic Republic of the Congo
- Ethiopia
- Indonesia
- Jordan
- Kenya
- Madagascar
- Mali
- Nepal
- Nigeria
- Philippines
- Rwanda
- Senegal
- Tanzania
- Uganda

SELECT MTaPS ACHIEVEMENTS AND RESULTS BY OBJECTIVE

GOVERNANCE

Strong governance in a pharmaceutical system fosters efficiency, accountability, and inclusivity, and reduces the risk of fraud and corruption. MTaPS worked with 53 entities in 17 countries to strengthen pharmaceutical-sector governance by concentrating on the following areas:

- Building transparency and accountability of country pharmaceutical systems
- Improving and enforcing evidence-based medicines policies, laws, regulations, standards and norms
- Increasing stakeholder engagement and empowerment including civil society and consumers

53 entities with improved transparency and accountability of country pharmaceutical systems

MTaPS developed and improved terms of reference for governing bodies, clarified mechanisms to manage conflict of interest, and ensured that information is publicly available. MTaPS convened an international working group that created a guidance manual on preventing and managing conflicts of interest in pharmaceutical systems in LMICs, which WHO approved and published on its website.[3] The program also collaborated with WHO to launch a complementary e-Learning course. Within the first 5 months of the course's release (October–March 2024), 1,400 learners from across the world completed it. The Malaysia Ministry of Health (MOH) adopted the course as a requirement for all pharmaceutical inspectors.

MTaPS drafted evidence-based pharmaceutical policies, regulations, guidelines, and standards to document pharmaceutical management practices and strengthen adherence and enforcement. For example, with MTaPS support, Nepal's regulatory framework was updated with critical documents such as a revised drug act and national medicines policy, six regulations, and three codes, including the country's first-ever good pharmacy practice guidelines, which establish accreditation standards for both public-sector and retail pharmaceutical outlets.[4]

436 evidence-based medicines, policies, laws, regulations, guidelines, norms and standards improved and enforced across 17 countries

In addition, MTaPS empowered stakeholders, including civil society and consumers, by including them in decision-making processes and pharmaceutical-sector governance and oversight. In 2021, MTaPS drafted guidance on how to engage civil society to improve access to quality-assured maternal, newborn, and child health–related medicines.[5] It also worked with MSC bodies in global health security to include members from the private sector, professional associations, and civil society on their national committees and working groups, while advocating for gender balance in these meetings and activities.

CAPACITY STRENGTHENING

To build resilient and sustainable pharmaceutical systems, MTaPS focused on strengthening capacities across individuals, institutions, and local organizations in every technical area. Traditional training is an easy way to share knowledge, but sustaining skills and knowledge demands multiple complementary techniques such as mentoring and supportive supervision, which will allow continued progress after the end of the program.

14,990 persons (26% female) trained in pharmaceutical systems management with MTaPS support.

[3] MTaPS Guiding Principle 7: Provide global technical leadership

[4] More on Nepal's journey to launch the good pharmacy practice guidelines can be found here : https://www.mtapsprogram.org/news-blog/nepal-launches-first-ever-guidelines-to-improve-quality-of-pharmaceutical-products-and-practices/

[5] MTaPS Guiding Principle 5: Build/strengthen the capacity of local, nongovernmental organizations

Country organizations, including local governments, academic institutions, and professional associations, are increasingly leading improvements to their countries' pharmaceutical systems. MTaPS worked with public and private organizations and personnel in 17 countries, leaving a lasting impact on local counterparts and boosting their confidence in managing this crucial part of the health care system.[6]

Overall, the MTaPS capacity-development approach concentrated on these areas:

Institutionalizing proven approaches to strengthen human resource capacity: MTaPS used global, regional, and national e-Learning platforms and provided supportive supervision, mentoring, and coaching in addition to traditional training approaches. In Philippines, 9 e-Learning modules were developed and uploaded to the Philippines Department of Health (DOH) Academy to enhance access to training opportunities for health workers to register and complete on their own pace. Furthermore, e-Learning contents are accredited for continuing professional development points, which encourage health workers to register and complete available courses.

24 in-person or e-Learning courses developed with MTaPS assistance

105 e-Learning courses related to AMR developed or adapted with MTaPS' support across 11 countries

Strengthening governments to manage pharmaceutical systems: MTaPS partnered with government agencies and country actors to develop not only technical skills, but also leadership and management skills, across the pharmaceutical system.

Increasing the private sector's ability to support pharmaceutical sector operations: MTaPS recognized the private sector's critical role in providing pharmaceutical products and positioned the sector to carry out pharmaceutical system functions effectively.

- In Kenya, MTaPS worked with four health professional associations to develop online courses in IPC and AMS that contribute to professional licensure credit. More than 4,000 association members completed one of the courses. The MTaPS Kenya team then advised their colleagues in MTaPS Uganda on launching a similar collaboration with associations.
- In response to the COVID-19 pandemic, MTaPS developed and rolled out COVID-19 IPC training materials for health care workers with the Ethiopian Public Health Institute. Using these materials, MTaPS trained 447 trainers who then went on to train nearly 2,500 health professionals across 122 COVID-19 facilities.
- In Uganda, MTaPS supported the "twinning" of health facilities to promote peer-to-peer learning and to establish IPC communities of practice. When the St. Mary's Regional Referral Hospital met criteria to become a Center of Excellence in IPC, MTaPS helped organize visits for staff at six other hospitals to rotate through units at St. Mary's to learn from their peers. They learned about implementing a surgical antimicrobial prophylaxis program, post-surgical IPC and wound care, using antibiotics in surgery and the outpatient department, managing a hand hygiene program, and hospital environmental management.

[6] MTaPS Guiding Principle 1: Utilize a systems-strengthening approach

CAPITALIZING ON PRIVATE-SECTOR PARTNERSHIPS TO INCREASE COVID-19 VACCINATION COVERAGE IN NIGERIA

As of December 31, 2021, Nigeria had fully vaccinated 4.48 million people, or about 2.1% of the population, far below the WHO vaccination coverage target of 40%.[7] More than 60% of the population gets health care from private providers, so to increase reach and influence, in 2022, the USAID MTaPS program began working with private entities in 5 states and the Federal Capital Territory, such as state primary health care boards, professional associations for pharmacists and doctors, and other partners involved in COVID-19 vaccination, such as WHO, UNICEF, and Breakthrough ACTION Nigeria.[8] They collaborated to develop and implement a private-sector policy and engagement strategy, to adopt minimum requirements for private community pharmacies to participate in the program, and to develop vaccination training materials. The Association of Community Pharmacists in Nigeria, Trans-Generational Pharmacies Development Foundation, University of Lagos, Mercer University, Pharmacy Council of Nigeria, and MTaPS trained 948 private providers (652 female) on all aspects of COVID-19 immunization.

Through vaccination campaigns and incorporating the private sector into the vaccination strategy, 122,170 doses of COVID-19 vaccine were administered at 82 community pharmacies and 64 private hospitals, which prompted national officials to consider expanding the model for routine immunizations. As of November 2023, Nigeria's COVID-19 vaccination coverage had increased to 81.3 million, or about 37% of the population, nearly 20 times more than when MTaPS first started working in Nigeria.[7]

"We want you [MTaPS] to do all that is in your power to continue, because within the time you joined the state vaccination drive, especially the outreach, we have seen the effect. Initially, only 30% of the facilities were vaccinating and sending reports, but now, we are so near 70%. So, we still need your help."

Adeoye Buzrat Adetoro, *State Immunization Officer (SIO), Oyo SPHCB*

REGULATORY SYSTEMS

Many NRAs in LMICs do not have the skills or resources they need to guarantee pharmaceutical product quality, safety, and efficacy. WHO's GBT for evaluating the maturity of national regulatory authorities guided MTaPS' support to each country. For instance, the Rwanda Food and Drugs Authority (FDA) was established in 2018 but lacked the staff or tools to meet its obligation to assure product quality; for example, it had no product registration procedure, which countries require before allowing a medical product to be sold or used, in place. MTaPS' approach was based on helping the Rwanda FDA achieve GBT maturity level (ML) 3, indicating a stable, well-functioning system, by focusing on GBT-identified weaknesses, including governance, regulatory and organizational management frameworks, quality management system, and electronic management information systems. In 2018, the Rwanda FDA's GBT score across 8 regulatory areas was 310/800, which rose to 754 by 2022 with MTaPS assistance.

Dr. Joseph from the Rwanda FDA in his office. Photo credit: Asadullah Azad

[7] Mathieu, E., Ritchie, H., Ortiz-Ospina, E. et al. (2023) Number of people who completed the initial COVID-19 vaccination protocol. Nigeria. A global database of COVID-19 vaccinations. Nat Hum Behav (2021) World Bank. (2022). Population, total - Nigeria. https://data.worldbank.org/indicator/SP.POP.TOTL?locations=NG WHO. (2021). Strategy to Achieve Global Covid-19 Vaccination by mid-2022. https://www.who.int/publications/m/item/strategy-to-achieve-global-covid-19-vaccination-by-mid-2022

[8] https://healthdigest.ng/over-nigeria-healthcare/

"The system which is in place is not only helping our clients, but it's also helping our staff. Initially we even used to work during the weekends processing applications—we used to have big workload—but now with the improvement in the system, we go home by 5:00 pm and we don't have to work on the weekends."

Joseph Habiyaremye, In-charge of Medical Devices Importation and Exportation, Rwanda FDA

NMRAs have carried out **41** **regulatory actions for drug safety** in Burkina Faso, Intergovernmental Authority on Development (IGAD) countries, Nepal, and Tanzania.

In addition, MTaPS worked with regional organizations such as AUDA-NEPAD to harmonize regulatory standards and streamline processes that will improve medicine safety and availability on the African continent.[9] MTaPS also collaborated with the AMRHI secretariat and the Gates Foundation to create a framework for regulatory reliance. This framework allows an NRA to base its decisions on another trusted authority's assessments rather than generating the evidence itself, saving time and money. MTaPS also collaborated with international experts to establish a set of minimum common standards for regulatory information management systems in LMICs. To promote the adoption of these standards by NRAs, MTaPS developed an advocacy brief and guidance on transitioning from manual to digital systems. Digitalization of regulatory information management systems promotes quality, consistency, efficiency, and transparency of regulatory system function within and across NRAs.[10]

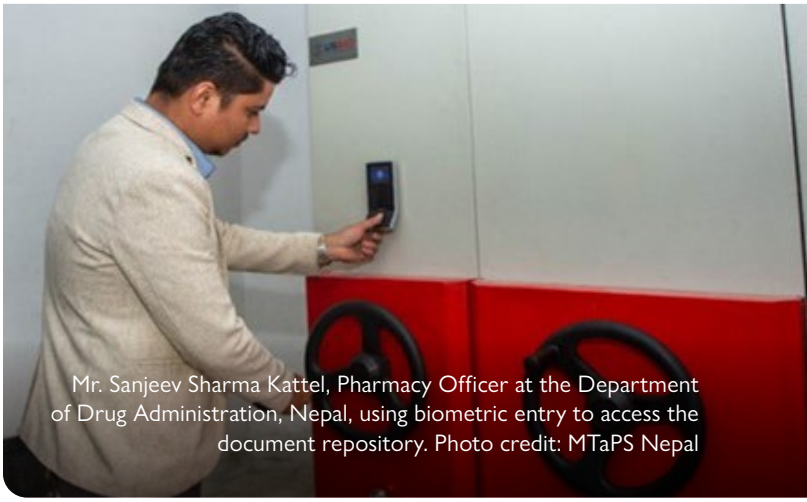
DECISION MAKING

Having and using high-quality information is essential for making sound decisions about selecting medicines, ensuring their quality, determining quantities needed, and understanding how patients and health care providers use them. However, data in LMICs are typically collected by hand at service points and sent up the health care chain—but then are rarely used for decision making. MTaPS worked to break this cycle by assessing countries' information system infrastructure, enhancing data governance and management strategies, and building local capacity to use and maintain information systems.

79% (6,133) MTaPS-supported health facilities in Bangladesh and the Democratic Republic of the Congo complete and submit an LMIS report on time.

To achieve this, MTaPS works on the following areas to increase the availability and use of pharmaceutical information for decision making and advancing the learning agenda:

- Implementing pharmaceutical management information systems that are interoperable and link patients and products effectively
- Ensuring availability and use of information on pharmaceutical systems
- Advancing the PSS research and global learning agenda



Mr. Sanjeev Sharma Kattel, Pharmacy Officer at the Department of Drug Administration, Nepal, using biometric entry to access the document repository. Photo credit: MTaPS Nepal

[9] MTaPS Guiding Principle 4: Support integration

[10] USAID PQM+ and MTaPS. Adopting Minimum Common Standards for Regulatory Information Management Systems—A Call to Action. Submitted to the US Agency for International Development by the USAID PQM+ Program. https://www.mtapsprogram.org/wp-content/uploads/2022/11/RIMS-Pathway-Document_Final.pdf

Over the course of the program, MTaPS supported 9,517 facilities to create interoperable information systems that effectively link patients and products in countries that included Bangladesh, the Philippines, Rwanda, Mozambique, and Mali.

For instance, MTaPS supported Nepal's NRA to introduce a new, much-needed electronic information management system using MTaPS' OpenRIMS platform, which streamlined the registration of the country's nearly 30,000 pharmacies and 4,000 pharmaceutical wholesalers and importers.[11] In Kenya, the Pharmacy and Poisons Board launched a mobile PV reporting app for Android and iPhone, developed with MTaPS support, for health care workers and the public to use in the country's effort to strengthen medicine safety monitoring.[12]

MTaPS has advanced the global learning agenda through several efforts, including launching the PSS 101 course and the Good Governance courses on the USAID-supported Global Health Learning Platform. Through the Global Health Learning Platform, MTaPS issued 8,656 certificates between October 2022 and June 2024, to participants around the globe.

ADVANCING THE PSS AGENDA[13]

One of MTaPS' significant achievements was to finalize a framework and tool to measure PSS by continuing the work that the USAID's SIAPS program did to design PSS Insight, which was piloted in Bangladesh, Nepal, Tanzania, and Uganda. PSS Insight has 41 indicators, organized according to 7 critical system components for measuring PSS. Available as a web-based tool, PSS Insight can be used by country teams to collect, analyze, and export PSS data to enable national-level data-driven decision making. PSS Insight is most useful when used regularly, so that country teams can observe trends and measure performance changes.

The program also fostered peer-to-peer learning on PSS through a series of virtual learning-exchange workshops for East Africa, South Asia, and Francophone Africa. Conducted entirely in French, the 3-day Francophone Africa event engaged 130 participants from local institutions in 27 Francophone countries. As a result of these and other learning events, countless representatives from local institutions in Africa and Asia now have a curated set of learning materials to increase their PSS pre-service and continuing professional development educational offerings.

To further drive the PSS agenda through technical and thought leadership, MTaPS engaged health system stakeholders and shared PSS best practices in a variety of forums, including over 100 presentations and workshops at global and regional conferences. As of August 2024, MTaPS had published 29 manuscripts in global peer-reviewed journals, 49 technical briefs and highlights, and 20 technical guides.

[11] https://www.openrims.org/

[12] Read more on MTaPS' web story here: https://www.mtapsprogram.org/news-blog/strengthening-pharmacovigilance-to-improve-product-safety-surveillance-and-reporting-in-kenya/

[13] MTaPS Guiding Principle 7: Provide global technical leadership

INSTITUTIONALIZING EFFICIENT INFORMATION SYSTEMS FOR EVIDENCE-BASED DECISION MAKING IN BANGLADESH AND THE PHILIPPINES

To achieve UHC, a country needs to be able to provide essential health commodities to all citizens, and a comprehensive eLMIS is the backbone of that system. MTaPS played a major role in creating information systems that produce necessary data and in strengthening the capacity of health officials to use these data to run an efficient system that safely supplies medical products when and where they are needed.

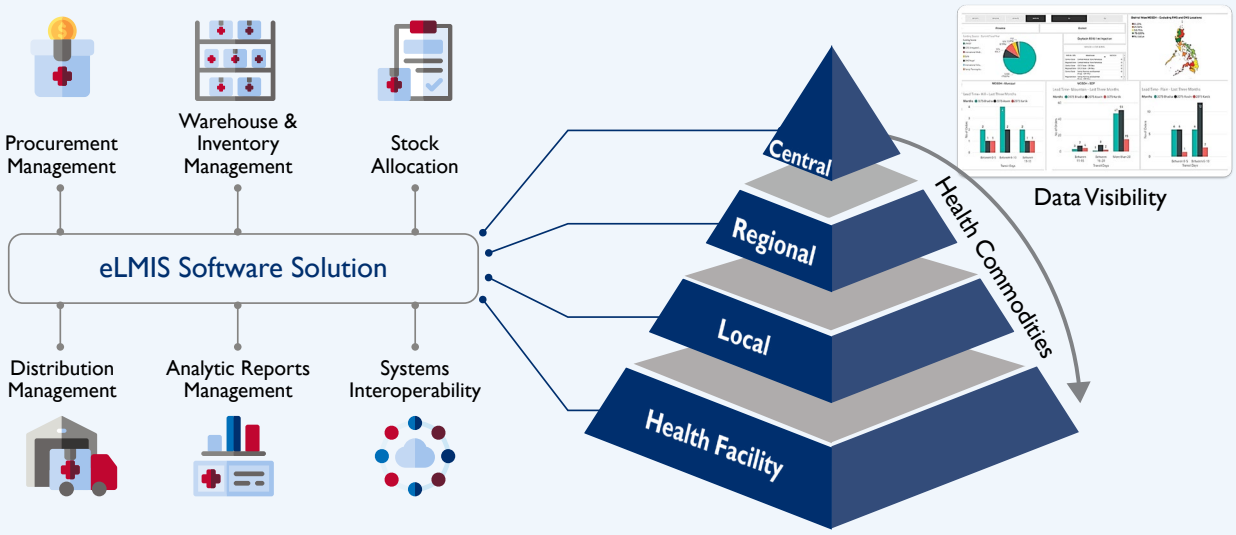


Figure 2. Functionalities of eLMIS

In Bangladesh, MTaPS built on existing information systems and tools to increase data transparency and accountability. Expanding the tuberculosis (TB) eLMIS to track 870 TB commodities allows for real-time stock tracking, accurate quantification, rational procurement, and uninterrupted supply to treatment sites. In addition, e-TB Manager was rolled out to all 868 TB sites (including private-sector sites) to manage cases electronically. As a result, 80% of these sites began exporting data to DHIS2, the national health information system, which policymakers used to monitor and improve TB program performance. Transitioning from a paper-based system to e-TB Manager also reduced reporting time from around 2 months to just a few minutes.

". . . One of the challenges in the attainment of UHC is the need to streamline and strengthen supply chain management at all levels of the health system. But with the support of USAID through MTaPS, we have our eLMIS to solve and conquer this challenge."

Undersecretary Maria Carolina Vidal-Taiño, Philippines

The eLMIS in the Philippines was integrated into the country's UHC regulations and scaled up across 216 warehouses and health facilities in all 17 regions to increase supply chain visibility and efficiency. MTaPS also helped the government to secure $3.2 million to expand and maintain the eLMIS. MTaPS also responded quickly to the pandemic by helping to integrate COVID-19 vaccine management into the eLMIS to produce consistent, timely COVID-19 vaccine supply chain data. A tracking system for mechanical ventilators and medical devices in hospitals was established and then transitioned to the DOH, which will monitor the equipment and devices annually.

50 out of 73 UHC sites in Philippines implemented and used eLMIS data for decision making

Pharmacy of the Mbouda District Hospital in Cameroon. Photo credit: Francois Ebah Bela

PHARMACEUTICAL FINANCING

Although LMICs strive to provide UHC for their citizens, they struggle to pay for that coverage, and as a result, many people pay out-of-pocket for health care, with much of this spending on medicines. In addition, poor financial management at all levels and outdated pharmaceutical procurement practices waste already limited financial resources. To reduce households' financial burden, MTaPS collaborated with government ministries to implement financial reforms using the following methods:

- Aligning pharmaceutical-financing strategies with the country's overall health system objectives
- Promoting efficient allocation and use of pharmaceutical resources
- Increasing the use of evidence-based pharmaceutical financing strategies
- Adopting workable methods to decrease people's financial barriers to accessing medicines
- Strengthening in-country ability to mobilize sustainable resources

In 2020, to support LMICs on their UHC journey, MTaPS and Management Sciences for Health (MSH) co-developed "A Roadmap for Systematic Priority Setting and Health Technology Assessment (HTA): A Practical Guide for Policy Action in Low- and Middle-Income Countries," drawing on contributions from global and regional experts.[14] Multiple countries such as Ethiopia, Indonesia, and Kenya have used the road map, and the Philippines HTA Division used it to create its official guidelines to evaluate the costs and benefits of medical devices. This real-world usage highlights the road map's usefulness, flexibility, and potential to provide HTA support to other LMICs.

The MTaPS program also built skills in Bangladesh, Nepal, and the Philippines to define and estimate the costs of evidence-based pharmaceutical benefits packages as part of UHC. Local capacity also increased in Bangladesh, Benin, Burkina Faso, Indonesia, and Malawi in tracking pharmaceutical expenditure, which allows health leaders to learn from past patterns to improve planning and resource allocation.[15] After analyzing different costing tools, MTaPS recommended the OneHealth tool, and designed and delivered virtual training to 46 stakeholders (14 female) from Bangladesh, Kyrgyzstan, Nepal, and the Philippines on using it.

PHARMACEUTICAL SERVICES

Positive treatment outcomes depend on medical products that are prescribed, dispensed, and used appropriately. Patient-centered pharmaceutical services respond to patients' needs—boosting their satisfaction—and help combat AMR. The quality of pharmaceutical care is often not as good as it should be in LMICs, due to a lack of effective systems, awareness, and expertise.

[14] HTA allows countries to determine the cost-effectiveness of pharmaceutical products and decide whether a product should be adopted for use, given its benefits and the countries' resources.

[15] MTaPS Guiding Principle 2: Optimize allocation and use of resources for medicines and related functions in health systems

MTaPS strived to make effective pharmaceutical care an integral part of countries' essential health services, leading to more appropriate medicines use, PV systems that improve patient safety, and comprehensive methodologies to promote AMS. To boost in-country capabilities to deliver such care, MTaPS stepped in with a systematic approach and proven tools, interventions, and quality-improvement methodologies to foster a sustainable and patient-focused approach to pharmaceutical services worldwide.

Thus, MTaPS worked in the following areas to improve pharmaceutical services:

- Improving availability of essential medicines and other health technologies
- Improving patient-centered pharmaceutical care
- Ensuring patient safety and therapeutic effectiveness
- Supporting AMR containment

"We have made great strides in both pharmacovigilance and post-market surveillance, co-creating activities with the Pharmacy and Poisons Board and supporting the countries in the IGAD and EAC region to strengthen their systems in these two areas. Through this collaboration, key milestones have been achieved to support medicines, regulation, and harmonization."

Wairimu Gakuo, Team Leader for Strategic Partnerships at USAID Kenya.

SUSTAINING SYSTEMS TO ENSURE PATIENT SAFETY

PV comprises the group of activities to detect, assess, and prevent medicine- or vaccine-related problems including adverse effects after a product is on the market. MTaPS supported 10 countries to strengthen their PV regulatory frameworks and systems, such as launching active surveillance for new HIV, TB, and malaria medicines in Burkina Faso, Mozambique, and Rwanda; developing and implementing a multiyear plan to scale up PV systems in Bangladesh and Rwanda; and strengthening (Mozambique, Rwanda) and establishing (Bangladesh, Jordan) active surveillance programs for COVID-19 vaccines. MTaPS supported the rollout of a PV monitoring system (PViMS) to 199 facilities in the Philippines and trained and mentored their staff to track TB medicines safety, resulting in 597 adverse events reported and causality assessments conducted.[16] Also, in collaboration with the West Africa Health Organization, MTaPS developed a web-based platform for improving PV systems for the 15 members of the Economic Community of West African States. The platform allows member states to share PV data, making it easier to identify safety issues.

85% (154) MTaPS-supported facilities across Bangladesh, Mozambique, and Rwanda, Philippines and IGAD countries have implemented medicines safety activities.

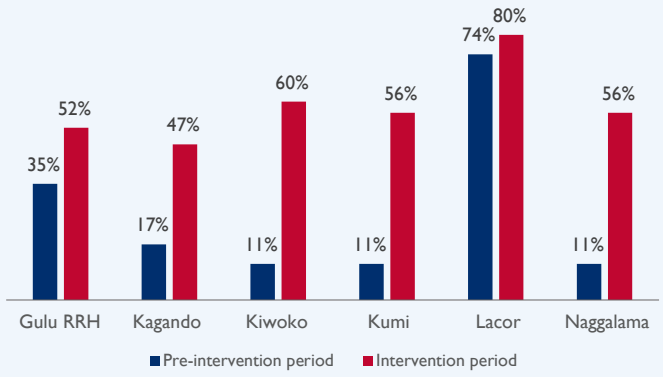
"The recent achievements in the procurement process of Directorate General of Health Services will bring the program one step ahead in ensuring on-time availability of required products in the program."

Dr. Afreena Mahmood, Directorate General of Health Services Director (Planning & Research)

An important part of MTaPS' support to COVID-19 vaccine rollout in 12 countries was to help set up systems to track adverse events following immunization (AEFI). Mali's mass immunization program involved multiple sectors, including universities and private-sector facilities which were trained to analyze and report the cause of COVID-19 vaccine–related AEFI. In Kenya, MTaPS addressed irregular AEFI reporting by developing a mobile PV electronic reporting system that allows real-time transmission of PV reports from mobile devices, even in remote areas. In Bangladesh, MTaPS worked with local partners and WHO to develop an online COVID-19 AEFI reporting system, trained health care workers, and distributed educational materials to health care professionals and the public, which led to the robust reporting of more than 4,500 AEFI reports. Then after evaluation, the country took 18 regulatory actions to reduce vaccine-related complications and increase public trust. As a result, the national vaccination coverage rate soared to over 82% by December 2023.

[16] https://www.mtapsprogram.org/our-resources/pvims/

DEVELOPMENT AND EVALUATION OF A QUALITY IMPROVEMENT PROGRAM FOR AMS IN UGANDA



Six Ugandan hospitals implemented AMS interventions between June 2019 and July 2022 with MTaPS' assistance. The program used the WHO AMS toolkit to set up hospital AMS programs and applied quality improvement techniques targeting conditions commonly associated with antibiotic misuse—urinary tract infections, upper respiratory tract infections and surgical antibiotic prophylaxis. The chart shows the six hospitals' improvements in WHO AMS core component scores between first and second assessments, which shows their improved ability to implement and sustain AMS.

Figure 3. AMS core element scores across six hospitals in Uganda before and during intervention[17]

SUPPLY CHAIN MANAGEMENT

A pharmaceutical supply chain system should guarantee the uninterrupted flow of quality-assured medicines and other health products from the manufacturer to the end user. Without resilient supply chains, countries cannot meet local health program demands or achieve global goals, such as ending the HIV/AIDS epidemic or responding to emergencies such as the COVID-19 pandemic.

Although LMICs have come a long way in improving access to quality-assured medical products, particularly since the recognition that they need to take a health-systems approach, cross-cutting challenges persist. For example, LMICs generally do not have enough qualified supply chain personnel working in the public sector, nor do they take full advantage of the private sector's competitive costs or best practices. MTaPS helped find supply chain management solutions that foster self-reliance through country-led initiatives.

MTaPS Nepal focused on improving pharmaceutical management at the end of supply chain—the service delivery point—by customizing the evidence-based Supervision, Performance Assessment, and Recognition Strategy (SPARS) developed in Uganda, which strengthens health care worker capacity in managing medicines, including storage, stock management, and dispensing quality. MTaPS and country counterparts piloted the strategy in 347 facilities to find out if it improved medicines management cost-effectively. At the end of the pilot, the facilities' average medicines management score increased by an impressive 109% from baseline, which led to government interest in scaling up the performance-improvement strategy to the rest of the country.

Staff checking medicines at a health facility in Jordan. Photo credit: MTaPS Jordan

100% (9) initially MTaPS-supported supply chain functions are now being carried out by national entities without external assistance in Bangladesh

[17] https://bmjopenquality.bmj.com/content/12/2/e002293

IMPROVING PHARMACEUTICAL PROCUREMENT PROCESSES FOR THE BEST VALUE

Not following good procurement principles such as supplier prequalification can lead to poor prices, services, and product quality. Although decentralizing procurement can allow for more flexible decision making and better response to people's needs, subnational authorities often lack the skills or tools to follow good practices or manage oversight.

In Bangladesh, MTaPS worked with the Directorate General of Health Services to significantly reduce procurement lead time by streamlining roles and responsibilities. For example, MTaPS had discovered that many procurement entities were sending their plans to the wrong authority for approval and moreover that procurement guidelines allowed approvals to be delegated to lower-level staff, but this was not happening. By clarifying responsibilities and adhering to the guidelines, procurement entities reduced procurement package approval times by up to 12 weeks.

To get the best pricing on health products, MTaPS Philippines supported the DOH to establish a framework agreement, pooled procurement, and a medicines price negotiation board. The program also introduced a nationally adopted road map and policies to streamline procurement and other supply chain functions by decentralizing them to local government units. These actions helped reduce unit costs and procurement process lead time, thereby increasing the supply of more affordable products. In Liberia, MTaPS also supported the MOH and the World Bank to establish a framework agreement for counties to procure quality-assured MNCH medicines and supplies from approved wholesalers when the Central Medical Stores are unable to supply them. MTaPS partnered with the government of Nepal to help local governments make informed decisions after they received the authority to procure many MNCH products and essential medicines. MTaPS' recommended using framework agreements, electronic procurement systems, and prime vendors to procure quality goods at a low cost, which the Department of Health Services incorporated into national and local work plans and budgets to ensure long-term implementation.

Using case studies and other examples, MTaPS published a guide on the best practices for the subnational procurement of quality-assured, low-cost MNCH medicines and supplies, which also described three valuable procurement mechanisms: central framework agreements, prime vendor programs, and e-procurement systems.

GENDER INTEGRATION ACROSS MTAPS

When interventions are blind to sex and gender–specific differences, lifesaving interventions may fail to reach certain groups or may even cause unintentional harm. MTaPS, therefore, analyzed sex and gender impacts in pharmaceutical systems to understand and address them, such as in PV, where adverse drug reactions vary by sex (due to metabolism) and by gender (due to exposure). Recognizing these differences is crucial to ensuring equitable access to safe, effective, quality-assured medical products and services and sustainably improving health outcomes for persons of all sexes and genders.

MTaPS increased an understanding of gender issues in PSS among staff and partners through the PSS 101 course and a series of blogs on topics ranging from gender's impact on vaccination to profiles of women leaders fighting AMR in Uganda. MTaPS also addressed the issue in the following ways:

- Conducted sex and gender analyses to gain a better understanding of the differences and their implications for pharmaceutical policy and services.
- Advocated for the routine collection and use of sex- and gender-disaggregated data to inform pharmaceutical policy and services.
- Reviewed national policies and guidelines, such as AMS guides and national medicines policies, to ensure adequate consideration of sex and gender differences.

In addition, MTaPS increased gender equity in PSS governance and leadership by promoting women's membership in technical and oversight groups and in training opportunities. For example, MTaPS' support increased female participation in national-level multisectoral coordination on AMR (MSC-AMR) in 13 countries by 36% between October 2019 and September 2023.[18]

Women reached by MTaPS efforts in strengthening pharmaceutical systems

44% (231,413) TB patients in Bangladesh registered in e-TB Manager are female

77% (6,501) female health workers received in-service training using non-traditional learning platforms

34% (510) women trained in AMR-related topics in leadership/management

[18] More on MTaPS approach towards sex and Gender can be read here : https://www.mtapsprogram.org/resources-focus-area/sex-and-gender/

AMR—CRITICAL COMPONENT OF THE GLOBAL HEALTH SECURITY AGENDA

In 2019, WHO declared AMR a top 10 global health threat, yet many challenges make AMR containment especially difficult in LMICs—from inadequate IPC measures to high rates of inappropriate use of antimicrobials in the human health, animal health, and environment sectors.[19]

The Global Health Security Agenda (GHSA) guides countries' strategies to protect themselves from infectious disease threats and to raise global health security as a national priority. To help countries better contain AMR, one of nine GHSA priorities, MTaPS' system-strengthening approach built in-country capacity to standardize IPC and AMS practices and to strengthen MSC-AMR to be able to follow International Health Regulations on handling public health events and emergencies. Findings from country scoping visits, baseline Joint External Evaluation (JEE) scores, and national- and facility-level assessments guided MTaPS' technical assistance.

MTaPS supported 13 GHSA countries to improve their capacity to advance to higher JEE levels in MSC-AMR, IPC, and AMS using the WHO 2018 JEE and 2019 International Health Regulations benchmarks tools to measure progress (figure 4). Together, the JEE and WHO benchmarks categorize countries' capacities ranging from 1 (no capacity) to 5 (sustainable capacity). Greater capacity enhances countries' ability to effectively control the emergence and spread of AMR as a public health threat.[20]

The GHSA Annual Reports released by the White House in 2021 and 2022 recognized USAID's contributions to strengthening global health security through its MTaPS Program, among other efforts.[21,22]

A mother receiving antibiotics in a Luxembourg hospital in Mali. Photo credit: Timothé Chevaux

GHSA PARTNER COUNTRIES

Bangladesh
Burkina Faso
Cameroon
Côte d'Ivoire
Democratic Republic of the Congo
Ethiopia
Kenya
Mali
Mozambique
Nigeria
Senegal
Tanzania
Uganda

OTHER COUNTRIES

Jordan
Nepal

[19] https://www.who.int/news-room/spotlight/ten-threats-to-global-health-in-2019
[20] More information on countries' progress on capacity levels can be found in the MTaPS GHSA Summary Report :
[21] Fiscal-Year-2021-GHS-Annual-Report_digital.pdf (whitehouse.gov)
[22] Strengthening Health Security Across the Globe (whitehouse.gov)

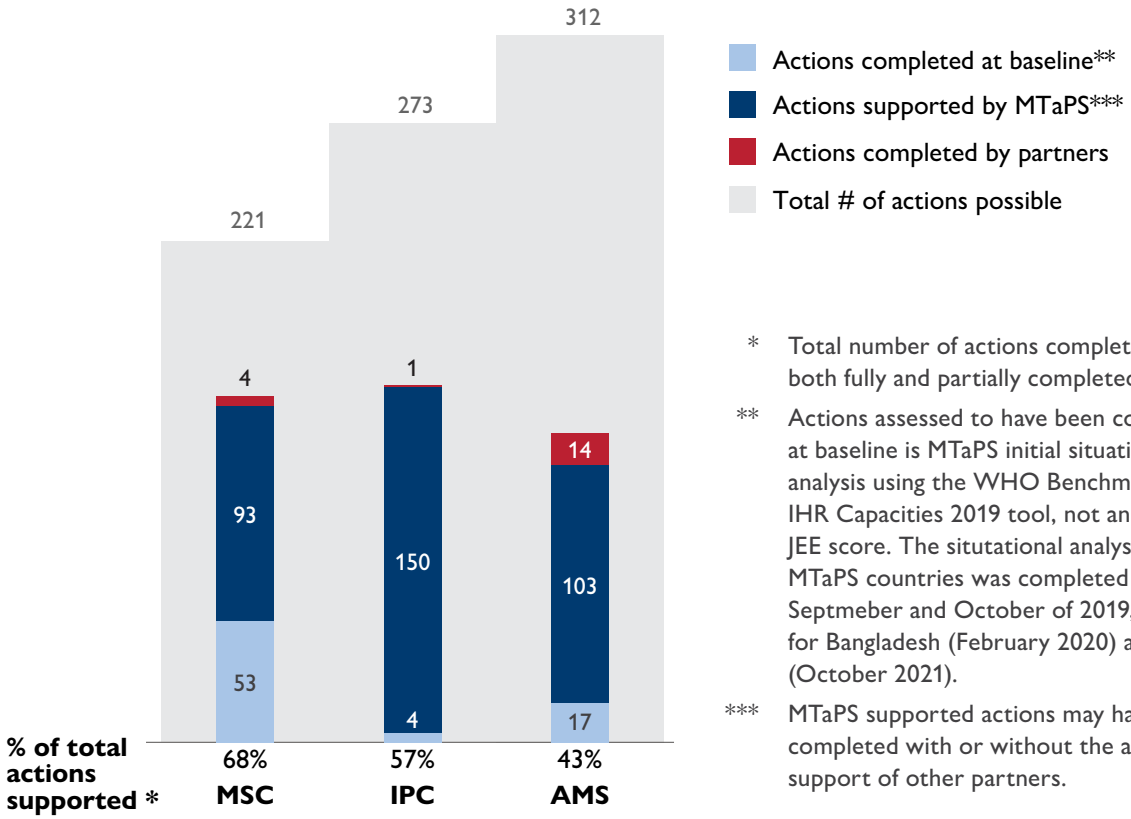


Figure 4. Cumulative number and percentage of WHO benchmark actions completed for MSC, IPC, and AMS in 13 countries as of September 30, 2023

Multisectoral Coordination

AMR cannot be tackled without addressing all its causes, which affect humans, animals, plants, and the environment. The One Health approach, with MSC at its core, provides the mechanisms for countries to successfully implement their national action plans on AMR (NAPs-AMR), including strengthening IPC and AMS practices in both human and animal health. To improve MSC-AMR, MTaPS focused on AMR-related governance bodies' leadership, oversight, coordination, and technical capabilities.

Other efforts involved strengthening AMR-related governance structures and policy frameworks and working with ministries of health, agriculture, and environment to develop, review, update, and implement NAPs-AMR. For example, with MTaPS' support, four countries finalized their first locally led NAP-AMR development, and eight countries reviewed how well existing NAPs-AMR were being implemented. Of these, six countries developed the next iteration of their plans by incorporating review findings and recommendations.[23]

Governance for MSC-AMR strengthened

3 countries established national platforms for governance and coordination of national AMR responses

10 countries developed new or updated terms of reference for multisectoral technical working groups that lead and coordinate AMS and IPC activities

13 countries supported to conduct regular MSC and NAP-AMR review meetings

[23] MTaPS Guiding Principle 6: Support country-led coordination

SHOWCASING MTaPS COMMUNITY WORK IN JORDAN, NEPAL, AND ETHIOPIA

Combating AMR requires contributions from the entire population—not just health care providers. Through focused education programs, media engagement, and community mobilization, Jordan, Nepal, and Ethiopia are making strides to lessen AMR and safeguard public health for future generations. In Jordan, MTaPS worked with the MOH to develop inclusive initiatives, such as the Communication and Awareness for School Students program, to help shape students' behavior on how to use antimicrobials; 30 awareness sessions reached 30 health educators and 2,700 students, 52% of whom were female. By empowering young people with knowledge and awareness about AMR's deadly threat, Jordan is taking important steps to foster a culture of responsible antimicrobial use from an early age.

Recognizing the media's influential role in public perception, MTaPS conducted workshops to equip Nepali journalists with accurate information to encourage responsible coverage of AMR. The training substantially increased journalists' AMR knowledge from 25% to 78%, supplying them with confidence to report intelligently on the issue. This intervention led to an impressive surge in media coverage—over 200 evidence-based news reports on AMR in newspapers, TV, radio, and social media. This success prompted the Lumbini Province Health Secretary to dedicate budget funds specifically for AMR awareness, which showed strong commitment to addressing the threat.

Civil society organizations can also mobilize community members in the fight against AMR. In Ethiopia, the USAID MTaPS program and the Addis Ababa Women Federation and Ethiopian Youth and Women Federations partnered to integrate AMR and appropriate medicine use education into existing health programs targeting women and youth. By using community structures and empowering 29 federation volunteers with AMR knowledge, this initiative reached 520 women. These grassroots efforts from Jordan, Nepal, and Ethiopia highlight how different community segments can combat AMR and stress targeted education's vital role in empowering individuals to take practical measures against this global threat.

"After this eye-opening training, I realized that everything we consume, from farm to table, is being affected by the misuse of antimicrobials. The very food we offer to improve our children's diet may inadvertently be endangering their health, turning into a slow poison. To secure our children's future, I am committed to take up this issue seriously and use my media platform to advocate for the rational use of antimicrobials and educate the public to fight against AMR."

Ms. Shrijana Thapa, Journalist, "Deukhuri Today" Local Newspaper, https://deukhuritoday.com/, Dang, Lumbini Province, Nepal

BRINGING THE ANIMAL HEALTH SECTOR UP TO SPEED IN THE FIGHT AGAINST AMR IN UGANDA, BURKINA FASO, AND THE DRC

In Uganda, the 20-year-old essential veterinary medicines list was revised and updated and guidelines formed on infection prevention and antimicrobial use in 5 animal production sectors, including cattle, sheep and goat, piggery, poultry, and fish. Similar guidelines were developed in Burkina Faso to optimize antimicrobial use in the country's livestock sector. To reinforce these initiatives, MTaPS facilitated training sessions and the dissemination of more than 5,000 printed copies of the guidelines in Burkina Faso and organized 6 dissemination workshops in Uganda's high animal production districts. In the DRC, MTaPS adapted WHO tools for assessing IPC at farms, pioneering the application of human health tools within the animal health sector.

INFECTION PREVENTION AND CONTROL

Poor IPC practices have a major effect on AMR, and in LMICs, IPC awareness and systems are generally poor in both the human and animal sectors; for example, weak IPC programs at the national and facility levels is evidenced by a high prevalence of health care-associated infections (average 15.5%).[24] MTaPS collaborated with stakeholders to advance IPC standards and practices in multiple countries, revising and implementing country-specific IPC guidelines, developing and implementing guidance for health care-associated infection surveillance and control in 5 countries, and drafting and carrying out 6 national IPC plans.[25] MTaPS assisted countries to adopt or adapt WHO tools and strategies to strengthen their national IPC programs. Specifically, 8 countries began monitoring their national IPC programs through repeat assessments using the WHO national IPC assessment tool 2 (IPCAT2). All 8 improved their IPC core components mean scores:

		IPC Program	IPC Guidelines	IPC Education & Training	HAI Surveillance	Multimodal Strategies	Monitoring/audits of IPC practices & feedback
Bangladesh	**Baseline** Jan 2020	66	81	10	0	10	28
	Repeat May 2023	74	97	10	21	45	44
Cameroon	**Baseline** Sep 2019	17	6	4	8	18	8
	Repeat Dec 2022	57	44	37	30	50	33
Côte d'Ivore	**Baseline** Jun 2020	57	50	70	81	75	61
	Repeat Jul 2021	73	92	100	85	100	89
DRC	**Baseline** Jun 2020	38	33	47	0	0	0
	Repeat Feb 2024	74	64	18	0	35	58
Ethiopia	**Baseline** Oct 2019	48	83	41	5	33	56
	Repeat Mar 2022	88	83	70	5	58	67
Mali	**Baseline** Jan 2020	43	72	38	13	25	6
	Repeat May 2021	61	75	60	13	50	19
Mozambique	**Baseline** Mar 2021	57	81	90	0	100	86
	Repeat Mar 2022	70	92	100	3	100	86
Senegal	**Baseline** Feb 2020	55	47	33	5	58	28
	Repeat Jun 2021	60	65	60	15	88	50

≥+25% Score difference between Baseline and Repeat

<+25% Score difference between Baseline and Repeat

Figure 5. Baseline and repeat scores on IPCAT2 core components for eight countries[26]

[24] Allegranzi B, et al. Burden of endemic health-care-associated infection in developing countries: systematic review and meta-analysis. The Lancet. 2011;377(9761):228–241.

[25] An example of advancing IPC practices in Uganda can be found in this blog on the MTaPS website: https://www.mtapsprogram.org/news-blog/designing-and-implementing-a-continuous-quality-improvement-approach-to-advance-infection-prevention-and-control-in-uganda/.

[26] IPC-related resources discussing countries' IPCAT scores can be found here on the website: https://www.mtapsprogram.org/resources/.

"The capacity building support provided by MTaPS in infection prevention and control was very beneficial. We want to thank UNICEF, MTaPS, and our hierarchy for all their efforts. With these new skills and knowledge, we'll be more productive and can reach the objectives of the Ministry of Health and Social Action to contain the pandemic."

Captain Idrissa Ndiaye, head of the Regional Hygiene Brigade in Thiès, Senegal

In collaboration with ministries of health, MSC bodies and their technical working groups (TWGs), and other stakeholders, MTaPS provided supportive supervision and mentorship to IPC committees to better manage IPC programs at health facilities. MTaPS supported 183 health care facilities across 12 partner countries to implement IPC interventions using standardized approaches and tools. The program helped set up IPC committees in 116 facilities (63%) and revitalized and strengthened existing ones in 67 facilities.

MTaPS also worked with in-country stakeholders to train 17,229 health care workers (37% female) on IPC topics in 12 countries and disseminated standardized guidance, tools, and informational materials.

Out of the 71 facilities that had at least one repeat assessment (using WHO's IPC Assessment Framework), 46 (65%) moved up by one or more capacity levels compared with the baseline; 28 (39%) rose by one capacity level compared with the baseline; and 18 (25%) rose by two capacity levels. Among the 21 (30%) health care facilities that remained within the same capacity level, 19 (27%) scores rose and only 3 (4%) facilities regressed to a lower capacity level than at baseline.

Antimicrobial Stewardship

AMS encompasses actions that promote appropriate antimicrobial use from the global to individual level and in the human and animal health, agricultural, and environmental sectors. Barriers to instituting AMS in LMICs include lax regulation and enforcement of antimicrobial use in humans and animals, limitations in the ability to systematically track antibiotic use, and lack of clinician training in these areas.

IPC governance strengthened

4 countries established national IPC TWGs

160 (94%) facilities supported by MTaPS developed and implemented quality improvement plans

155 (91%) facilities supported by MTaPS monitored IPC using standardized tools

AMS strengthened

146 (92%) MTaPS- supported facilities developed and strengthened quality improvement plans to boost AMS capacity and improve antibiotic use

8 countries incorporated WHO AWaRe categorization into their national essential medicines lists and 5 countries into their standard treatment guidelines.

Cleaner in Hôpital Général Idrissa Pouye, Senegal.
Photo credit: Phototigui

Nationally, MTaPS worked with 4 countries to draft AMS-specific national plans for the human health sector and 2 countries for the animal health sector. These documents provide country-specific road maps for promoting appropriate medicine use. In addition, MTaPS supported national MSC bodies and AMS TWGs in 10 countries to map existing AMS-related multisectoral legislation and regulation that would need to be revised to advance medicines-use policy and guidelines.

Monitoring antimicrobial consumption at various levels and sectors within a country is crucial for understanding usage patterns, developing and implementing strategies to modify usage, and tracking progress. MTaPS collaborated with stakeholders to conduct national antimicrobial consumption analyses in the DRC, Tanzania, and Uganda; while in Uganda, MTaPS supported the National Drug Authority to develop a framework and guidelines for continuous multisectoral antimicrobial consumption surveillance. Similar usage assessments in individual health facilities are called point prevalence surveys. In Côte d'Ivoire and Kenya, MTaPS worked with the national AMS TWG to develop local protocols to guide point prevalence surveys on antibiotic use and to conduct surveys in 33 health care facilities across 5 countries—Burkina Faso (1), Kenya (3), Nigeria (7), Tanzania (9), and Uganda (13). The program worked with country counterparts to publish articles in peer-reviewed journals on national antibiotic consumption assessments (Tanzania and Uganda) and point-prevalence surveys (Tanzania and Uganda).

Another important tool is WHO's Access, Watch, and Reserve (AWaRe) classification to promote treatment of common infections with antibiotics with low resistance potential and deter the use of more resistance-prone medicines. AWaRe is used to track appropriate use in health facilities, as well as in countrywide consumption.

Dr. Innocent in his office at the University Teaching Hospital of Kigali, Rwanda (CHUK). Photo credit: Asadullah Azad

INSTITUTIONALIZING AMS SUPPORTIVE SUPERVISION IN TANZANIA

MTaPS supported Tanzania to integrate the WHO health facility AMS checklist into the national Afya Supportive Supervision System (AfyaSS) digital platform, which enhanced supervision of AMS activities in health care facilities. Through AMS supportive supervision at 10 facilities, improvements were observed in monitoring antibiotic use and budget allocation for AMS interventions. The data collected through this process were incorporated into the AfyaSS platform, facilitating the institutionalization and sustainability of MTaPS stewardship efforts. This system-based approach ensures efficient reporting of AMS data and further strengthens AMS practices nationwide.

ENGAGING FUTURE HEALTH PROFESSIONALS ON AMR CONTAINMENT IN UGANDA

To raise AMR awareness among future health care workers, MTaPS supported Uganda's national AMR subcommittee and the country's pharmaceutical society to hold symposia for more than 1,000 students from 7 universities. The participating students went on to create AMR interest groups at each of the universities. The groups, which now boast more than 2,300 members (July 2023), have coordinated activities which include educating patients in hospital wards, producing articles for a medical journal and the Uganda One Health AMS newsletter, applying for AMR-related research grants, creating short online videos, participating in radio talk shows, and organizing social media campaigns and community walks to raise AMR awareness. Their dedication has resulted in an estimated $173,000 in awards and grants.

"It is important that [future health professionals] know the global challenges before they graduate and the challenges in Uganda as key stakeholders. As a country, we are realizing the importance of One Health concept."

Dean of the Faculty of Medicine, Mbarara University of Science and Technology

Supported African Medical Devices Forum (AMDF) to build capacity in regulation of MNCH medical devices through development and dissemination of guidance,

in a webinar of **42** participants and **17** African NRAs, and its use in building capacity of **22** medical devices assessors from **10** national regulatory authorities

AMR AWARENESS AND KNOWLEDGE

MTaPS also built the capacity of future health workforces, established structures to sustain capacity development of health workers and health facilities, and engaged civil society and journalists to raise awareness of the risks and prevention of AMR.

In 10 countries**,** the program helped country partners develop AMR training packages, courses, curricula, and e-Learning modules and platforms and make them accessible to health workers and the public. AMR content was incorporated into the curriculum for the new master's degree program for Infectious Diseases and AMR at the University of Buea in Cameroon. In Ethiopia, Kenya, and Tanzania, the courses were linked to continuous professional development credit for professional relicensure and delivered through professional associations. Other countries, such as Jordan and Uganda, are seeing the benefit of engaging with even younger students.

Centers of excellence were established with MTaPS' technical guidance at hospitals in four countries as an innovative way to provide training, supportive supervision, and mentorship to other health facilities; in Uganda, a tool was designed to assess and standardize hospital designation as centers of excellence and an online repository was created for AMS and IPC tools, knowledge, and expertise to help sustain AMR containment efforts.

PREVENTING MATERNAL AND CHILD DEATHS

MTaPS supported USAID's commitment to ending preventable maternal and child death by working to highlight the need for consistently accessible MNCH medical products and services, to raise awareness of access barriers, and to provide technical assistance to reduce these barriers at both the global and country levels.

A country must register a medicine or health product before allowing it on their market, and registration backlogs can restrict the availability of lifesaving medicines. In Improving Access to Maternal, Newborn, and Child Health Medical Products in Low- and Middle-Income Countries: Considerations for Effective Registration Systems, MTaPS analyzed the registration status of MNCH medicines in nine countries, summarized major challenges, and provided solutions. Together with AUDA-NEPAD, MTaPS went on to develop a call to action for LMICs

to prioritize the registration of MNCH medicines and presented it at the AMRHI week in Maputo in October 2024.[27] Access and appropriate use of amoxicillin for pneumonia, a major killer of children under five, is still problematic in many countries, and MTaPS developed a call-to-action paper addressing key bottlenecks in access to and appropriate use of amoxicillin and presented it at the 2nd Global Pneumonia Forum in Madrid in April 2023.[28]

Oxygen is a key part of pneumonia management, and its quality is often overlooked. MTaPS developed a technical resource on quality assurance of oxygen to ensure that safe-quality oxygen is administered to newborns and children, and it was widely disseminated in a WHO meeting to 62 member states and 69 partners.[29]

In the DRC, MTaPS supported significant improvements in the availability of essential MNCH medicines; for example, the DRC registered 56 quality-assured MNCH and reproductive health/family planning medical products with MTaPS support and increased the percentage of registered MNCH products on the country's essential medicines list from 17% to 79% over 2 years.

MTaPS trained 323 health community leaders and chief nurses and 1,017 community-based organization members to improve availability and storage of MNCH medicines as part of an effort to empower community members to be whistleblowers when they see that health commodities are being mismanaged. Additionally, the program collaborated with central and provincial officials to develop and distribute MNCH protocols and job aids at 170 facilities and community MNCH programs in Nord Kivu and Ituri provinces for health care workers to use pharmaceutical products appropriately to treat potentially fatal conditions, such as postpartum hemorrhage, eclampsia, and pneumonia.[30]

"We are very happy about MTaPS' support. We had lost many patients in the past due to a lack of knowledge and protocols/job aids to assist and guide the management of patients, especially the administration of medicines such as magnesium sulfate. For example, two pre-eclamptic women died due to the fact that health providers didn't know how to use magnesium sulfate, whereas this product was available. But today, with the support from MTaPS, we can no longer make such mistakes and errors as we have all the needed guiding protocols and job aids."

Dr. Patrick Basara, Head of Rwampara Health Zone in Ituri, DRC

Baby receiving oxygen in Jordan. Photo credit: MTaPS Jordan

29 **COVID-19 e-Learning modules** developed in English and French (some accessible on LeaderNet.org)

6,254 **health facilities** supported by MTaPS for IPC and/or WASH for COVID-19

[27] Why African countries should prioritize the registration of maternal, newborn, and child health medical products: a call to action - The Medicines, Technologies, and Pharmaceutical Services (MTaPs) Program

[28] https://www.mtapsprogram.org/our-resources/call-to-action-expanding-access-to-medicines/

[29] https://www.mtapsprogram.org/our-resources/quality-assurance-practices-for-medical-oxygen-systems-technical-resource-for-distribution-and-facility-level-medical-oxygen-systems/

[30] How Pharmaceutical Systems Strengthening Benefits Maternal, Newborn, and Child Health Care Services - The Medicines, Technologies, and Pharmaceutical Services (MTaPs) Program (mtapsprogram.org)

COVID-19

In the early months of the pandemic, strong IPC practices were essential to slow the spread of the virus, protect health care workers and the public, and maintain critical health services. Establishing a reliable supply chain for personal protective equipment and other IPC products was both urgent and difficult, with rising global demand and resulting shortages. As COVID-19 vaccines became available, the rollout presented yet another challenge due to the unprecedented scale, required speed, and unclear cost of vaccinating so many people in such a short time, which required improved planning, capacity, and collaboration. MTaPS' strategy for increasing countries' capacity to respond to the COVID-19 pandemic centered on reinforcing existing health systems, leveraging established infrastructure and expertise, and encouraging collaborative cross-country knowledge exchange.[31]

In Jordan, safety data on more than **400,000 COVID-19 vaccine recipients** were analyzed to enhance public confidence in COVID-19 vaccines

MTaPS' systems-strengthening work paid off during the COVID-19 pandemic, particularly the MSC and IPC strengthening done as part of the GHSA. Countries where MTaPS had previously helped strengthen pharmaceutical systems were better equipped to respond to the global health crisis. In addition, MTaPS supported international efforts to estimate the cost of COVID-19 vaccination programs needed for planning.

Group photo during the donation of COVID-19 equipment in Senegal. Photo credit: Phototigui

MTaPS COVID-19 COUNTRIES

- Bangladesh
- Burkina Faso
- Cameroon
- Côte d'Ivoire
- Ethiopia
- Jordan
- Kenya
- Madagascar
- Mali
- Malawi
- Mozambique
- Nigeria
- Philippines
- Rwanda
- Senegal
- Tanzania
- Uganda

[31] MTaPS guiding principle 3: Build on and strengthen existing systems

IMPROVING EFFICIENCY OF INTEGRATED DIAGNOSTIC SERVICES IN MADAGASCAR

Diagnostic services for infectious diseases in LMICs are typically siloed by disease programs, but when the pandemic struck, this weakness hampered access to COVID-19 diagnostic tools. In Madagascar, MTaPS supported the Ministry of Public Health to develop an action plan for networking peripheral laboratories with the Central Medical Laboratory to streamline the diagnostic process for COVID-19 and other diseases such as TB and HIV. The new network design was based on a rapid situational analysis and mapping of diagnostic facilities and equipment, laboratory information systems and data flows, and human resource capacities. Laboratory product supply inefficiencies were addressed by establishing standardized processes to quantify and procure supplies for the newly adopted diagnostic network. To ensure sustainability, MTaPS developed training materials for laboratory supply management, COVID-19 rapid diagnostic testing techniques, and the use of harmonized electronic registers and data entry into DHIS2.

In its COVID-19 activities, MTaPS built upon its multisectoral networks and expertise in IPC and PSS to help countries rapidly build health workforce and institutional capacity to prevent and manage infections, establish and strengthen emergency supply chains for COVID-19 IPC products, strengthen regulatory and safety systems to introduce vaccines, and provide vaccine logistics support.

"Just-in-time" COVID-19-focused IPC training and mentorship programs were built on structures and materials developed during prior MTaPS work. Establishing local ability to manage e-Learning platforms allowed many people to receive training quickly through interactive modules on COVID-19 IPC and related topics. In addition, in Bangladesh, a COVID-19 supply quantification tool and COVID-19 eLMIS were developed, rolled out, and integrated into the Directorate General of Health Services management information system, enabling real-time monitoring of emergency commodity stocks across health facilities and pharmacies to help prevent stockouts.[32],[33]

HIV/AIDS

The international community committed to ending the AIDS epidemic by 2030, and in 2022, the US President's Emergency Plan for AIDS Relief launched a strategy to achieve that goal.[34] By building resilient pharmaceutical systems, MTaPS contributed to providing safe access to HIV diagnostic, preventive, and treatment tools needed to end HIV/AIDS as a global public health threat.

In Mozambique, MTaPS helped test an active safety monitoring system for a new treatment—tenofovir + lamivudine + dolutegravir—in nine health care facilities. This included development of a surveillance protocol and digital solution—OpenRIMS-PV—and training for more than 370 personnel. Over its lifetime, the trial enrolled more than 3,000 people living with HIV, and in total, 149 adverse events were reported among 105 study participants. Building on this experience, the monitoring system was adapted for new TB-preventive treatment regimens in people living with HIV, and as of June 2023, more than 450 patients had been enrolled in active surveillance across 5 facilities, meeting the target of 14 combined study sites.

To increase the number of safe products on the market in Tanzania, including antiretrovirals (ARVs), MTaPS trained more than 100 regulators to streamline the product registration process and carry out PV functions. Having more trained assessors significantly reduced the timeline for registering medicines, from 240 to 180 days, which increased the number of the country's registered medicines, including ARVs, from 5,434 in 2021 to 7,458 by December 2023. In addition, the additional PV experts eliminated backlogs of 100 product safety reports and 20 risk management plans.

[32] http://covidelmis.dghs.gov.bd/
[33] https://www.mtapsprogram.org/news-blog/digitalization-of-covid-19-commodities-supply-management-strengthens-health-delivery-in-bangladesh/
[34] https://www.un.org/en/academic-impact/countries-commit-action-end-aids-2030

EBOLA VIRUS DISEASE, TB, MALARIA, AND MPOX

In addition to COVID-19 and HIV/AIDS, MTaPS helped strengthen systems to manage other infectious diseases, including Ebola virus disease, TB, malaria, and Mpox. MTaPS' Ebola activities spanned multiple countries and included creating national management guidelines and conducting simulation exercises at border entry points. In Senegal, following a neighboring country's Ebola outbreak, MTaPS collaborated with other ministries and other MOH health emergency partners to develop and implement the national Ebola preparedness and response plan. MTaPS Mali supported the use of WHO's Ebola scorecard to assess Ebola management capacity at 7 health district referral centers; helped develop action plans; and provided training, visual aids, and videos. All centers implemented their action plans, with 5 moving their scores from the intermediate to the advanced level. In TB management, MTaPS created an eLMIS for TB commodities in Bangladesh used to track 870 TB commodities, which enables real-time stock visibility in all 485 subdistrict stores; additionally, rollout of the digital e-TB Manager, which links patient data across all 868 public-sector treatment sites, reduced reporting time from around two months to a few minutes, and the government took full ownership of the tool. The Janao app captures patient information from private-sector TB sites, which reduces cases lost to follow-up. For mpox, MTaPS collaborated with the MOH in the DRC, organizing trainings on IPC and WASH for health supervisors, workers, and community members in 46 facilities in the 2 provinces with highest Mpox deaths.

Group photo during the donation of COVID-19 equipment in Senegal. Photo credit: Phototigui

THE FUTURE OF PHARMACEUTICAL SYSTEMS STRENGTHENING

Over the life of the program, MTaPS worked to continually reinforce the concept that supply chain management is just one component of the overall pharmaceutical system—an understanding needed to prevent neglect to other critical system components. Below are some important considerations for the direction of PSS.

GOVERNANCE

- Medicines regulatory systems are crucial gatekeepers that ensure equitable access to safe and efficacious medicines and health products. They are especially important for rapidly and safely introducing new medicines and vaccines and managing regional manufacturing of products such as those needed for a pandemic response. Investments in strengthening NRAs should be guided by WHO GBT standards, in addition to results of PSS analyses of specific public health priorities such as MNCH and gender mainstreaming. Continuing to expand digitalization will increase NRAs' ability to register lifesaving products and conduct surveillance in areas such as PV and antimicrobial usage.
- Functional One Health MSC platforms are needed to carry out the GHSA, including for pandemic preparedness and the health effects of climate change; however, they need sustained access to government resources and mechanisms for public accountability.[35] Linking a country's AMR policies to UHC, primary health care, and vertical infectious disease programs, as well as persistent advocacy, will help cement political commitment to AMR and facilitate policy implementation and regulatory enforcement.

REGULATORY SYSTEMS

- Assisting countries to improve their regulatory systems will help them achieve total market control and enforcement of compliance. The global metric tool, the WHO GBT, can be used to continually assesses NRAs' implementation of their Institutional Development Plans and progress toward ML 3 and onward to ML 4.

Mother and child visiting CHUK for a checkup. Photo credit: Asadullah Azad

- Work with leading NRAs can result in regulatory systems that are strong enough to make them candidates for consideration as WHO-listed authorities.
- It is important to advance regulatory capacity and create opportunities innovation in the way regulatory services are delivered, applying technology and artificial intelligence.

INSTITUTIONAL AND HUMAN RESOURCE CAPACITY

- Growing and maintaining national pharmaceutical sector capacity requires a multisectoral effort to develop national pre-service and in-service curricula that show, for example, how the supply chain fits into the pharmaceutical system and highlight emerging priorities such as those related to gender equity and disability inclusiveness. For continuing education, e-Learning and virtual training are both cost-effective and sustainable ways to improve local knowledge on PSS, One Health, and AMR.

[35] USAID's Climate Strategy includes AMR as one of the impacts on Human Health. https://www.usaid.gov/sites/default/files/2022-11/USAID-Climate-Strategy-2022-2030.pdf

- Strengthening capacity sustainably requires a multipronged approach, such as (1) a mentorship model, where PSS champions and experts work with national and subnational organizations to implement PSS-related strategies; (2) a coached-collaboration model, where technical assistance decreases as national counterparts increasingly identify data-driven, locally appropriate solutions to address PSS challenges; and (3) a regional and country network model that uses peer-to-peer knowledge exchange groups, regional and in-country networks, and global communities of practice such as Joint Learning Network for Universal Health Coverage and People that Deliver.

AVAILABILITY AND USE OF PHARMACEUTICAL INFORMATION FOR DECISION MAKING

- While the potential of AI is exciting, the maturity of many LMICs' health-sector data use is still at the problem-solving rather than problem-prevention level. Immediate investments in pharmaceutical management information systems should focus on data quality assurance mechanisms, including audits to ensure reliable data, interoperability between eLMIS and other health information systems such as DHIS2, and automated data processing.
- The PSS Insight tool and its indicators should be incorporated into national pharmaceutical structures (i.e., monitoring and evaluation plans, strategic plans, key performance indicators) and routinely and explicitly linked to pharmaceutical system decision-making processes.

PHARMACEUTICAL FINANCING, RESOURCE ALLOCATION, AND USE

- Optimizing resource allocation for PSS interventions requires countries to be able to estimate expenditures in service-delivery models—especially to plan for the introduction of new products such as medicines and vaccines. Creating realistic cost estimates requires institutionalized systems to collect data on past and current expenditures, which LMICs generally lack.
- All countries, but particularly LMICs, need to evaluate the public health benefits and value of new medical technologies to set priorities for public spending and achieving UHC. These decisions can be easily swayed by outside influence; however, a strong regional or national HTA body guides health priority setting and resource allocation through an evidence-based, systematic—and importantly—transparent process. Governments, donors, and global health organizations should develop sustainable funding models for HTA activities and facilitate knowledge exchange and collaboration on HTA best practices in priority setting for UHC.

PHARMACEUTICAL SERVICES, PRODUCT AVAILABILITY, AND PATIENT-CENTERED CARE

- Recent advances in treating HIV and TB and the development of vaccines for COVID-19, malaria, and mpox highlighted the need for comprehensive national PV systems and electronic platforms that support active safety surveillance of medicines and vaccines; user-friendly reporting interfaces for health care workers and the public; and adverse drug reaction report review, feedback, and follow-up. Such systems should be integrated into an NRA's product safety surveillance system and should address sex and gender factors. Based on country GBT findings, an NRA should develop PV road maps to address identified gaps and use a stepwise approach to improve capacity of reporting, data analysis, and feedback.
- The global AMR crisis requires extensive actions at the health service delivery, provider, and patient level. Many LMICs have successfully piloted facility-based AMS programs with quality-improvement mechanisms to improve the prescription and use of antimicrobials, which must be scaled up.
- The COVID-19 pandemic painfully illustrated the vulnerability of global supply chains. To decrease countries' total dependence on global supply during public health emergencies, investments must be made in localized manufacturing of essential IPC products, including personal protective equipment, hand rubs, disinfectants, waste management products, and vaccines. Strong local and regional markets for essential medicines and products will benefit national health programs.

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Dr. Hervé Boni at the Syncassci Pharmacy in Côte d'Ivoire. Photo credit: Timothé Chevaux

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